

**PUBLIC REVIEW DRAFT
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**SANTA ROSA
CITYWIDE CREEK MASTER PLAN**



The City of Santa Rosa
The County of Sonoma
The Sonoma County Water Agency

November 2006

EXECUTIVE SUMMARY

The Citywide Creek Master Plan presents a set of creek-related policies and recommendations for site-specific improvements to the nearly ninety miles of creeks that flow through Santa Rosa.

Development of the Master Plan was guided by an enormous amount of community interest and input, from public workshop and creek tour participants, creek stewards, neighbors, educators, activists, local businesses, non-profit organizations, and local, state, and federal agencies. The project team has made every effort to remain faithful to the vision that was expressed by the community.

Creek-related policies from several previous planning documents, including the Santa Rosa Creek Master Plan (1993), Santa Rosa Waterways Plan (1996), and the Santa Rosa 2020 General Plan (2002), have been reorganized into the Citywide Creek Master Plan.

It is expected that the Master Plan will be periodically updated and amended to reflect changing conditions and new opportunities that would increase the benefits that creeks provide to the community.

Recommended habitat preservation, enhancement, and restoration projects, and improvements to the creekside trail system are presented conceptually and specifically by watershed. Project recommendations are based on community input, literature reviews, and extensive field survey work. Site-specific recommendations are presented in the text and on a set of Geographical Information System-based maps, organized by watershed area.

Implementation of the Master Plan will occur over several years, perhaps decades, and will be accomplished through partnerships with citizens, organizations, agencies, and the development community. Project funding will come primarily from grants or other funding sources designated for restoring fish and wildlife habitat and for improving creekside recreation, access, and transportation opportunities.

Our local creeks have the potential to enhance our hearts, our minds, our health, our connections to each other and with the natural world. It is up to all of us who live, work, and play in Santa Rosa to each do our part to help make the vision expressed in this Plan become a reality.

CITYWIDE CREEK MASTER PLAN

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SONOMA COUNTY BOARD OF SUPERVISORS (list members)

SANTA ROSA PLANNING COMMISSION (list members)
WATERWAYS ADVISORY COMMITTEE (list members)

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Appendices are contained within a separate volume.

1. INTRODUCTION



“Rivers run through our history and folklore, and link us as a people. They nourish and refresh us and provide a home for dazzling varieties of fish and wildlife and trees and plants of every sort. We are a nation rich in rivers.”

--Charles Kuralt

CHAPTER 1. INTRODUCTION

We have the tremendous fortune of living along a network of creeks and waterways, rich with plant and animal life and cultural history. No matter where you live in Santa Rosa, creek waters flow nearby. Keeping these riparian corridors healthy and clean is important for all of us. Our creeks are habitat for native plants and wildlife, including otters, turtles, insects, and steelhead trout. Our creeks also carry rainwater from winter storms to the Russian River and out to the Pacific Ocean. Santa Rosa is unique in that the majority of our creeks remain above ground, serving as welcome greenways and open spaces within a growing urban area. Pathways along creeks provide opportunities for walks, bike rides, and educational outings. Healthy and natural creek areas enhance the economic value of neighborhoods, and provide a peaceful place for urban dwellers to relax and unwind. People have been drawn to creeks for centuries, and our local waterways have sustained generations of many different cultures.

Our community takes great pride in our creeks, and we are intent on keeping them healthy and vital.

1.1. GENERAL PLAN IMPLEMENTATION

Policy OSC-D-13 of the Santa Rosa 2020 General Plan states the following:

“Develop a Citywide Creek Master Plan that will identify opportunities for natural habitat restoration, enhancement of fisheries, protection of health and safety along creek channels, open space preservation, multi-use transportation routes, and recreation. The Plan will include text with a citywide creek map with proposed restoration concepts and associated text with a description of each creek, and in some cases, specific reaches. The Waterways Advisory Committee will phase the Plan to most effectively preserve and enhance existing resources.”

The purpose of the Master Plan is to implement the General Plan and to provide guidelines, policies, and criteria for the protection, care, management, restoration, and enhancement of waterways in Santa Rosa. This document, as well as the Santa Rosa Design Guidelines, should be consulted any time a question of protecting, restoring, or enhancing waterways arises, and whenever development is proposed adjacent to a waterway. The Citywide Creek Master Plan, along with updates to the Santa Rosa Design Guidelines, supercedes the Santa Rosa Creek Master Plan, and the Santa Rosa Waterways Plan.

This Master Plan embraces the concept that waterways are important for multiple uses: drainage and flood control, fish and wildlife habitat, and recreational and educational opportunities, open space and alternate transportation routes. It also acknowledges that many waterways are located on private property, and that private landowner rights must be respected.

1.2. THE VISION

“Santa Rosa Creek is a vital, central focus of the community; a place where fish, plants, and animals thrive; a place where children can play safely and where busy adults relax; a place where people walk, jog, and ride bicycles and horses; a place where recreation,

shopping, and dining merge and flourish; and a place where residents gather for celebrations, entertainment and to learn more about their environment.”

So states the Santa Rosa Creek Master Plan, adopted by the City of Santa Rosa, County of Sonoma, and the Sonoma County Water Agency in 1993. The Citywide Creek Master Plan aims to expand this creekscape vision to all of the creeks in Santa Rosa, for all of our citizens to enjoy.

1.3. CREEKS IN SANTA ROSA

The Citywide Creek Master Plan area includes the portions of the Laguna de Santa Rosa watershed that are within the 45.5 square mile Urban Growth Boundary surrounding the City of Santa Rosa in Sonoma County, California (Figure 1). The Master Plan will address the nearly ninety miles of creeks that flow through Santa Rosa. Generally, creeks begin in the eastern foothills, drop down to the urban area, and gradually make their way across the Santa Rosa Plain to join the Laguna de Santa Rosa, and ultimately the Russian River and Pacific Ocean.

Santa Rosa Creek headwaters are on the northwestern slope of Hood Mountain and then tumble through a canyon which roughly parallels Los Alamos Road. The Creek enters the Valley of the Moon and begins its westerly journey through the City of Santa Rosa and then through agricultural lands before joining the Laguna de Santa Rosa north of Sebastopol. From headwaters to its confluence with the Laguna, Santa Rosa Creek flows approximately twenty-two miles. Main tributaries include Brush Creek, Matanzas Creek, and Piner Creek. Smaller tributaries include Ducker Creek, Austin Creek, Skyhawk Creek, Oakmont Creek, Rincon Creek, College Creek, Russell Creek, Steele Creek, Coffey Creek, Paulin Creek, Poppy Creek, Pomo Creek, Cooper Creek, Indian Creek, Peterson Creek, Forestview Creek, Spring Creek, Arroyo Sierra Creek, and Lornadell Creek.

There are several creeks that flow through the southern portion of the Master Plan area, including Colgan Creek and Roseland Creek. Colgan Creek begins in the foothills near Taylor Mountain, down to Petaluma Hill Road, and then flows westward across Highway 101 towards the Laguna de Santa Rosa. Roseland Creek begins near the Northwest Pacific Railroad, and flows westward until it meets the Laguna. Naval Creek, Gravenstein Creek, Irwin Creek, Countryside Creek, and Old Cooper Creek also flow through Southern Santa Rosa towards the Laguna. Todd Creek, along with tributaries Hunter Creek and Moorland Creek, flows south before turning west towards the Laguna.

At the time of European settlement, the Citywide Creek Master Plan area was populated by the Southern Pomo. The Southern Pomo were hunter-gatherers and settled in permanent villages. In 1837, Maria Carrillo settled in an adobe house on Santa Rosa Creek near Farmers Lane. This was the first enduring non-Native American residence in the area. The City of Santa Rosa is built on land designated for the purpose by Julio Carrillo (Maria's son) and Barney Hoen, an early settler. Luther Burbank, noted horticulturalist, made his home at the confluence of Santa Rosa and Matanzas Creeks.

Santa Rosa's creeks have changed a great deal over the past century. After the devastating 1906 earthquake, which leveled several blocks of downtown, debris and rubble was pushed into Santa Rosa Creek, filling the flood plain terrace and resulting in steeper banks. Industry located along the creek, including the Grace Brothers Brewery

upstream of Railroad Street. Gas and oil production plants, and later, drycleaning facilities, contributed contaminants to the surrounding soil and groundwater.

Some waterways in Santa Rosa have remained relatively natural. Several of these natural creeks are protected by major flood control detention basins such as Spring Lake and Matanzas Creek Reservoir. However, historic flooding during the 1950s and 1960s resulted in the channelization of many miles of Santa Rosa's waterways as part of the Central Sonoma Watershed Project, to protect against future flooding. Most channelization projects occurred with little emphasis placed on protecting the ecological functions of streams. As a result, water moves efficiently through channelized waterways; but at a cost to fish and wildlife, particularly steelhead trout, which is listed as Threatened under the federal Endangered Species Act.

The creeks that flow through the Master Plan area generally can be classified as either riparian woodland or riverine habitat. Riparian woodland occurs where the creeks are more natural, with a dense canopy cover comprised of large, mature native trees such as big-leaf maple, cottonwood, willows, box elder and alder. These areas provide resting and rearing habitat for steelhead trout, and support other native fish and wildlife. Riverine habitat occurs in channelized reaches, which are for the most part located west of Highway 101. The viable creek ecosystem in these reaches has been confined to the aquatic environment in the channel bottom -- basically, flowing water with unvegetated shores or fringe marshes. Where intensive channel maintenance has not occurred, riparian vegetation has grown in along the toe of each bank. In many areas the tree canopy, however, remains sparse due to the immaturity of the vegetation. Beyond the channel banks, adjacent habitats are largely urban within town, changing to cropland, pasture, and seasonal wetlands outside of the City limits. Native fish diversity is low in these reaches, but high numbers of introduced species have adapted to the warm water.

Today, despite the channelization, local creeks do still support an abundance of life. Pockets of undisturbed habitat remain, and channelized reaches that have been left alone or carefully maintained have started to recover. River otters, egrets and herons, and steelhead trout all make their home along local waterways.

Service roads occur along most flood control channels within the project area. The Sonoma County Water Agency owns and maintains approximately 35 miles of channels within Santa Rosa. Many service roads, if open to the public, double as pathways for pedestrians and bicyclists. Soft paths that wind along some portions of Santa Rosa Creek and Paulin Creek, veering from the floodplain terrace at times towards the water's edge, are used by hikers and for educational outings. Many people like to walk and bike along creekside trails, or skip stones in the water, or simply gaze up at birds in the tree canopy.

The Creek Revival

In 1969, the City of Santa Rosa published the Natural Waterways Study as an element of the Santa Rosa Area General Plan. This study stated: "The removal of a major portion of the natural waterways in the planning area makes mandatory the retention of the remaining waterways in as near their natural state as possible." Unfortunately, additional creeks, including portions of Roseland Creek, were channelized after the release of this study. However, there was an awareness of the harm caused by such activities to the natural riparian ecosystem. The study goes on to state: "while the

retention of all waterways in a natural conditions is a worthy goal, a system of priorities has been developed which recognizes outstanding natural qualities, multiple use potential, and relationship to existing public lands.” Then, as now, local decision-makers were faced with balancing the needs of the growing urban community with those of resident fish and wildlife.

A growing appreciation for what Santa Rosa had lost through a singular focus on the flood control role of creeks began to build over the next twenty years. A ‘creek revival’ of sorts began to really gather steam in 1989, when a group of citizens gathered along the grouted rip-rap banks of Santa Rosa Creek near Pierson Street and decided that things could change for the better. Creeks could be restored for fish and wildlife, creekside trails could be constructed, and flood control capacity could be maintained. The economic revitalization of downtown Santa Rosa could be focused around a thriving and healthy creek ‘greenway’. The Citizens for Restoring Santa Rosa Creek, along with local, state, and federal agency staff, community leaders, elected representatives, local business, and countless volunteers joined together to develop the Santa Rosa Creek Master Plan, adopted in 1993. The Santa Rosa Waterways Plan followed in 1996, the Brush Creek Restoration Project was completed in 1998, and construction of the Prince Memorial Greenway project through downtown Santa Rosa began in 1999.

Over the past fifty years, a shift in community awareness and local government policy towards the protection and enhancement of creeks has occurred. An active citizenry, various stakeholders, and government agencies have collaborated to create a new vision for local creeks. The Citywide Creek Master Plan effort builds on this previous work, expanding planning efforts to cover all creeks that flow within Santa Rosa.

1.4. CREEK STEWARDSHIP

There have always been caretakers of local creeks, those that pick up litter, remove invasive plants and take care of newly planted native species, and generally watch over their neighborhood creek. In recent years, the Sonoma County Water Agency and City of Santa Rosa created an official Creek Stewardship Program, to support individuals, businesses, neighborhoods, and community groups who volunteer as Creek Stewards to help keep local creeks clean and safe. The program’s objectives are to:

- Increase the public’s awareness of the values provided by local creeks by providing creek restoration, education, and recreation activities in conjunction with local community and environmental organizations.
- Support volunteer Creek Stewards who serve as additional “eyes and ears” to identify and report undesirable conditions and activities. Creek Stewards also perform minor maintenance and monitoring tasks and provide suggestions to enhance creek areas.
- Provide timely and effective response to citizens’ concerns regarding creek related maintenance, environmental, safety, and recreational issues.

The Creek Stewardship Program draws from the multitude of community resources to increase the public’s appreciation and support for the environmental and social benefits provided by urban creeks. Planned activities include walks, bike rides, nature

interpretation, youth outings, tree planting, restoration work days, presentations on creek topics, and creek activities in Summer Youth Camps. A Program Coordinator assists Creek Stewards' activities and expedites follow through on reports regarding trash removal, water quality, natural habitat, recreational opportunities, trail maintenance, neighborhood safety and other situations that arise.

The Creek Stewardship Program promotes creek protection and restoration in a manner that maximizes amenities offered to the public. A populace that values the benefits of healthy creeks will naturally take pride in their creeks and regard them as part of their "backyard." Working together, the City and its citizens can enhance creek corridors to provide efficient transportation routes, safe neighborhoods, scenery, wildlife habitat, recreation and social interaction.

1.5. ORGANIZATION OF THE PLAN

The Citywide Creek Master Plan is organized into several chapters. Chapter 2 discusses the goals, policies, and objectives for creeks in Santa Rosa. General policies and objectives are presented for each Master Plan goal, followed by a separate discussion of policies of particular relevance to proposed developments adjacent to creeks. Habitat preservation, enhancement, and restoration concepts as well as ideas for improvements and connections of creekside trails are discussed in Chapter 3. Recommendations for specific creek reaches within each watershed are presented in Chapter 4. A strategy for implementation of the Master Plan is described in Chapter 5. Chapter 6 includes information about map products and the integration of the Master Plan data into the City's Geographical Information System. Several appendices are included to provide supporting materials for the Master Plan.

2. GOALS, OBJECTIVES, AND POLICIES



"Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs and mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water-lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of his education."

--Luther Burbank

CHAPTER 2. GOALS, OBJECTIVES, AND POLICIES

2.1. GENERAL PLAN IMPLEMENTATION

The Santa Rosa 2020 General Plan calls for the development of:

“...a Citywide Creek Master Plan that will identify opportunities for natural habitat restoration, enhancement of fisheries, protection of health and safety along creek channels, open space preservation, multi-use transportation routes, and recreation. The Plan will include text with a citywide creek map with proposed restoration concepts and associated text with a description of each creek, and in some cases, specific reaches. The Waterways Advisory Committee will phase the Plan to most effectively preserve and enhance existing resources.”

Current planning documents focused on creeks in Santa Rosa include the Santa Rosa Creek Master Plan (1993), Santa Rosa Waterways Plan (1996), Santa Rosa Creek Design Guidelines Manual (1998) (Appendix G), and Creek Dreams: Expanding the Vision (2004) (Appendix B). In addition, the Santa Rosa 2020 General Plan and the Santa Rosa Design Guidelines include language regarding creeks.

The Citywide Creek Master Plan supercedes both the Santa Rosa Creek Master Plan and the Santa Rosa Waterways Plan.

Whenever a question arises about protecting, enhancing, or restoring creeks, about the creekside trail system, or whenever development (private or public) is proposed adjacent to a creek, the following documents should be consulted:

- Santa Rosa 2020 General Plan for general guidance.
- Santa Rosa Zoning Code for creek setback requirements.
- Santa Rosa Design Guidelines for policies applicable to projects involving creeks, riparian corridors, and storm drainage.
- Santa Rosa Creek Design Guidelines Manual. In the future, the Santa Rosa Creek Design Guidelines should be revised to include broader language that reflects conditions found along other local creeks. Until this revision occurs, the following sections of the Manual will apply to all creeks within the Master Plan area.
 - site planning (Section II B-1)
 - grading (Section II B-2)
 - creek crossings (Section II B-3)
 - architecture (Section II B-4)
 - pathways (Section II B-7)
 - landscaping (Section II B-12)
 - fencing (Section II B-13)
- Citywide Creek Master Plan for general guidance (Chapter 2 policy) and recommended treatments of specific creek reaches (text and maps) in Chapter 4,

and detailed creek restoration concept plans, including Pierson Reach of Santa Rosa Creek (Appendix H), Upper Colgan Creek (Appendix J), Lower Colgan Creek (K), and Roseland Creek (I).

Compliance with these policies is strongly encouraged since ensuring healthy and vital local creeks is the collective responsibility of all members of the Santa Rosa community.

2.2. CITYWIDE CREEK MASTER PLAN GOALS, OBJECTIVES, AND POLICIES

The following eleven goals were developed for the Citywide Creek Master Plan after a comprehensive review of current creek-related planning documents. Together, these goals represent a complete vision for an integrated and healthy creek system that provides many benefits to our local community.

HABITAT (HA)—Local creeks and riparian corridors are preserved, enhanced, and restored as habitat for fish, birds, mammals, and other wildlife.

STORM WATER (SW)—The ability of waterways to carry storm water runoff and surface drainage is protected.

ECONOMIC (EC)—The economic value of areas adjacent to creeks is enhanced.

OPEN SPACE (OS)—The urban environment is enhanced with natural and open space features.

RECREATION (RT)--Trail corridors and other recreational opportunities are provided along some waterways

EDUCATION (ED)--Educational opportunities are provided along some waterways.

AESTHETICS (AE)--Aesthetic qualities of creeks are enhanced.

WATER QUALITY (WQ)—Water quality of creeks is protected and enhanced.

PRIVATE PROPERTY (PR)--Private property rights are respected.

HEALTH AND SAFETY (HS)—Public health and safety is protected.

CULTURAL RESOURCES (CR)—Cultural and archaeological resources are protected.

Objectives and supporting policies are presented for each Citywide Creek Master Plan goal.

HABITAT (HA)—Local creeks and riparian corridors are preserved, enhanced, and restored as habitat for fish, birds, mammals, and other wildlife

The Santa Rosa 2020 General Plan recognizes that open spaces and natural resources contribute to Santa Rosa’s “enviable quality of life”. The Citywide Creek Master Plan presents recommendations for preservation of the healthy parts of creeks, enhancement of all creeks for fish and wildlife, and restoration of modified channels to a more naturally functioning hydrologic and ecological state. Habitat preservation, enhancement, and restoration concepts are discussed further in Chapter 3.

Objective HA-1. Preserve healthy and/or environmentally sensitive creek areas.

Many of Santa Rosa’s creeks have been channelized or compromised in some way. It is important to preserve remaining natural creek channels and riparian corridors. The Citywide Creek Master Plan proposes to preserve intact and environmentally sensitive reaches for fish and wildlife habitat and to protect the riparian ecosystem from pollution, bank erosion, and other impacts.

Policy HA-1-1. Avoid channelization of additional creeks to preserve remaining wildlife habitat.

Policy HA-1-2. Meet or exceed the required creek setback to provide ecological buffers, recognize the 100 year floodplain, and allow for stream corridor restoration. Development shall locate outside the creek setback, as defined within the Santa Rosa Zoning Code.

Objective HA-2. Enhance creek areas that require some remediation to reach a healthy condition.

Habitat enhancement includes removal of non-native invasive species and replanting with native riparian vegetation. Native species effectively stabilize banks, screen pollutants from runoff entering the channel, and shade the channel, providing cooler water for native fishes. Riparian trees form a multi-layered creekside forest that shelters many bird and small mammal species. Vegetation also contributes leaf litter and detritus that will be used by benthic macroinvertebrates, restoring nutrients to the ecosystem and providing food for fish.

Policy HA-2-1. Remove non-native invasive species from riparian corridors and adjacent areas.

Policy HA-2-2. Revegetate riparian corridors with native species to enhance aquatic and terrestrial habitat. Select native, locally available and genetically appropriate riparian plant materials for enhancement projects. This is discussed further in Chapter 3.

Policy HA 2.3. Allow streambank and waterway stability repairs as necessary and reasonable to protect the integrity of adjacent properties and public health and safety. Repairs should be sensitive to the natural environment. Use bioengineering techniques, where possible.

Policy HA-2-4. Utilize in-stream habitat structures including large branches, tree stumps and trunks, and boulders where appropriate to improve aquatic habitat substrate complexity. Large scale or restoration project-level changes to the creek cross-section are discussed under Objective HA-3.

Objective HA-3. Restore creek areas that have become degraded due to channelization, erosion, or removal of creekside vegetation.

Creek restoration methods are discussed further in Chapter 3.

Policy HA-3-1. Restore channelized waterways to a more natural condition which allows for more natural hydraulic functioning, including development of meanders, pools, riffles, and other stream features. Remove concrete linings where feasible to allow for a connection with the stream channel and the natural water table.

Objective HA-4. Maintain creek areas using practices that protect and support fish and wildlife as well as help retain hydraulic capacity.

Appropriate stream maintenance procedures are described in Chapter 3.

Policy HA-4-1. Plan and perform stream maintenance activities that respect the balance of flood protection and environmental protection.

Objective HA-5. Focus preservation, enhancement, and restoration efforts on habitat that supports one or more special-status species, including those species that are state or federally listed as Threatened or Endangered, or as a Species of Special Concern.

Several special-status species depend on local creeks for survival.

Policy HA-5-1. Protect habitat for Endangered Species, through preservation, enhancement, and restoration of riparian corridors (as discussed above) and prevention of storm water pollution (discussed under Goal WATER QUALITY (WQ)).

Policy HA-5-2. Reestablish populations of special-status species as ecologically appropriate

Objective HA-6. Obtain and comply with all necessary regulatory agency permits.

Regulatory agencies include the California Department of Fish and Game, the U.S. Army Corps of Engineers, the North Coast Regional Water Quality Control Board, National Oceanic and Atmospheric Administration Fisheries Service, as well as local agencies including the Sonoma County Water Agency, County of Sonoma, and City of Santa Rosa.

Policy HA-6-1. Coordinate, as appropriate, with regulatory agencies on Master Plan projects.

Objective HA-7. Use the 'best available science' when planning and implementing a creek project.

Creek habitat improvement projects should not be developed in a vacuum, but with awareness of current and past efforts in similar conditions.

Policy HA-7-1. Consult with knowledgeable experts as appropriate, including natural resources agency staff and other jurisdictions or organizations that have successfully completed similar projects.

Objective HA-8. Conduct pre-and post-project physical and biological habitat monitoring to measure success as part of preservation, enhancement, and restoration projects.

Monitoring before and after a creek habitat improvement project allows for assessment of project success, and adaptation of management actions as appropriate.

Policy HA-8-1. Include monitoring in project planning and list as a separate task in grant funding applications.

Policy HA-8-2. Collect existing conditions data for later comparison with post-project conditions. Utilize repeatable, scientifically sound methods for measurements.

Policy HA-8-3. Projects should be monitored on an annual basis for the first few years after construction, and on a regular basis thereafter.

STORM WATER (SW)—The ability of waterways to carry storm water runoff and surface drainage is protected

Creeks in Santa Rosa comprise a significant portion of the storm drainage system. The General Plan calls for managing, maintaining, and improving storm water drainage and capacity. The Standard Urban Storm Water Mitigation Plan addresses the amount and quality of storm water runoff from new and redevelopment project sites.

Objective SW-1. Maintain hydraulic capacity of creeks.

As a consequence of channelization, local creeks were confined, no longer allowed to meander or affect nearby lands through the natural stream processes of erosion, deposition, and vegetative succession that occur with periodic flooding. The constraints placed upon Santa Rosa's creeks limit their restoration potential. Restoration opportunities consist of re-creating as much of the natural functioning of the creek system as possible, given the constraints of existing structures and adjacent land uses, and the need to maintain an adequate level of flood control protection.

Policy SW-1-1. Cooperate with partner agencies to conduct regular assessment of storm water drainage facilities, to ensure that adequate drainage capacity is maintained throughout the system.

Policy SW-1-2. Maintain current flood hazard data, and coordinate with responsible agencies to coordinate flood hazard analysis and management activities.

Policy SW-1-3. Balance habitat restoration and hydraulic capacity. Provide a detailed hydraulic analysis for every project component affecting flood conveyance prior to implementation to identify allowable "roughness" values and to interpret those values in the form of a vegetation planting and monitoring plan. Where restoration is proposed as part of the Master Plan, hydraulic capacity of the existing channel versus proposed channel condition was evaluated (See Appendix F).

Policy SW-1-4. Work cooperatively with partnering agencies to obtain data from stream gauges within the Master Plan area that will increase the accuracy of estimates of "roughness" assumed to represent existing conditions.

Objective SW-2. Implement the Standard Urban Storm Water Mitigation Plan

The Standard Urban Storm Water Mitigation Plan (SUSMP) developed by the City of Santa Rosa and County of Sonoma describes their programs for preventing and controlling the detrimental effects of new and redevelopment projects on storm water quality and runoff. The SUSMP is part of continued coordination with National Pollutant Discharge Elimination System (NPDES) permit to reduce pollutants and runoff flows. The SUSMP's goals for new and redevelopment projects are to manage, as close to the point of origin as possible, 1) storm water quality, 2) storm water quantity, and 3) to conserve natural areas of the development site.

Development projects within the City of Santa Rosa that are subject to SUSMP requirements are submitted to the Community Development Department for review and approval. These projects may include a variety of creative source and treatment

controls consistent with the SUSMP guidance document that can be viewed at www.ci.santa-rosa.ca.us/pworks/other/SW/FinalSUSM_PLAN.pdf.

Policy SW-2-1. Require that new development incorporate features into site drainage plans that would reduce impermeable surface area, increase surface water infiltration, and minimize surface water runoff during storm events.

Policy SW-2-2. Incorporate features and appropriate standards that reduce flooding hazards into the City's design standards.

Policy SW-2-3. Require dedication, improvement and maintenance of storm water flow and retention areas as a condition of approval.

Policy SW-2-4. Require developers to cover the costs of drainage facilities needed for surface runoff generated as a result of new development.

Objective SW-3. Perform channel maintenance in an environmentally sensitive manner and only where needed.

Stream maintenance activity is primarily for flood protection. Vegetation is selectively removed to maintain the water-carrying capacity of the channel, thereby maintaining protection against floods. However, consideration is given to the habitat value that vegetation provides to fish and wildlife. Trees, in particular, provide protection for fish while also shading the water, which helps to keep the temperature cool.

Policy SW-3-2. Maintain channels and vegetation with hand tools, where possible.

Certain maintenance activities should be done with hand tools to protect the creek environment, for example, removal of small debris, low branches, selective thinning of vegetation, and stabilization of some eroded stream banks. Heavy equipment may be necessary to remove lower tree limbs and problem debris.

Policy SW-3-3. Maintain the channel by performance, not schedule

Sonoma County Water Agency has established stream maintenance guidelines (described in Chapter 3) for balancing environmental protection with the flood carrying capacity on more than 80 miles of improved flood protection channels countywide. Each year, an inventory, including flow models, compares each site's estimated water-carrying capacity against its design capacity. Based on the results, streams are prioritized for maintenance activities.

ECONOMIC (EC)—The economic value of areas adjacent to creeks is enhanced

The Citywide Creek Master Plan encourages creek-compatible land uses on properties adjacent to creeks, and integration of development project features with creek improvements.

Objective EC-1. Implement policies for development adjacent to waterways as stated in the City’s General Plan, Design Guidelines, Santa Rosa Creek Design Guidelines Manual, and the Citywide Creek Master Plan.

Required improvements by developers of public pathways and related amenities shall be considered by the Waterways Advisory Committee and decision-making bodies. The proportionate share of the cost of such improvements may reflect the benefit to the development of immediate access to the creek trail system, the number of dwelling units in a residential project or the size of an industrial or commercial project, regardless of the length of property frontage along the creek.

Policy EC-1-1. Where discretionary approval for new development is sought adjacent to the creek, that development shall, to the extent possible, be consistent with and support the Master Plan. Planners and decision-makers will look for consistency between proposed projects and the Master Plan. The overall intent of this policy is to make the creek part of the project design.

Policy EC-1-2. Conditions of approval for development should include dedication of land and construction of Master Plan improvements as appropriate, and where a nexus can be demonstrated.

Policy EC-1-3. The design of new development adjacent to the creek shall, to the extent possible, allow for future public improvements consistent with the Master Plan.

Objective EC-2. Encourage healthy, clean, and safe creeks, thereby increasing economic value of areas adjacent to creeks

Several City departments have responsibilities that contribute to the prevention of crime, graffiti, water pollution, unlawful encampments, and other illegal activities and unsafe conditions along creeks. In addition, projects such as the Prince Memorial Greenway are restoring creeks and contributing to the revitalization of City neighborhoods and economic and cultural centers.

Policy EC-2-1. Continue to support efforts towards healthy, clean, and safe creeks.

OPEN SPACE (OS)—The urban environment is enhanced with natural and open space features

The General Plan supports maximizing the benefits of open space, conserving the City's open spaces and significant natural features, and creating a framework of public spaces at the neighborhood, city, and regional scale. When a community's natural resources including creeks are conserved, and incorporated into the design of new development, and multi-use trails provide access to community and regional open space areas, this results in a higher quality of life. The Prince Memorial Greenway project along Santa Rosa Creek is an example of a riparian corridor considered as an amenity for residents and visitors.

Objective OS-1. Provide for new open space opportunities throughout the city, especially in neighborhoods that have less access to open spaces.

This includes exploring the potential for creek restoration, bicycle and pedestrian ways, as well as new parks and conservation areas.

Policy OS-1-1. Provide an open space network that is linked by pedestrian and bicycle paths, and that preserves and enhances Santa Rosa's significant visual and natural resources.

Policy OS-1-2. Encourage the Sonoma County Agricultural Preservation and Open Space District to appropriate funds for the acquisition of open space within and surrounding Santa Rosa. Priorities for acquisition would include lands adjacent to creeks, such as the Santa Rosa Creek Greenway corridor.

Policy OS-1-3. Coordinate with public and private entities to link open spaces with a network of paths and trails, including Sonoma County Water Agency access roads, Sonoma County Regional Parks Department trails, Sonoma Marin Area Rail Transit trail, and the Bay Area Ridge Trail.

Objective OS-2. Utilize open space areas for preservation, enhancement, and restoration of creeks, as well as flood plain protection.

Open space areas are valuable for fish and wildlife habitat and for flood plain protection.

Policy OS-2-1. Maintain connectivity of corridors to protect natural resources and support fish and wildlife populations.

Policy OS-2-2. Ensure flood plain protection by retaining existing open areas and creating new open areas needed to retain storm water, recharge aquifers, and prevent flooding.

RECREATION (RT)--Trail corridors and other recreational opportunities are provided along some waterways

The General Plan calls for multi-use paths along local creeks, providing off-street linkages. The Master Plan includes recommendations for creekside pathways for a variety of recreational trail users including pedestrians, cyclists, equestrians, wheelchair users, and pedestrians with strollers, enhanced access to these trails, and creation of trailheads and trailside parks.

Trails would be part of an open space network that in many places would function as linear parks or greenways and provide off-street linkages to locations of interest. Connections to regional trails and locations of interest such as schools and parks would be indicated by signage. The system would be designed to be safe and convenient, and to be consistent with City and County policies and comply with the Americans with Disabilities Act.

Objective RT-1. Develop multi-use paths where appropriate

“Soft” and “hard” refer to the surface of the path, suitable for different intended users. People in wheelchairs and riders of road bicycles may prefer a hard, paved all-weather surface, whereas equestrians and mountain bicyclists may prefer a softer surface. Walkers and joggers may choose a hard or soft path at different times.

Policy RT-1-1. Provide and maintain multiple-use soft paths for pedestrians, equestrians and all-terrain bicyclists.

Policy RT-1-2. Provide and maintain multiple-use, hard-surface path for wheelchair users, road bicycles, and pedestrians, constructed to Class 1 Bicycle Facility standards.

Policy RT-1-3. Utilize on-street connectors where it is infeasible to locate creekside trails.

Objective RT-2. Provide public, neighborhood, and private access to creekside trails as appropriate.

Access points to the creek trail system will be designed to admit pedestrians, and where appropriate, equestrians, bicyclists, and people with disabilities. Entry by unauthorized motorized vehicles would be prohibited while Police, Fire, and maintenance vehicles would access through keyed entry ways.

Policy RT-2-1. Provide access to the creek trail system for people and authorized vehicles, and from neighborhoods.

Policy RT-2-2. Support private access to the creek trail system as allowed by the Sonoma County Water Agency.

Objective RT-3. Develop trailheads and trailside parks.

Trailheads act as public access points to the creek trail system and may provide facilities such as parking, restrooms, benches and interpretive displays. Trailside parks are located along the creek trail system to enhance recreational aspects.

Policy RT-3-1. Develop trailheads.

Policy RT -3-2. Develop trailside parks along creeks. Trailside parks along creeks serve as rest areas for trail users and quiet “walk-in” parks for local residents.

Policy RT-3-3. Expand equestrian facilities in Santa Rosa and consider development of trailheads with adequate parking to support equestrian access to these facilities.

Objective RT-4. Accommodate connections to regional trail systems that enhance or support the creek trail system network.

Trails through Santa Rosa provide a link between regional parks and trail systems.

Policy RT -4-1. Cooperate with various public and private entities to create, where appropriate, new public access trails along creeks to parks and open spaces within the Urban Growth Boundary, as well as connections to regional trail systems.

Objective RT-5. Provide a signage program that clearly identifies the path system.

There is a need for three main types of signage along the creek trail system. Directional signage would direct trail users to their destination. Objective ED-2 relates to interpretive signage. Objective HS-1 relates to regulatory and location signage to support emergency personnel.

Policy RT-5-1. Develop and implement a system for directional signage to direct trail users.

EDUCATION (ED)--Educational opportunities are provided along some waterways

Achieving the Goals of the Citywide Creek Master Plan greatly depends on the support of Santa Rosa's citizens. This support can be strengthened by providing residents, businesses, and visitors with information that increases their awareness of the many benefits that creeks provide to our community. Addressing their concerns and offering opportunities to help take care of creeks will instill a sense of ownership, responsibility, and pride. Schools are a natural place to implement creek education, but educational opportunities should be available to everyone of any age group, cultural background, and social status.

Objective ED-1. Continue to implement Creek Stewardship Program

The Creek Stewardship Program offers citizens who live, travel, and recreate along Santa Rosa's creeks the opportunity to protect and enhance the creeks they enjoy. An informed, supportive, and proactive community strengthens desirable qualities such as wildlife protection and public safety while reducing problems such as illicit dumping, water pollution, illegal camping, bank erosion and growth of non-native invasive plants.

Policy ED-1-1. Increase the public's awareness of the values provided by local creeks by providing creek restoration, education, and recreation activities in conjunction with local community and environmental organizations.

Policy ED-1-2. Support volunteer Creek Stewards who serve as additional "eyes and ears" to identify and report undesirable conditions and activities. Creek Stewards also perform minor maintenance and monitoring tasks and provide suggestions to enhance creek areas.

Policy ED-1-3. Provide timely and effective response to citizens' concerns regarding creek related maintenance, environmental, safety, and recreational issues.

Policy ED-1-4. Prepare a Creek Stewardship guide that addresses, in part, erosion control techniques, vegetation management, and water quality. The guide should also explain how an individual or organization can protect and enhance the creek environment.

Objective ED-2. Install signage including interpretive and educational displays at some trailheads and trailside parks, and creek markings at bridge crossings.

Interpretive displays should include topics such as vegetation, wildlife habitat, flood control and hydrology, storm water pollution prevention, creek restoration, history and culture, and creek stewardship. Locational signage helpful for emergency personnel purposes is discussed in Objective HS-1, directional signage for trail users is discussed in Objective RT-5.

Policy ED-2-1. Identify creeks with signage or other distinctive structures or markings at bridge crossings and at significant watershed boundaries.

Objective ED-3. Encourage use of the creek as a living museum and a natural laboratory.

Many of Santa Rosa's schools are located next to, or are within a short walk of a creek. Access to creeks will allow schools and other organizations (for example, 4-H and scouts) to have a natural laboratory for many subjects including science, math, art, and writing programs. For the general public, the creek is also a living museum where they can learn about natural processes and habitat.

Policy ED-3-1. Encourage schools to integrate creeks in their curriculum.

AESTHETICS (AE)--Aesthetic qualities of creeks are enhanced

The General Plan calls for creeks to be preserved and enhanced as they are part of Santa Rosa's scenic character. Creeks not only serve ecological and flood control functions but also provide aesthetic values in the urban environment. Goal HA includes policies focusing on enhancement of riparian habitat.

Objective AE-1. Revise the Santa Rosa Creek Design Guidelines Manual to apply to all creeks within the Master Plan area.

The Santa Rosa Creek Design Guidelines Manual includes information for design of developments adjacent to creeks that encourages integration of creeks into new and redeveloped neighborhoods. Language in the Manual is specific to Santa Rosa Creek but could be revised and updated to apply to all creeks in the Master Plan area.

Policy AE-1-1. Revise the Santa Rosa Creek Design Guidelines Manual. In the future, the Santa Rosa Creek Design Guidelines should be revised to include broader language that reflects conditions found along other local creeks.

Policy AE-1-2. Until the revision to the Manual occurs, the following sections of the Manual will apply to all creeks within the Master Plan area.

- site planning (Section II B-1)
- grading (Section II B-2)
- creek crossings (Section II B-3)
- architecture (Section II B-4)
- pathways (Section II B-7)
- landscaping (Section II B-12)
- fencing (Section II B-13)

WATER QUALITY (WQ)—Water quality of creeks is protected and enhanced

The General Plan calls for protection of water quality through implementation of the Storm Water Management Program and preservation and restoration of riparian habitats. Protecting the water quality of Santa Rosa's creeks is a significant factor in determining the survivability of native plant, fish and animal species as well as the health and safety of citizens. See Goals HABITAT (HA) and STORM WATER (SW) for additional policies that protect and improve water quality.

Objective WQ-1. Use education and community involvement to protect water quality.

Education can take the form of distributed printed materials or a media campaign, and participation in creekwalks, community creek clean ups, and other Creek Stewardship Program events.

Policy WQ-1-1. Preserve waterways by informing residents of the environmental effects of dumping yard waste into creeks, or other wastes, such as motor oil, into storm drains that empty into creeks. The Public Works Department has created several brochures about storm water pollution prevention and the benefits of local creeks.

Policy WQ-1-2. Educational programs, creek walks, community creek clean ups, and opportunities to engage in creek restoration activities would allow citizens to learn about their creeks while taking care of them. See Goal EDUCATION (ED).

Objective WQ-2. Use a combination of Best Management Practices, constructed devices, and biological systems, to remove pollutants from storm water.

Several methods help to protect creeks and storm water from pollutants. Examples of constructed devices include storm drain inlet filters, deflecting separators for trash and sediment, and trash racks. Retention basins, marshes, vegetative buffers, and grassy swales are types of biological treatments. Control measures could be phased in and are not necessarily dependent on implementation of any other proposed improvements to be successful.

Policy WQ-2-1. Require implementation of Best Management Practices to reduce drainage system discharge of non-point source pollutants originating from streets, parking lots, residential areas, business, industrial operations and those open space areas involved with the application of chemicals

Policy WQ-2-2. Implement the Standard Urban Storm Water Mitigation Plan (SUSMP) to reduce pollutants and runoff flows from new development and significant redevelopment projects. See Policy SW-3.

Objective WQ-3. Enforce and update as necessary the City's Storm Water Ordinance to protect water quality.

The City's Storm Water Ordinance stipulates that only storm water is allowed to enter the storm drain system.

Policy WQ-3-1. Ensure that construction and other activities adjacent to creek channels are sensitive to the natural environment. Ensure that these activities do not disrupt or pollute the waterway.

Policy WQ-3-2. Continue to educate public about the connection between storm drains and local creek health (see Objective WQ-1).

PRIVATE PROPERTY (PR)--Private property rights respected

The Citywide Creek Master Plan includes recommendations for some improvements that are located on private property. See Goal ECONOMIC (EC), the Santa Rosa Design Guidelines, and the Santa Rosa Creek Design Guidelines Manual for policies guiding land development adjacent to creek corridors.

Objective PR-1. Where discretionary land use approvals are sought, development shall, to the extent possible, be consistent with the Master Plan.

To realize the Santa Rosa community's vision for healthy creeks and an integrated creekside trail network, public and private development projects should reflect the recommendations for each creek reach. Decision-making bodies should require that proposed improvements are consistent with the Master Plan.

Policy PR-1-1. Proposed improvements associated with development projects should be consistent with the Master Plan.

Objective PR-2. Respect the rights of private property owners as the Citywide Creek Master Plan is implemented.

Private property owners are an essential partner in creating healthy and sustainable creeks and usable creekside trails. The City will work with private property owners to accomplish implementation of the Master Plan.

Policy PR-2-1. Easements or fee title shall be obtained, if possible from willing property owners, before trails are constructed or the creek channel is restored or any other creek improvement is installed on private property in implementation of the Plan.

Willing landowners may, if they wish to participate, donate (in exchange for tax or other benefits) or sell land or easements for the project. In addition, to encourage landowner participation, public agencies may offer additional incentives such as fences or native vegetative buffers to provide screening between paths and private land use on public and/or private land, depressing the grade of the path, and land swaps.

Policy PR-2-2. Every effort will be made to avoid exercising the power of eminent domain for the purpose of implementing the Plan.

Where possible, the Plan includes an alternative (located within public right-of-way) to proposed improvements shown on private property. The alternative of choice would be determined at the time of Plan implementation. This determination would be made by decision-making bodies, considering recommendations by the Waterways Advisory Committee.

Policy PR-2-3. The power of eminent domain would be invoked only as a last resort, after all other alternatives have been exhausted. The Santa Rosa City Council would consider the use of eminent domain on a case-by-case basis, and only after extensive negotiations with the property owners.

Three main requirements would need to be met to begin an eminent domain proceeding. First, the Santa Rosa City Council must adopt a resolution that describes the property in question and the intended public use, and a declaration that the project is needed for the public interest, the project was designed to result in the greatest good and least harm as possible, and a hardship would be caused without the project. The property owners would be properly noticed and would have an opportunity to be heard at a public hearing on the issue. Lastly, the resolution would need to be adopted by a vote of two-thirds of all the members of the Santa Rosa City Council. Property owners would be compensated for the fair market value as determined by an appraisal.

Eminent domain would only be pursued in a manner consistent with the California Code of Civil Procedure (including sections 1245.330-360).

Objective PR-3. Encourage access from private property to public creek trails where desired by the property owner and where appropriate.

Access to creek trails often leads to increased awareness of the intrinsic value of riparian areas, a renewed sense of creek stewardship, and also adds to property values.

Policy PR-3-1. Support landowners requests to allow gates from private property to creek trails along flood control channels, where approved by Sonoma County Water Agency. Encourage participation in the Creek Stewardship Program.

Policy PR-3-2. Discourage public access to waterways where it would significantly degrade sensitive environmental habitats, archaeological sites, Native American sacred or traditional lands, or private property of existing land uses. See Goals HABITAT (HA), CULTURAL RESOURCES (CR).

HEALTH AND SAFETY (HS)—Public health and safety is protected

The General Plan calls for a healthy and safe environment for the Santa Rosa community. Protection of life, property, and the environment through coordinated actions of several City Departments, combined with preparedness for and minimization of known potential hazards, are intended to create such an environment.

Objective HS-1. Provide for public health and safety

Public health and safety can be improved through the minimization of known and potential hazards, thoughtful design of site improvements, and development of a signage system for use by emergency personnel. Directional signage for trail users is discussed under Objective RT-5, and interpretive signage is discussed under Objective ED-2.

Policy HS-1-1. Minimize hazards associated with storm flooding. See Goal STORM WATER (SW).

Policy HS-1-2. Enhance pedestrian activity and safety by designing streets, buildings, pathways, and trails to provide a visual connection with public spaces.

Policy HS-1-3. Develop a system of signage along creek trails and at street crossings to assist emergency personnel when an incident occurs.

CULTURAL RESOURCES (CR)—Cultural and archaeological resources are protected

The General Plan calls for protection of Native American heritage, and preservation of Santa Rosa’s historic structures and neighborhoods. Since Native American archaeological sites tend to be located near waterways, projects proposed along creeks present an increased risk of impact to cultural resources.

Objective CR- 1. Protect known and probable historic and prehistoric sites

Where improvements are proposed along creeks, cultural resources may be present and must be protected.

Policy CR-1-1. Comply with all local, state, and federal regulations regarding cultural resources.

Policy CR-1-2. Consult with potentially-affected Native American tribes, the Northwest Information Center at Sonoma State University and other sources prior to or during the entitlement or project planning process to determine whether project sites contain or have the potential to contain Native American resources.

Policy CR-1-3. Require that areas found to contain significant artifacts be examined by a qualified consulting archaeologist for recommendations concerning protection and preservation.

Objective CR-2. Increase awareness of and appreciation for cultural resources through incorporation of culturally-important aspects into Master Plan projects

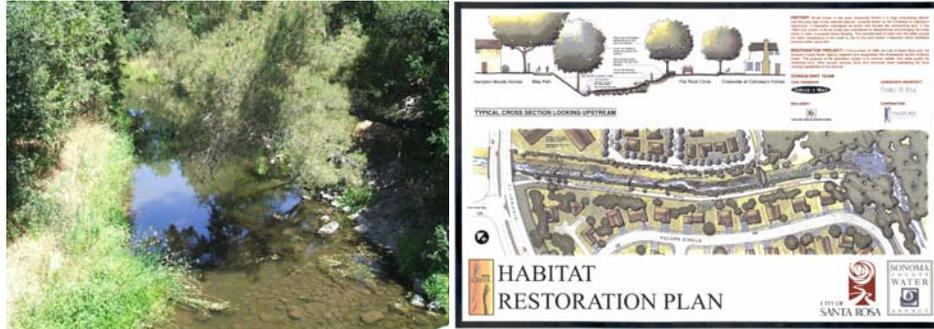
Culturally important sites should be respected, and recognized as appropriate. Many traditions and rituals continue to be practiced today, and as appropriate, could be shared with other Santa Rosans in an effort to increase awareness of these traditions.

Policy CR-2-1. Encourage interpretive educational signage, located so as to not interfere with or draw unnecessary attention to sacred sites.

Policy CR 2-2. Include culturally important plant species in enhancement and restoration projects. See listed plants in Table 1.

Policy CR 2-3. Encourage use of and accommodate access to culturally important sites by present day tribe members.

3. PLAN CONCEPTS



“I am beginning to understand that the stream the scientists are studying is not just a little creek. It's a river of energy that moves across regions in great geographic cycles. Here, life and death are only different points on a continuum. The stream flows in a circle through time and space, turning death into life across coastal ecosystems, as it has for more than a million years. But such streams no longer flow in the places where most of us live.”

--Kathleen Dean Moore and Jonathan W. Moore

CHAPTER 3. PLAN CONCEPTS

This chapter describes in general the categories of physical modifications that can be expected with Master Plan implementation. These include habitat restoration concepts such as preservation, enhancement, and restoration, as well as recreation concepts such as paths, bridge undercrossings, creek crossings, parks, and trailheads.

For the purposes of the Plan, five general types of physical creek channel configurations occur in Santa Rosa. These include Natural, Restored, Modified, Modified Natural, and Culvert (Figure 2).

Natural. Creeks that remain relatively unaltered would be considered natural. Most natural creeks can be characterized by the presence of native riparian vegetation, a natural meander stream pattern, pools and riffles, and shelter for fish such as overhanging banks, tree roots, or boulders.

Restored. Portions of two creeks in Santa Rosa have been partially or completely restored to a relatively natural habitat and hydrological condition. These include Brush Creek downstream of Highway 12 and Santa Rosa Creek between Santa Rosa Avenue and Railroad Street. Areas that are planned or proposed for restoration are noted on the maps and in the text.

Modified. A modified creek type has been channelized, with a cross-section generally as illustrated in Figure 3. Most of the modified creeks in Santa Rosa have this design, with service roads on one or both sides, including some that serve as trails. These sections typically have V-ditches along the outside edges that conduct water to culverts that discharge into the creek.

Modified-Natural. A creek that has been channelized as above, but with re-established natural vegetation resulting in a relatively natural appearance and reintroduction of habitat functions and values, would be considered a modified-natural creek type.

Culvert. A creek that is routed underground in a pipe or box culvert is considered a culvert creek type. This typically requires a creek trail to follow an on-street route to bypass the underground portion. It may be possible to 'daylight' some culverted sections of creeks.

3.1. HABITAT RESTORATION CONCEPTS

The citizens of Santa Rosa are committed to protecting and restoring the health of local creeks (Appendix A and B). Sightings of wildlife such as river otters and egrets remind the people that live and recreate along creeks that they are part of a larger ecosystem, and are tasked with the long-term care of the creek network. A survey of existing biological studies and current field conditions (Appendix D) confirmed that some of our creeks are healthy, but many others are not, and all local creeks could benefit from protection and restorative action.

Many of our local creeks lack in-stream habitat complexity. Channelized reaches tend to have fewer native riparian plant species, less dense tree canopies, and higher summertime water temperatures. Wide, shallow channels with silt bottoms provide few hiding or resting places for fish, no gravel for spawning, nor cobble for benthic macroinvertebrates to colonize. Some culverts and grade control structures can prevent fish from migrating to historic spawning areas upstream of the urban area. Invasive plant species crowd out natives and don't provide the food or shelter necessary to support our native birds, mammals, and other wildlife.

There are additional steps that can be taken to improve the health of local creeks, including preservation, enhancement, and restoration. Depending on the existing condition of a particular reach, varying levels of treatment would be recommended. Each has a specific purpose when included as part of a habitat improvement project, and application of one concept does not necessarily exclude the use of another.

Preservation. Preservation means that no physical changes are proposed, and the reach would be protected through an adequate creek setback or ultimately a conservation easement. Regular stream maintenance and management tasks would be conducted as needed in a preservation reach (Figure 4).

Enhancement. Enhancement would include removal of invasive species and replanting with natives, including understory sedges, grasses, and shrubs, as well as tree species to form a stream canopy. Enhancement could also include minor bank repair or erosion control using 'soft' methods, including willow plantings (Figure 5).

Restoration. Restoration requires changing the physical basis of the channel in some way to return it to a past condition, ideally an ecologically healthier and self-sustaining state. This may involve removal of concrete and riprap, channel recontouring to restore meanders, installation of instream habitat structures such as rock or log weirs or anchored rootwads, 'soft' armoring of banks with willows and other plants, and other plantings of native species (Figure 6).

For habitat restoration and enhancement projects, a list of suggested plant species is included as Table _1_. For the purposes of revegetation projects, the riparian zone can be divided into upper bank, mid-bank, low bank, and instream areas. Each riparian species is adapted to one or more of these areas.

When possible, source material originating from the same watershed should be used to maintain the genetic integrity of each watershed. Species appropriate for projects located in foothill areas will differ slightly from species appropriate for projects located on

the Santa Rosa Plain. Consult the Milo Baker Chapter of the California Native Plant Society for further information on species appropriate to particular site conditions.

Where appropriate, native plant species of particular significance to Native American tribes should be incorporated into the revegetation plan, to support tribe members in their continued practice of traditions, including source material for baskets, medicines, and canoes. Ease of access for elder tribe members to sites for plant collection and ceremonies should be considered when deciding where the incorporation of culturally important plant species is appropriate.

Any riparian revegetation plan should be submitted to and approved by the appropriate regulatory agencies prior to implementation, which may include the California Department of Fish and Game, North Coast Regional Water Quality Control Board, U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration. The following guidelines are from *A Guide to Restoring Native Riparian Habitat in the Russian River Watershed* (Sonoma County Water Agency and Circuit Rider Productions 1998), and would apply to any revegetation project within the Citywide Creek Master Plan project area:

- Revegetation should attempt to replicate the natural system
- Seeds, cuttings or transplants should be collected as close as possible to the project site
- Propagation of plant material in containers needs to begin up to 18 months prior to planned installation
- Installation of containerized and direct seeded plants should take place in the fall or winter, after several significant rainstorms have resulted in high soil moisture levels
- Broadcast seeding of native grasses and forbs should take place in the fall of each year to ensure adequate time for seed germination prior to the rain and cold weather
- In general, planting in the active channel (instream area) is not recommended

Application rates and planting densities vary according to type of vegetation and the specific target habitat type. It is best to identify a local reference site to determine the proper target densities. Keep in mind that some of the revegetation plantings may not survive, and will need to be replaced to reach a target density.

Native plants used for the revegetation projects should ideally be contract-grown by a qualified nursery. Seed collection should be conducted by a qualified botanist and/or nursery staff. Seed should be collected locally from selected sites to maintain the genetic integrity of the native plant species. Seeds should be propagated for planting during the fall dormant season. A list of nurseries where locally-grown plants native to the region are available is included in Table 2.

Many of the proposed improvements (such as trails on access roads and pedestrian bridges over creeks) will not impact the flood carrying capacity of the creeks. Proposed restoration actions (such as removing concrete and adding trees and other vegetation to channels) have the potential to reduce the flood carrying capacity below existing levels. The creek reaches where recommended actions have the potential to impact flood carrying capacity were evaluated based on a master plan level of hydraulic analysis (Appendix F). When designs of these reaches are developed prior to implementation, a detailed hydraulic analysis must be completed for every project component affecting

flood conveyance to identify allowable “roughness” values and to interpret those values in a vegetation planting and monitoring plan. The detailed hydraulic analyses should be based on the results of any current drainage studies that are completed at that time.

Two drainage analyses currently in process will provide the City and the community with a much greater understanding of the level of flood protection afforded by the existing drainage system. The Army Corps Santa Rosa Creek Flood Damage Reduction and Ecosystem Restoration Feasibility Study addresses the Santa Rosa Creek watershed which drains the central and northern areas of Santa Rosa. The Southern Santa Rosa Drainage Study addresses the largest watersheds in southern Santa Rosa. When completed, these analyses will show where flooding would likely occur in a 100-year storm event and what alternatives should be considered by the community to address flooding problems. The drainage analyses conducted for the Citywide Creek Master Plan should be updated based on information from these drainage analyses when each is completed.

Stream Maintenance

Stream maintenance is appropriate for most reaches within the Master Plan area, since it is unusual in an urban area for streams to be self-sustaining. The goal of stream maintenance is to promote additional canopy while retaining hydraulic capacity of the channel (Figure 7). Fish-friendly maintenance activities currently practiced by the Sonoma County Water Agency, include the following:

- Top 2/3 of channel bank is subject to limited thinning to prevent dense under-story of willows, blackberries and other shrubs. Existing trees are not removed, and the banks may become well vegetated.
- Bottom 1/3 of bank has no more than a couple of years of growth, allowing only scattered small shrubs and young willow (less than 5 feet height).
- Channel bed is near original design condition, however some encroachment of vegetation from banks and aquatic vegetation, primarily tules and grasses, is initially established (up to 2 years growth).

Maintenance of creek plantings as part of enhancement or restoration projects would also include weeding, watering, pruning, and other necessary care. In-stream or planting maintenance responsibilities for creek restoration project sites would continue to be shared according to ownership and easements designated at recording.

3.2. RECREATION, ACCESS, AND TRANSPORTATION CONCEPTS

The overall concept for the creek trail system is to create a continuous system of access along the creeks where feasible, and connections from the creeks to major generators and destinations of bicycle and pedestrian traffic, such as schools, employment centers, community and government centers, parks, downtown and shopping districts, and residential neighborhoods. The creek trail system is much more than a recreational facility: it is intended to support walking and bicycling as viable alternative modes of transportation to the automobile. This will reduce roadway congestion, improve air quality, increase the safety of bicyclists and pedestrians, help conserve increasingly scarce and expensive fossil fuel resources, improve public health, social interaction, and impart a sense of community identity and pride. These benefits are especially valuable to children, seniors, immigrants, people with disabilities, and other populations with limited ability to drive.

Using creek corridors as a greenway and recreation amenity is a highly desirable concept that allows all citizens to enjoy nature and low-impact recreation close to their homes and workplaces. In statewide and national polling on recreation needs and desires, trails for walking and bicycling consistently rank as the highest overall public recreation activity and priority (USDA Forest Service 2000).

The creek trail system is intended to be multi-use, accommodating bicycles, pedestrians, wheelchair users, runners, rollerbladers, and at least in rural areas, mountain bicyclists and equestrians. The Master Plan does not determine the type of users that would be allowed in any particular location, except to the extent it defines the physical type of trail, such as paved or unpaved.

Santa Rosa is fortunate to have an extensive network of creeks extending through nearly all its urban areas. The channelization of most of the creeks has largely addressed flooding problems. The negative impact of this creek modification on wildlife habitat is being addressed by restoration activities already completed and proposed in the Master Plan. Channelization provided opportunities for creek trail access because it resulted in the acquisition of public creek corridors and the construction of bank-top service roads that can also serve as trails.

From a transportation and recreation standpoint, ideally all creeks should be opened up to trail access. However, the Master Plan recognizes that public access may be in conflict with wildlife habitat and other natural resources and processes. Access may be limited to one creek bank or excluded from certain areas for this reason. The other major constraint to access is private property and associated existing structures. A key goal of the Master Plan is to respect private property rights. Many creek reaches are entirely in private ownership, with structures and improvements constructed near the creek. Proposed trails are shown on private property in some cases. Establishment of these proposed trails would in most cases require acquisition of fee title (outright ownership) or an access easement. This issue is discussed further in Chapter 2.

In other cases the creek is in a publicly owned corridor, backed by residential or commercial properties. Existing greenway and creek trail systems in many communities have demonstrated that trails can be compatible with adjacent development, improve the neighborhood quality of life, and can add significantly to property values.

Transportation Facility Design Standards

The creek trail system serves as an important transportation facility for bicycles and pedestrians, as well as a multi-use recreational facility. It is an important part of the City's overall bicycle and pedestrian circulation network. As a public transportation facility the creek trail system must meet adopted transportation design standards.

Intersections between trails and roadways are often the most critical issues in shared use paths design. Due to the potential conflicts at these junctions, careful design is of paramount importance to the safety of path users and motorists alike. Guidelines and other criteria that are used to select appropriate crossing designs are identified in the Caltrans Highway Design Manual (HDM), the Manual on Uniform Traffic Control Devices (MUTCD), the California Supplement to the MUTCD, and the Federal Highway Administration (FHWA) publications 2003. Additional design resources can be found in:

- American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 2001.
- AASHTO, Guide for the Development of Bicycle Facilities, 3rd Edition, 1999.
- USDOT, FHWA, Selecting Roadway Design Treatments to Accommodate Bicycles, 1994.
- USDOT, FHWA, Conflicts on Multiple Use Trails: Synthesis of the Literature and State of the Practice, 1994.
- Institute of Transportation Engineers (ITE), Design and Safety of Pedestrian Facilities, 1994.

The Caltrans design guidelines are the definitive source for the development of transportation facilities in California, and all other guidelines are considered as design resources, to be supplemented by the judgment of professional engineers and designers. The recommendations provided in this report should be considered guidelines, not absolutes. Each intersection is unique and will require review by the Department of Public Works prior to implementation.

Access for People with Disabilities

Accommodating wheelchairs and making other provisions for people with disabilities is required under the California Building Standards Code (Title 24), and under the federal Americans with Disabilities Act (ADA). These statutes specify gradients, cross-slopes, surfaces, transitions, and other aspects of trail systems and sidewalks. The state code tends to be more stringent than the federal code. The policy and standard of the Recreation, Access, and Transportation Component is that all parts of the paved system will be accessible to people with disabilities. However, parts of the existing creek trail system and the creek service road system that would be converted to trails may have slopes, such as at undercrossing ramps and steep connections to adjacent streets, that do not meet access standards. Though undercrossings and steep connections are identified, data on the gradient of slopes and ramps is not yet available. The City is currently proceeding with an ADA inventory and plan to address access for persons with disabilities on its sidewalk system.

Corridors for the Creek Trail System

Most of the creek trail system exists as modified/engineered channels with bank-top service roads that also serve (or will serve) as trails. Many other reaches are in a natural

condition but fully developed private properties afford no opportunities for access. But there are many locations where development will occur along the creek or on a connecting route, or where street extension projects are planned.

In these locations an adequate trail corridor is needed to accommodate the trail and provide a buffer from adjacent development and to protect the creek habitat. To protect the riparian habitat, the trail corridor should be located outside the zone of existing riparian vegetation if possible.

To provide a buffer between the creek and the trail, and a buffer between the trail and the adjacent development, a setback from the top of bank or edge of existing riparian vegetation is necessary. Additional buffer/setback should be provided where there are residential front or rear yards abutting the trail corridor. The development-side buffer may consist of landscaping or open space that is not part of active use areas.

Trail and Path Types

The following types of trails (the term is generally interchangeable with “path”) and related access features are conceptually defined for the Master Plan. There are existing improved sections, such as the Prince Memorial Greenway, that have special design features. The 1993 *Santa Rosa Creek Master Plan*, and the accompanying *Santa Rosa Creek Design Guidelines* provided a substantial amount of detail regarding the design of creek trail facilities specific to Santa Rosa Creek. A more general level of design guidance is provided here, focusing on resolving system-wide design approaches.

Paved Trails. A new or existing asphalt paved path (or concrete in case of some special project areas) 8’ to 12’ wide. Most of these trails occupy the alignment of service roads along a modified creek channel. To minimize impacts upon fish, wildlife and vegetative habitat, and reduce maintenance costs, this type of trail would be kept out of environmentally sensitive creek channels, except potentially at bridge under-crossings.

Cantilevered and Retained Trails. Where channels have steep banks and no available level trail corridor beyond the bank, trails supported by retaining walls or cantilevered boardwalks may be appropriate, provided there are no environmental impacts or they are appropriately mitigated. This type of trail exists in the Prince Memorial Greenway. Alternatively it could be constructed as a cantilevered boardwalk or pier-supported structure which would occur within the confines of restricted channel sections. These types of structures would be designed to avoid hydraulic impact and minimize maintenance.

Unpaved Service Road/Trails. In the context of the Master Plan, most unpaved trails are gravel or base rock surfaced service roads (service road/trails) originally designed for Sonoma County Water Agency maintenance access. These are typically 12’ wide with a gravel (base rock) surface. In some cases existing service roads are proposed to be removed to support restoration of natural creek habitat. Typically this occurs where a public trail exists or is proposed on the opposite bank.

Dirt or “Soft” Trails. A subtype of unpaved trails, these are improved pedestrian (and potentially mountain bike and/or equestrian) paths with compacted earth or other “soft” surface. Width would typically be 4’ to 8’, with an assumed average of 6’. This category

may include upgrades of informally created foot/bridle paths to formally improved unpaved trails.

Foot or Bridle Paths. An informally created or minimally improved dirt path, often created by users, typically 2 to 3 feet wide. These may exist parallel to a paved trail.

Trail Bridges. Trail bridges are non-vehicular bridges allowing the trail to cross the main creek or side channel. Many such bridges currently exist on the creek trail system, and additional bridges are proposed. Bridges would typically be prefabricated steel on a drilled concrete pier foundation. They would accommodate all types of trail users, as well as small patrol and maintenance vehicles.

On-Street Connections

The creek trail route will need to follow streets where access along the creek is not feasible. This must include provisions for bicycles and for pedestrians, including wheelchair users.

Bicycle Facilities. Three class definitions of bicycle facilities are consistently used by Caltrans and other transportation agencies:

Class 1 bicycle facilities are off-street paved paths. These are similar to the “paved path” type defined under 2.2.4, except that there are very specific design standards for Class 1 bike routes, including radius of curves, slopes, transitions, etc. that do not apply to generic paved paths.

Two types or classes of bicycle facilities may occur on streets:

Class 2 bicycle facilities consist of striped and signed lane for bikes along the street, typically 4' wide minimum.

Class 3 bicycle facilities consist of a bike route along the street, marked by signs.

For the purposes of the Master Plan, where paved trails are proposed, they will meet the design standards of Class 1 bicycle facilities. Some of the on-street routes will follow existing designated and improved bikeways that may provide all or part of such connections. The City maintains an adopted Bikeways Map showing designated routes and facilities by type/class. These are reflected in the Master Plan. In some cases new on-street connections are proposed to complete the system.

On-Street Pedestrian Facilities. Where pedestrians must follow an on-street route there should be sidewalks to accommodate them, including curb ramps to accommodate wheelchairs.

The broad scope of the Master Plan and the limited extent of available data about the on-street routes does not allow for a determination of whether on-street connections currently feature sidewalks to accommodate pedestrians, whether the sidewalk has curb ramps and slopes to accommodate wheelchairs, or whether the desirable/feasible bicycle facility is Class 2 bike lanes or a Class 3 signed route. These details will be resolved by subsequent site-specific studies and plans, the City's current ADA studies,

or by future street improvement projects. These potential improvements are not included in the detailed trail system tables or cost estimates.

Trail Traffic and Transportation Design

Multi-use trails have certain design standards which vary depending on the agency that is constructing or managing them. Paved trails on the creek trail system should be designed to meet the standards for a Caltrans Class 1 Bikeway, which are defined in the California Department of Transportation Highway Design Manual Section 1003.1. Generally, converting existing Water Agency service roads to paved multi-use trails will result in trails that comply with these standards. The configuration of points where the creek and associated trail system cross a street or a rail line are important to resolve for safety and traffic flow purposes. Crossing types include surface crossings, undercrossings, and in certain instances, overcrossings. This section identifies general transportation design principles and standards for these crossings, and further specifies how they should be configured for the creek trail system.

Trail Intersection Operations. Based on research conducted by the University of North Carolina Highway Safety Research Center, the following principles were developed for the operation of trail intersections.

- Four-way stops are ineffective and can constitute a hazard. Motorists tend to stop, and bicyclists rarely do. This creates a false sense of security that can lead to a collision.
- High Speed Roadways – Assignment of right-of-way is critical. For crossings on roadways with speeds of 40 mph and greater, right-of-way is always assigned to the motorist.
- Medium Speed Roadways – Right-of-way can be assigned to trail users when their volumes exceed vehicular volumes and motorist speeds are at about 30 mph. Traffic calming devices should supplement the right-of-way assignment and be used to further slow the speed of motorists.
- Low Speed Roadways – Right-of-way can be assigned to trail users when their volumes exceed vehicular volumes and motorist speeds are 20 mph or less. In this case supplemental traffic calming devices are not necessary.

However, it should be noted that the volume of trail users in the City of Santa Rosa is rarely higher than the conflicting vehicular volume. Therefore, right-of-way is generally assigned to the motorist rather than the trail users.

The following are suggested techniques for enhancing crossing safety at trail/roadway intersections.

- Provide adequate stopping sight distances for motorists and trail users.
- Reduce conflict speeds by controlling the approach speed for either or both the trail user and the motorist.
- Reduce conflicts at intersections by routing trail crossings through existing

crosswalks, or placing crossings outside of the influence of intersections.

- Even on 2-lane roads, medians can help by acting as a traffic calming feature and separating conflicts in time and space.
- Trail crossings should be perpendicular. But, when needed, it is possible to skew the crossing to 75 degrees and still only lengthen the crossing distance by about 4 percent.
- Properly placed overpasses on trails will be well used, especially if at-grade crossings are complex, require excessive waits, or pose high speed conflicts. Long approaches to overpasses may be needed to meet ADA requirements.
- Signal cycles must be responsive to bicyclists, and should not require an excessive wait.

MUTCD 2003. The Manual on Uniform Traffic Control Devices (MUTCD) 2003, the national standard for designing, applying, and planning traffic control devices, includes guidelines for typical signs and markings for shared use paths as well as appropriate right-of-way and traffic control. Federal law requires all public agencies to conform to the MUTCD. MUTCD 2003 provides standards for use of a stop or yield sign and guidelines for assigning right-of-way.

Surface Street Crossings. This is a case where trail users must cross a street to enter or continue on the trail system. Surface crossings also function as potential creek trail entry points, typically with potential entries at the four corners of the street/creek crossing (upstream and downstream on the right bank and the left bank). There are approximately 200 roadway crossings in the citywide creek path system. Traffic volumes on the intersecting roadways range from low to moderate to high-volumes. Seven prototype crossing treatments have been developed to enhance crossing safety over the range of roadway types that intersect the pathway network. The crossing prototypes are listed in Table 3 and shown in Figures 10-15.

Features for all proposed roadway crossings include warning and/or control signs both for vehicles and pathway users. The type, location, and other criteria are identified in the Manual for Uniform Traffic Control Devices (MUTCD) and are illustrated on Figures 10-15. At each crossing location, consideration must be given for adequate warning distance based on vehicle speeds and sight distance. On higher volume roadways, catching the attention of motorists desensitized to roadway signs may require additional high visibility devices such as flashing light systems, pavement legends, roadway striping, or changes in pavement texture. Signing for path users includes a standard “STOP” sign and pavement marking combined with bollards, and in some cases where adequate space is available, a curve in the path to slow bicyclists on their approach to the street crossing. Care must be taken not to place too many signs at crossings or they will result in sign clutter and will negate their impact.

Directional signing may be useful for path users and motorists alike. For motorists, a sign reading “Santa Rosa Creek Pathway Xing” along with a path emblem or logo helps to both warn and promote use of the path itself. For path users, directional signs and street names at crossings help direct people to their destinations.

Many of the existing and proposed pathway segments emerge near a controlled roadway intersection. In these cases, a determination was made regarding the need to route pathway users to the existing intersection, or to develop a new mid-block crossing. A distance of approximately 200 to 300 feet was used in this evaluation, as the maximum distance pedestrians would travel out of their way to use an existing crossing. This distance was selected because it is generally outside of the influence of existing intersections and is a distance which may deter pedestrians from walking out of their directed path.

Where pathway users are expected to route to an existing intersection, a barrier and directional signing will be required to keep them from crossing at the unmarked location. At the existing intersection crosswalk, all path users will technically become pedestrians. Signs warning motorists of the presence of bicycles may be needed, as well as right turn on red prohibitions “when pedestrians and bicyclists present.” High-speed curve geometry and free right turns should be replaced with tighter radii to help slow vehicles, or enhanced with pavement texture or slightly raised speed tables.

One of the key problems with using existing intersections is that it requires bicyclists to transition from a separated two-way facility to pedestrian facilities such as sidewalks and crosswalks, normally reserved for pedestrians. Widening and striping the sidewalk (if possible) between the path and intersection may help to alleviate some of these concerns. Ultimately, users will cross at the trailhead unless there is a significant reason for them to divert to the closest crossing.

Surface Rail Crossings. Creek trail crossings at a rail line should, if possible, be redirected to the nearest existing public street. Establishment of a new public crossing requires approval by the Public Utilities Commission.

Under-Crossings. Ideally, in order to reduce potential conflicts between trail users and vehicles at points where the creek trail crosses existing streets, and if there is physical space, trails will pass under bridges. There are a variety of existing under-crossing types on the existing creek trail and service roads. Some of these are “dry season under-crossings”, where trail users can cross under the street below a bridge only when water levels are low. Under-crossings should be designed or modified to meet ADA standards, with slope gradients a maximum of 5%, or up to 8.33% if resting platforms are provided at the intervals specified in detailed access standards. All ramps should be paved, even if they are connecting unpaved trail segments. Railings should be provided where there are steep drop-offs (e.g. over 2 feet and over 1:1 side slope). Ideally under-crossings should feature good visibility of the trail from the adjacent road and nearby trail for security purposes, which is primarily a function of design of the vehicular bridge that creates the under-crossing.

Trail Entries

Most of the trail system entry points occur where a public street crosses the creek and creek trail. If trails occur on both banks of the creek, entries could occur at the four corners of the street/creek crossing (upstream and downstream on the right bank and the left bank). Figure 16 illustrates various types of existing entry structures. The standard configuration of these entries from a traffic circulation standpoint is discussed earlier in this chapter. Other entry points occur where public streets dead end at or abut

the creek. Still others are in public parks or school grounds. The specific current entry point conditions and changes proposed to accommodate public access are detailed in tables, as discussed in Chapter 3. Most entries are in locations where there is currently a paved or unpaved gravel service road. Generally, providing public access entails removing chain link gates or creating openings in chain link fences and placing removable locking bollards (posts) in the opening to prevent entry by unauthorized vehicles. In the case of mid-block entries, many creek reaches will require installation of a culvert to allow the entry to cross the drainage ditch that typically occupies the outside of the Modified or Modified Natural Creek corridor. Where there is a significant grade drop between the adjacent land or public road a ramp will be needed to accommodate trail users at an ADA compliant grade. The ramp also needs to accommodate emergency vehicles, or at least small maintenance and patrol vehicles. Alternatively, an adjacent or nearby entry point or ramp that has a steeper grade than the public access ramp could be provided.

Support and Recreational Facilities

There are many sites along the creeks where there are existing features or potential opportunities for support facilities, parks and open space, and other features that would complement the creek trail system. There are also physical and land use constraints that will be barriers to the trail system unless they can be resolved.

Restrooms. Trail users will need access to restrooms. Existing public restrooms in parks or other public facilities or building close to the trail could also serve trail users. No new restrooms are proposed directly in conjunction with the trail, but new restrooms may be provided in conjunction with park projects identified as part of the overall greenway system, or in conjunction with other public projects.

Parking. Most of the trail traffic is expected to be local, but in some cases users may drive to the trail system to embark on recreational or commute trips and will need parking. Some existing public parking areas are located close to the trail and could serve trail users. Potential public parking areas are identified near the trail in conjunction with potential park and open space opportunities

Parks and Open Space. Parks along or near creek trails are vital components for recreational use, and also help support transportation use of the trail system. Trailside parks may serve as rest areas for trail users and quiet “walk-in” parks for local residents. They may provide parking lots to allow people who don’t live close to the trail system to begin their recreational or commute trip. Parks along creek trails could provide restrooms, picnic facilities, play equipment, usable landscaped open space, trash receptacles, and interpretive displays.

In addition to existing public parks and open space, two types of future parks are identified on the maps and in the descriptions: 1) “Planned” parks that are shown in the General Plan or another City planning document. These sites may or may not have been acquired, and are typically not yet improved. 2) “Potential/Concept” park or open space sites that have special environmental qualities and/or are undeveloped, and may warrant consideration for acquisition or designation as protected open space or improved parks in the future. Some of these sites are in public ownership, and some are private. These potential parks and open spaces are concepts originating in studies for the Master Plan. These concepts may or may not be feasible for the City Recreation and Parks

Department to implement, and are not currently among the parks prioritized for acquisition or development.

Existing public parks, including Annadel State Park, Spring Lake Park, and Howarth Park, in the eastern portion of Santa Rosa, provide important trail links and destinations for creek trail visitors. The creek trail system also includes links to nearby parks, such as Doyle Park, Finley Park, Olive Park, Julliard Park, Sonoma Avenue Park, Jacobs Park, and Burbank Home and Gardens.

Historic Sites. Sites with identified historic significance or adjacent to historic structures may warrant special interpretive signage or installations.

Signage. The creek trail system needs signage and trail identification features to make it easy for people to find their way on the system and to use it to reach major destinations around the city, such as schools, shopping, and community and government service centers. The Santa Rosa General Plan, in Objective RT-5, specifies: "Provide a signage program that clearly identifies the path system." General Plan policies and objectives specify directional signage to direct trail users to their destination, interpretive signage, and signage to support emergency personnel response. In addition, signage will be need to inform trail users of rules and regulations and to support enforcement of laws.

There are several current creek trail signage design efforts underway or in place in and around Santa Rosa that will need to be referenced or coordinated to provide the signage program.

The Sonoma County Agricultural Preservation and Open Space District has commissioned a sign program for the Santa Rosa Creek Greenway. This is currently underway. A separate effort is underway to design a series of signs for where the creek trail crosses streets. The *Santa Rosa Creek Design Guidelines Manual* included a series of standard designs for signs and creek trail markers, including a graphic logo for the Santa Rosa Creek Trail that could be adapted to the citywide system.

The Master Plan does not include design of signs, or determining the locations of any specific signs, since it is anticipated that a subsequent revision of the Santa Rosa Creek Design Guidelines Manual will serve that purpose. The following concepts are provided for sign types, designs and locations.

Directional Signage

There should be a consistent graphic design and logo for signs that identify the creek trail system. Signs should identify each entry point for trail users, including identifying the entry from outside and from within the trail system, and key destinations such as major streets, parks, or public facilities. These signs or markers should continue on any on-street connections to make it easy to follow the route. A consistent system of naming and numbering of the creeks and corresponding trail segments should be used on the signs, and reflected on creek trail maps.

Bollards or pylons could be used to identify the trail entries and route. Painted symbols or marking on the pavement and/or plaques embedded in the pavement could also be used to mark the route.

Mapboard signs should be provided at major entry points such as downtown or public parks to provide overall orientation. These are typically a kiosk or signboard with an enlarged graphically-designed map showing the location in relation to the overall or watershed trail system. In addition to parks on or near the trail system, the maps should highlight major destinations such as schools, community centers, government offices, and shopping districts to support use of the trail system for transportation as well as recreation. The kiosks or signboards should provide information about highlights along the trail system, current events, issues, volunteer projects, etc. Special informational signs may be posted at specific locations, such as at a new or changed trail or when a trail rule or policy is changed.

Interpretive Signs

There are numerous opportunities along the creek trail system to interpret nature, including riparian habitats, wildlife, and hydrologic processes, as well as prehistoric and historic local history. Interpretive signs and installations should be designed to be consistent with the overall signage design theme, but each could and should be somewhat unique.

Location Signage for Emergency Personnel

The Santa Rosa Fire Department has requested that an organized system of creek trail segment numbers and names be created and signed, and that the name of each creek be stenciled or signed on each under-crossing to facilitate rescues. The Master Plan reach and segment number provide an organized naming system that could be used for these markings, which should be consistent with the trail and crossing designations in user directional and informational signs.

Rules and Regulations

The City Police Department has asked that regulations pertaining to the creeks and the creek trail system be posted to support law enforcement. Signs with standard rules and regulations for the creeks and creek trail system should be posted at each major entry point. These would address hours of use, types of use, any prohibitions such as trespassing, smoking, littering, damage to public or private property, disturbance of wildlife or habitat, camping, etc. Special specific regulation signs may be posted in locations that are known or expected to experience specific issues.

Traffic Control and Warnings

The creek trail system and its connecting on-street routes will be part of the City's bicycle and pedestrian transportation system, and will intersect with vehicular and rail transportation in many instances. Signs are needed to warn and control trail traffic as it approaches crossings, and to warn drivers as they approach the trail. These signs, and other traffic information and control methods, are discussed earlier in this chapter.

Signs and markings will also be needed on the trail system in some cases to control trail users traffic, particularly bicycles. Speed limit, yield and stop signs may be required on more heavily used paved trail reaches. Pavement markings may include lines dividing the trail into traffic directions. Pavement markings and signs should be provided to clarify right-of-way for different trail user groups, especially when more groups are mixed (e.g. bikes yield to hikers, both yield to horses).

General Sign Design and Construction Standards

Signs, markings and monuments must be constructed of extremely durable materials, construction methods, and installation to resist weather, vandalism, and normal wear and tear. They should be easy to read and understand, carefully coordinated with the overall system of creeks and trails, and of a consistent design throughout the system. Preparation of a sign design manual is an appropriate next step, building on the details from the various prior and current sign design efforts.

4. WATERSHED-SPECIFIC RECOMMENDATIONS



“The mark of a successful man is one that has spent an entire day on the bank of a river without feeling guilty about it.”

--Chinese Philosopher

CHAPTER 4. WATERSHED-SPECIFIC RECOMMENDATIONS

For the purposes of the Master Plan, creeks were grouped into watershed areas and divided into reaches (Table 4). Each creek reach served as the study unit for assessment purposes. Existing conditions and recommendations resulting from the Natural Resources Assessment and Recreation, Access, and Transportation Component are presented for each reach.

ABOUT THE MAPS

A series of 60 11" x 17" maps at 1" = 500' scale have been prepared to cover all the creek reaches. The maps have their own watershed/creek naming system rather than figure numbers. The maps were created using data from the City's Geographic Information System (GIS), which contains a wide range of information about conditions and features throughout the City. They also show features, opportunities and constraints identified in the *Creek Dreams* and *Existing Conditions Survey* documents, and identified during preparation of the Master Plan.

In the text, locations of the various existing and proposed conditions within each reach are identified as being either on the left or right creek bank (from the perspective of looking downstream) and/or are given a cardinal direction, i.e. north, south, etc.

The Master Map Legend (Figure 17) lists the features that are shown on the maps. These map features and their importance to the creek trail system are explained in detail below.

Creek Types

Indicates the five types described in Chapter 3, including Natural, Restored, Modified, Modified-Natural, and Culvert.

Creek Reaches

Creek reaches within the seven watersheds are numbered moving downstream. The reaches are mapped and described starting from the headwaters of each main channel, and then each tributary in the watershed, moving in a clockwise direction, consistent with the watershed and creek mapping system described in Table 4.

Ownership/Land Use

The ownership adjacent to the creek is important to the feasibility of access and recreational use. The creek may occupy a separate elongated parcel or "corridor", or may be within a larger parcel that straddles the creek. The width of the public creek parcel corridors typically varies widely. Ownership and land use types shown on the maps include:

City. Owned by the City of Santa Rosa.

Other Public. Owned by other public agencies.

SCWA. Owned by the Sonoma County Water Agency.

School Properties. Owned by a school district.

Private. This may mean that access rights along the creek do not exist, or there could be an existing or proposed easement that allows access.

Urban Growth Boundary. This is the currently designated limit for urban growth and the ultimate potential city limit line. It is used as the planning area boundary for the Master Plan.

Existing Roads and Trails

Many of the creek reaches have some type of existing service road, though not necessarily public access. Many creek sections are already open to public access on unpaved service roads or on service roads that have been paved to function as multi-use trails. In some cases the existing service roads could be used for public trail access with little or no change. In other cases an existing footpath, or dirt or gravel road, will need to be upgraded to a paved road/trail to implement the plan. Shown on the maps:

Paved. Typically an asphalt surface service road/trail 8' to 12' wide, which is suitable for use as a multi-use (bicycle and pedestrian) trail (Class 1 bike route).

Unpaved Service Road/Trail. An improved service road, typically 12' wide surfaced with gravel/base rock surface, but may include dirt roads. *Where the service road is currently closed and is proposed to be opened a series of "O"s are overlaid on the route.*

Closed Service Road. An existing Water Agency service road (typically 12' wide gravel, or base rock surface) that is closed to public access and proposed to remain closed.

Restored Service Road. An existing Water Agency service road (typically 12' wide gravel, or base rock surface) that is proposed to be removed and restored to a natural creek habitat area. Typically there is an existing or proposed trail on the opposite bank. *Restored service roads are indicated on the map by a series of "R"s overlaid on the route.*

Dirt or 'Soft' Trail. An existing pedestrian (and potentially mountain bike and/or equestrian) path with compacted earth, decomposed granite, or other "soft" surface. Width typically is 4' to 6' but this category may include narrower informal dirt paths created by use.

Trail Bridge. An existing bridge that allows the trail to cross the main creek or side channel. This does not include vehicular or rail bridges over the creek, or bridges that allow bikes and pedestrians to cross over roads or rail lines, which are counted as "Crossings".

Existing Bikeways

The City maintains an adopted Bikeways Map showing designated routes and facilities. These include important connections to the creek trail system, and in some cases provide on-street alternative routes where access along the creek isn't feasible. Three

types, or classes, of bicycle facilities are shown on the maps. These class definitions are consistently used by Caltrans and other transportation agencies:

Class 1. An existing paved bike path separated from roadways, and at least 8' wide. These typically function as multi-use paths, and many comprise parts of the creek trail system, and trail systems in parks and other public facilities.

Class 2. An existing striped and signed lane for bikes along the street, typically 4' wide minimum.

Class 3. An existing bike route on the street, marked by signs.

Proposed Trails and Connections

These are proposed improvements to complete the creek trail system. Detail on the design standards for these improvements is provided in Chapter 3. They include new trails and on-street routes, as well as opening service roads that are currently closed (not identified on the maps or in the tables), and upgrades of existing unpaved paths to paved.

Road Extension. A new road proposed in the City General Plan or other document. These future routes may include bicycle and pedestrian facilities to provide connections along or between creek trail reaches. The maps depict the general location of the proposed extension, not a specific alignment.

Paved Trail. A new asphalt paved path (or concrete in case of some special project areas) 8' to 12' wide (proposed to meet design standards of a Class 1 bike route). This category includes upgrades of informally created footpaths to formally improved Paved Trails.

Service Road/Trail to be Paved. An existing unpaved gravel service road/trail 8 to 12' wide that is proposed to be paved. *This is indicated by a series of "P"s overlaid on the route.*

Dirt or "Soft" Trail. A new, formally-improved pedestrian (and potentially mountain bike and/or equestrian) path with compacted earth, decomposed granite or other "soft" surface. Width would typically be 4' to 8', with an assumed average of 6'. This category includes upgrades of informally created footpaths to formally improved trails.

On-Street Connection. A proposed creek trail connection that follows streets where access along the creek is not feasible. The type of bicycle facility (Class 2 or 3) or pedestrian facility that exists, or should be created, is not yet specified.

Trail Bridge. Proposed trail bridge to allow the trail to cross the main creek or side channel.

Street/Trail Crossings and Trail Entries

The basic crossing types are identified on the maps and the crossing locations are numbered for reference to detailed tables contained in Appendix (E) identifying conditions at each crossing. The street/creek crossing points also function as trail entry

points, which are also detailed in the tables. Locations for mid-block entry points, where the creek system may be entered from a side street or public site, are also numbered on the map for reference to the tables.

Surface Crossing. Trail users must cross a street or railroad to continue.

Under-Crossing. Trail users can cross under railroad tracks or the street below a vehicular bridge. Some of these are Dry Season Under-Crossings, where trail users can cross under the street below a bridge only when water levels are low.

Proposed Under-Crossing. A proposed point where trail users will cross under railroad tracks or the street below a vehicular bridge

Mid-Block Entry. An existing point where the creek trail can be accessed from a dead-end street or public property such as a park.

Proposed Mid-Block Entry. A proposed point where the creek trail will be accessed from a dead-end street or public property such as a park.

Existing and Potential Facilities

These are existing and potential support, recreational and environmental facilities that would enhance the trail system. *On the maps:*

Restroom. An existing public restroom, in a park or other facility or building close to the trail. No new restrooms are proposed in conjunction with the trail, but new restrooms may be provided in conjunction with other public projects, such as parks.

Parking. An existing public parking area close to the trail that could serve trail users.

Potential Parking. A proposed or potential public parking area close to the trail that could serve trail users.

Parks/Open Space. Existing public parks and open space lands

Potential Park/Open Space. Adjacent sites that have special environmental qualities and/or are undeveloped, and may warrant consideration for acquisition and/or development as protected open space or improved parks. (See clarifications regarding these sites in Chapter 3).

CREEK SYSTEM IMPROVEMENTS OVERVIEW

Figure 18 presents an overview of the City-wide creeks and the existing and proposed creek trail system and connecting trails and bike routes. These trail system features and specific habitat restoration projects are described in detail in the reach-specific maps and descriptions that follow.

WATERSHED-SPECIFIC RECOMMENDATIONS

4.1. SANTA ROSA CREEK WATERSHED

Santa Rosa Creek is the major collector stream in the City, central to the hydrologic system. Santa Rosa Creek has received the most attention in prior plans and improvements, including the Santa Rosa Creek Master Plan, Santa Rosa Creek Design Guidelines, and the Prince Memorial Greenway Project, constructed where the creek passes through the heart of downtown.

The Santa Rosa Creek watershed drains approximately 78.6 square miles, including agriculture, parks and open space, and urban land uses. The headwaters are on the northwestern slope of Hood Mountain. The creek tumbles through a canyon which roughly parallels Los Alamos Road, then enters the Valley of the Moon and begins its westerly journey through the urban area and then agricultural lands before joining the Laguna de Santa Rosa north of Sebastopol. The Laguna flows northerly to Mirabel, its confluence with the Russian River. The Russian River flows westerly to its mouth at the Pacific Ocean at Jenner. From headwaters to its confluence with the Laguna, Santa Rosa Creek flows approximately 22 miles. Elevation varies from approximately 2,000 feet to about 40 feet above sea level. Tributaries of Santa Rosa Creek that are considered in the Master Plan as part of the Santa Rosa Creek watershed area include Oakmont Creek, Skyhawk Creek, and College Creek.

Vegetation within the watershed ranges from mixed evergreen forest and chaparral in the east, to riparian woodland and riverine within the creek corridor, ornamental landscaping within the urban area, to oak savannah grasslands with vernal pools and other seasonal wetlands on the Santa Rosa plain. In the eastern reaches, there is dense canopy cover with large, mature native trees such as big-leaf maple, cottonwood, willows, box elder and alder. Steelhead and resident rainbow trout are present. Chinook salmon have been observed here in recent years. In the western reaches, a riparian woodland has begun to develop in the absence of intensive channel maintenance. To increase habitat value for steelhead trout within Santa Rosa Creek, the Sonoma County Water Agency has instituted stream maintenance methods such as selective vegetation removal that promote canopy cover yet maintain hydraulic capacity.

The Citywide Creek Master Plan area includes eleven creek reaches within the Santa Rosa Creek watershed. Reach designations from the 1993 Santa Rosa Creek Master Plan, if applicable, are indicated in parentheses.

SANTA ROSA CREEK

For the purposes of the Master Plan, Santa Rosa Creek is organized into eight reaches, which are covered in fifteen map tiles, moving downstream. Corresponding reaches present previously within the 1993 Santa Rosa Creek Master Plan are noted in parentheses.

Reach 1 (A East): Urban boundary to Calistoga Road

Maps: SANTA ROSA A, B, C, D

Type: Natural Creek

Length: 12,968 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Most of this reach is natural with aquatic habitat consisting of pools and riffles, shelter provided by boulders, roots, and undercut banks, and good stream canopy cover. This reach supports steelhead trout. There is a diversion structure located at Montgomery Drive, where high flows are diverted to Spring Lake Reservoir for storage. A spillway allows return of water to Santa Rosa Creek to prevent the reservoir from filling beyond capacity. A concrete apron upstream of Melita Road may present a barrier to juvenile fish. Tree species include alder, willow, big leaf maple, walnut, cottonwood, bay, and live oak. Invasives include vinca, ivy, Himalayan blackberry, and pampas grass.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancement including removal of invasive species and replanting with natives is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are mostly private. No direct creek trail access is proposed, but on-street routes are proposed on the north bank along Melita Road and Queen Anne Drive to existing signed bike routes and/or bike lanes on Highway 12. On the south side of the creek, a proposed on-street route would extend west on Channel Drive and Montgomery Drive to Calistoga Road and Reach 2. A connection from the route on Melita Road to the Channel/ Montgomery route would be provided by a surface crossing of Montgomery Drive and an existing trail bridge (#2) crossing the Spring Lake Diversion Channel to Annadel State Park near an existing parking area. At Calistoga Road proposed trail bridge (#4) would connect to a short section of proposed paved trail.

Reach 2 (A West): Calistoga Road to Farmers Lane

Maps: SANTA ROSA D, E, F

Type: Natural Creek

Length: 12,947 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is natural, with pools and riffles and good stream canopy cover. Large woody debris, boulders, and tree roots provide shelter. Spawned-out Chinook salmon have been seen within this reach during the last few years. Several parcels along this reach are owned by the City of Santa Rosa, providing access for education programming and restoration work. Tree species include alder, Oregon ash, big leaf maple, willow, and box elder. Invasives include Himalayan blackberry, ivy, periwinkle, and giant reed.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancements including removal of invasive species and replanting with natives is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are mostly private upstream from the confluence with Brush Creek and public below. No creek access exists or is proposed east of Acacia Lane. An on-street route, following an existing Class 3 signed bike route, is proposed from Calistoga Road west along Sonoma Highway U.S. Highway 12 and then south on Acacia Lane to the existing Class 1 paved path along the north side of the creek that begins at the intersection with Quigg Drive. The paved path extends to Mission Boulevard where an undercrossing is proposed. An existing Class 1 paved path downstream of Mission Boulevard is proposed to be connected via a proposed paved path with the existing Class 1 paved path that extends upstream from the confluence with Brush Creek at Flat Rock Park (#1), a planned park. A proposed trail bridge (#5) and paved trail would lead to Montgomery Drive and existing Class 2 bike lanes on Summerfield Road that connect to Howarth Memorial Park. Shadow Lane could serve as an on-street connector until completion of the proposed paved trail.

An existing trail bridge over Brush Creek (#29) connects to the Brush Creek trail and an existing Class 1 paved trail that continues along Santa Rosa Creek to a point 200 yards downstream from Yulupa Avenue, where it becomes a dirt/soft path. The paved path has a surface crossing of Yulupa Avenue near Yulupa Circle. The parallel dirt/soft trail, the Farmers Lane Trail, is below the top of the creek bank and was built by the California Conservation Corps in 1991. It begins at the future Flat Rock Park, crosses under Yulupa Avenue, and continues to the end of the reach at Farmers Lane.

On-street connections on Yulupa Avenue and Hartley Drive on the south side of the creek connect to a proposed paved trail that would extend from a planned park (#2) at the Carrillo Adobe at Montgomery Drive and Franquette Avenue, west to Farmers Lane. A proposed trail bridge (#6) would cross just upstream of Farmers Lane. A new trail undercrossing is proposed at Farmers Lane.

Street crossing treatments include using the crosswalk at Mission Circle to cross Mission Boulevard (#6) and crossing Yulupa Drive (#7) at Yulupa Circle. There is also an existing undercrossing at Yulupa Drive.

Reach 3 (B): Farmers Lane to E Street

Maps: SANTA ROSA F, G

Type: Natural Creek

Length: 8,709 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is fairly natural, with pools and riffles and good canopy cover. Some banks are steep, with existing development (homes, businesses, commercial buildings) occurring close to the top of bank. Tree species include alder, willow, cottonwood, redwood, and box elder. Invasives include Himalayan blackberry, ivy, and giant reed.

This reach of Santa Rosa Creek is recommended for preservation, due to its value as fish and wildlife habitat. Enhancements including removal of invasive species and replanting with natives is also recommended.

Recreation, Access, and Transportation

Parcels are predominately privately-owned in this reach. The proposed paved trail on the south bank would cross under at Farmers Lane and continue west to Shortt Road. From that point, a proposed trail bridge (#7) would connect north across the creek to an on-street route following an existing Class 3 signed bike route along 4th Street. On-street connections would extend south on Shortt Road and on Gilbert Drive, then west on Leonard Avenue and Montgomery Drive, and north-south on Doyle Park Drive, connecting to Doyle Park at the south end, and to Memorial Hospital at the north. Between Memorial Hospital and Brookwood Avenue a proposed paved trail would be located on the south/left bank of the creek, with a proposed trail bridge (#8) crossing Santa Rosa Creek at Leland Street. Trail undercrossings are proposed at Montgomery Drive and Brookwood Avenue. West of Brookwood Avenue the paved trail would be on the north/right bank of the creek. All trails would be located along the top of bank. Between Memorial Hospital and “E” Street, the trails can be located on either side of the creek as an alternate.

Street crossing treatments include crossing Farmer’s Lane (#9) at 4th Street. There is also potential for an undercrossing at this location. A bridge is proposed at the end of Shortt Road (#10). A Type III treatment is proposed for Montgomery Drive (#11); there is also potential for an undercrossing at this location. Type IV treatment is proposed for Brookwood Avenue (#12), north side. An undercrossing is proposed at this location also.

Reach 4 (C): E Street to Pierson Street

Map: SANTA ROSA H

Type: Culvert, Restored, and Modified Creek

Length: 5,489 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Santa Rosa Creek has been altered significantly. From E Street to Santa Rosa Avenue, the creek flows through a pair of box culverts with a fish ladder. At Santa Rosa Avenue, the creek resurfaces and continues through what was once a grouted, rip-rap channel down to Pierson Street. The Prince Memorial Greenway project will restore almost all of the channel below Santa Rosa Avenue. The final phase of the project, from Railroad Avenue to Pierson Street, is underway (the adopted Pierson Reach Concept Plan is included in Appendix H). The restoration work involved removal of most of the grouted riprap, construction of instream habitat structures including rock weirs, placement of root wads to encourage pool formation, and planting of native sedges, rushes, and trees to increase shade to the channel. What was once a denuded, barren channel now supports fish, birds, and other wildlife, including Western pond turtle and river otter.

The restored portions of this reach should be monitored for colonization by invasive species. Invasives should be removed as soon as possible and replaced with native plantings. Adaptive management should be used if the planted vegetation or other aspects of the project are not performing as expected.

At some point in the future, the government center of Santa Rosa is expected to be redeveloped. When that occurs, consideration should be given to the daylighting and restoration of Santa Rosa Creek and Matanzas Creek through this area. Fish and wildlife would benefit from a healthier creek, but people would also benefit, in terms of recreation opportunities and aesthetics. The success of the Prince Memorial Greenway project has shown that the community supports habitat restoration and enjoys spending time along creeks.

Recreation, Access, and Transportation

The conceptual daylighting project described above could include a Creek Walk, connecting the proposed trail to the east of this reach to the Prince Memorial Greenway. A potential public parking area (#3) is identified at the corner of 1st and South E Streets. West of Santa Rosa Avenue is the planned Gateway Park (#5) and the beginning of the Prince Memorial Greenway, which extends to the end of the reach. The Greenway is a fully-improved urban amenity, with decorative concrete paths, benches, seat walls, art installations, and lighting on both sides of the creek to Railroad Avenue, and continuing on the north bank to Pierson Street. East of Pierson Street is a potential site for another gateway park (#6). Access to the creek trail will be provided at West 3rd Street and the Railroad Square water tower site.

A series of three trail bridges cross the creek: downstream of Santa Rosa Avenue (#12), at Olive Park (#13), and downstream of the railroad bridge (#14). The latter trail crossing connects Prince Memorial Greenway to the Joe Rodota Trail. The Joe Rodota Trail is proposed to be extended through to West 3rd Street. The SMART trail system route diverts from the Northwest Pacific Railroad right-of way at Santa Rosa Creek, extending west to Pierson Street, then following West 6th Street, Jefferson Street, and West 7th Street to rejoin the Northwest Pacific Railroad north of Railroad Square. A trail undercrossing of U.S. 101 is located on the north bank, and a pedestrian overcrossing is located on the south bank that connects Sonoma Avenue to Olive Park. The overcrossing will be replaced with an undercrossing during the Highway 101 widening project. The north bank trail also has existing undercrossings at "A" Street, Railroad Street, the Northwest Pacific Railroad tracks, and West 3rd Street.

Street crossings treatments include crossing A Street (#26) at 1st Street or using the existing undercrossing, Type III treatment at Railroad Street (#30) or using the existing undercrossing, crossing Third Street (#32 and 33) at SMART or using the existing undercrossing, and Type I treatment at Pierson Street (#35).

Reach 5 (D): Pierson Street to Stony Point Road

Maps: SANTA ROSA H, I

Type: Modified-Natural Creek

Length: 5,966 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Santa Rosa Creek is channelized. Due to fish-friendly stream maintenance practices, trees are maturing alongside and within the channel, providing canopy cover. Species include Oregon ash, walnut, willow, valley oak, live oak, alder,

bay, and box elder. Instream plants include rushes and sedges, nut sedge, willows, cottonwood, and cattail. Invasives include eucalyptus, ivy, tamarisk, Himalayan blackberry, and silk tree. There is a heavy infestation of tree of heaven as well, just downstream of Pierson Street.

Pools and riffles are present, with some shading from maturing trees as mentioned above. Old riprap, tree roots, and some bank areas provide some shelter for fish. Steelhead trout use this corridor for migration to and from spawning areas upstream.

The Santa Rosa Creek Master Plan recommended that this reach be restored. However, since that plan was adopted in 1993, a fiber optics cable has been installed underneath the left bank service road. The Santa Rosa Creek Greenway Project, including paving and construction of several bridge crossings, is now under construction along the right bank service road. In light of these constraints, the Citywide Creek Master Plan is recommending enhancement rather than restoration of this reach, including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation

There is an existing Class 1 paved trail/service road along the north/right bank and an unpaved service road/trail along the south/left bank of the creek for the entire distance of this reach. Both trails cross under Dutton Avenue. New entry points on the north bank are proposed at the western end of West 6th Street and on both sides of Dutton Avenue. The east side of Dutton Avenue is adjacent to a lot owned by the Sonoma County Water Agency. Access to the creek trail is proposed on this site, along with a potential park (#7). New entries on the south bank are proposed for the downstream side of Dutton Avenue and at Heather Drive. Also proposed is an on-street connection from the Heather Drive entry point south to Third Street. This undeveloped site is identified as a potential park or open space opportunity (#8) in conjunction with future development. A trail bridge (#15) crossing Santa Rosa Creek is proposed near the Heather Drive entry point. A trail undercrossing exists at Stony Point Road on the north bank.

Street crossing treatments include Type VI at Dutton Avenue (#38-41) or using the existing undercrossing, and Type VI at Stony Point Road (#42) or using the existing undercrossing.

Reach 6 (E): Stony Point Road to confluence with Piner Creek

Maps: SANTA ROSA J, K, L

Type: Modified-Natural Creek

Length: 11,087 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Santa Rosa Creek is channelized. Due to fish-friendly stream maintenance practices, trees are maturing alongside and within the channel, providing canopy cover. Species include Oregon ash, walnut, willow, valley oak, live oak, alder, bay, and box elder. Instream plants include rushes and sedges, nut sedge, willows, cottonwood, and cattail. Invasives include eucalyptus, Himalayan blackberry, periwinkle, water primrose, and giant reed. Pools and riffles are present, with some shading from

maturing trees as mentioned above. Old riprap, tree roots, and some bank areas provide some shelter for fish.

The Santa Rosa Creek Master Plan recommended that this reach be restored. However, since that plan was adopted in 1993, a fiber optics cable and reclaimed water line have been installed underneath the left/south bank service road. The Santa Rosa Creek Greenway Project, including paving and construction of several bridge crossings, is now under construction along the right/north bank service road. In light of these constraints, the Citywide Creek Master Plan is recommending enhancement rather than restoration of this reach, including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation

There is an existing paved Class 1 trail on the north/right bank between Stony Point Road and Fulton Road. Downstream of Fulton Road the trail is unpaved but is proposed to be paved all the way to Guerneville Road. An unpaved service road/trail exists the entire distance on the south/left bank. Existing mid-block entry points are located on Malibu Circle on the south bank of the creek and at the intersections of the College Creek and Piner Creek Trails on the north bank. A potential park site (#9) is located at a bend in the river on the north bank near the storage ponds. A trail bridge (#16) is proposed across Santa Rosa Creek near the confluence with College Creek. A Place to Play Park abuts the trail on the south bank. Two trail bridges (#17 and #18) are proposed near the east and west ends of the park. Two hundred yards east of the confluence with Piner Creek an unpaved service road enters from the south that connects to a proposed trailhead with equestrian facilities on Hall Road, and eventually, to the Joe Rodota Trail via the proposed Santa Rosa Creek/West County Trail Connector. An existing trail bridge (#50) continues the north bank trail downstream of Piner Creek.

Street crossing treatments would include Type VI at Fulton Road (#49) or using the existing undercrossing.

Reach 7 (F): Piner Creek to Willowside Road

Maps: SANTA ROSA L, M, N

Type: Modified-Natural Creek

Length: 8,730 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is more rural, extending from Piner Creek west to the Willowside Road. The channel is wider and shallower, with more sediment bars and some riprap. Levees are present, and agricultural land use and a floodplain are adjacent to the creek. Native vegetation within this reach includes willow, valley oak, Oregon ash, and walnut. Invasive species observed include Himalayan blackberry and English ivy. Several bird species are found within this reach.

The Santa Rosa Creek Master Plan recommended that this reach be restored. However, since that plan was adopted in 1993, a fiber optics cable and reclaimed water

line have been installed underneath the left bank service road. The Santa Rosa Creek Greenways Project, including paving and construction of several bridge crossings, is now under construction along the right bank service road. In light of these constraints, the Citywide Creek Master Plan is recommending enhancement rather than restoration of this reach, including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation

There are existing unpaved service road/trails on both the north and south banks of this reach. Existing trail bridges cross Piner Creek (#50), Peterson Creek (#51), and Wendel Creek (#19) as they enter from the north. The north bank trail is proposed to be paved while the south bank would remain unpaved to accommodate equestrians and others who prefer a softer surface. There is an existing mid-block access point where the service road/trail along the east/left bank of Peterson Creek intersects.

Street crossing treatments include Type II at Willowside Road (#50).

Reach 8 (G): Willowside Road to confluence with Laguna de Santa Rosa

Maps: SANTA ROSA N, O
Type: Modified-Natural Creek
Length: 8,510 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is more rural, extending from Willowside Road west to the Laguna de Santa Rosa. The channel is wider and shallower, with more sediment bars and no riprap. More riparian vegetation occurs here than in channelized reaches to the east. Agricultural land use and a floodplain are adjacent to the creek. Delta Pond, a storage pond operated by the Santa Rosa Utilities Department, lies to the south of the creek. Native vegetation within this reach includes willow, valley oak, Oregon ash, creeping wild rye, and walnut. Invasive species observed include Himalayan blackberry and pepperweed. Many bird species are found within this reach (Appendix D). Turtles and even a mountain lion have been observed recently. A concrete low flow crossing is present within the reach, and may present a barrier to fish migrating during low water conditions.

The Santa Rosa Creek Master Plan recommended that this reach be restored. However, since that plan was adopted in 1993, a fiber optics cable has been installed underneath the right bank service road. The Santa Rosa Utilities Department staff must use the service road located along the left bank to service Delta Pond, a major water storage facility. In light of these constraints, the Citywide Creek Master Plan is recommending enhancement rather than restoration of this reach, including removal of invasive species and replanting with natives.

Recreation, Access, and Transportation

Unpaved service road/trails extend along both the north and south banks through this reach, but the trail on the north bank is currently mostly overgrown. A paved trail will

follow the north bank of the creek from Willowside to Guerneville Road. The unpaved trail along the south bank will remain unpaved and open to the public. The service road around the perimeter of Delta pond will remain closed to protect sensitive wildlife and habitat. A parking area is proposed at the northwest corner of Santa Rosa Creek and Willowside Road.

COLLEGE CREEK

College Creek is a tributary of Santa Rosa Creek and is covered on one map tile.

Ridley Avenue to confluence with Santa Rosa Creek

Map: SANTA ROSA K

Type: Modified-Natural Creek

Length: 4,802 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

College Creek is a channelized stream, with some sections routed through underground culverts. Pools are present, with some riffles. Overhanging vegetation provides some cover for fish. There is an 8-10 foot drop over grouted riprap at the confluence with Santa Rosa Creek, serving as a barrier to fish passage. Trees include redwood, live oak, valley oak, willow, Oregon ash, walnut, and Monterey pine. Invasives include eucalyptus, Himalayan blackberry, and acacia.

Habitat enhancement is recommended for this reach, including removal of invasive species and replanting with native vegetation. Additional trees should be planted at the top of bank to encourage more canopy cover. The fish passage barrier should be addressed, but at this time is deemed a low priority, since limited upstream habitat exists.

Recreation, Access, and Transportation

This creek is contained within Sonoma County Water Agency and City property. The College Creek trail provides alternate transportation routes to Finley Park. It is proposed to open to the public a closed service road that follows the south/left bank from the top of the reach to West College Avenue. The service road upstream of Marlow Road will be opened upon obtaining access across public property to Ridley Avenue from the upstream end of the Water Agency owned creek. The section of service road between Marlow Road and West College Avenue could be opened sooner. On-street connections are proposed on Ridley Avenue and on Marlow Road south to West College Avenue, where it would follow existing bike lanes west of Marlow, and a signed route east of Marlow.

On the downstream side of West College Avenue an existing driveway on the east side the Sonoma County Water Agency complex provides a connection to the unpaved service road/trail that follows the north/right bank to the confluence with Santa Rosa Creek. A driveway on the west side of the California Department of Forestry complex provides a potential connection to the creek trail. A proposed unpaved trail alongside

the north/right bank extending south from West College Avenue would replace the existing sidewalk and driveway on-street connection.

Street crossing treatments would include Type VI at Marlow Road (#46) and Type IV-B at West College Avenue (#47).

SKYHAWK CREEK

Skyhawk Creek is a tributary of Santa Rosa Creek, and is covered in three map tiles.

Urban boundary to confluence with Santa Rosa Creek

Maps: SANTA ROSA C, D, P

Type: Natural Creek

Length: 10,352 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Skyhawk Creek is for the most part a natural stream, with some sections routed underground downstream of Highway 12 towards the confluence with Santa Rosa Creek. When the Skyhawk subdivision was built, much of the riparian corridor was preserved, with a bypass storm drain pipe installed to carry increased storm water runoff around the reach to prevent a change in the seasonal nature of the vegetation. Plant species within this reach include willow, live oak, redbud, valley oak, big leaf maple, cottonwood, cattail, and grasses. Invasives include Himalayan blackberry.

This reach is recommended for preservation, due to the habitat value for fish and wildlife, especially upstream of Highway 12. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation.

Recreation, Access, and Transportation

The creek flows through City-owned land to Highway 12. An existing paved trail starts downstream of Sunhawk Drive and follows the north/right bank of the creek past Mountain Hawk Way, where an existing trail bridge (#10) crosses to paved trails on the south bank in Skyhawk Park. Existing and proposed entry points are located at the cul-de-sacs bordering the creekside open space, with unpaved/gravel trails connecting south to the paved trail. An existing unpaved/soft trail on the south bank connects Fawn Drive to Mountain Hawk Avenue. A proposed trail bridge (#9) would connect this trail to the existing paved trail on the north bank. The north bank trail continues west, crossing Mountain Hawk Drive again before crossing another existing trail bridge (#3) to the south/left bank and ending at Highway 12. South of Highway 12 an existing unpaved/soft trail follows the south bank of the creek between Diane Way and Melita Road, where the creek enters a culvert.

OAKMONT CREEK

Oakmont Creek is a tributary of Santa Rosa Creek, and is covered in four map tiles.

Urban boundary to confluence with Santa Rosa Creek

Maps: SANTA ROSA B, C, Q, R

Type: Natural Creek, Modified-Natural Creek

Length: 18,152 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Oakmont Creek flows through the Oakmont golf course and neighborhood, then alongside Channel Drive and Annadel State Park until it meets Santa Rosa Creek near Melita Road. In the more natural sections downstream of White Oak Drive, pools and riffles form the aquatic habitat, with roots, boulders, and undercut banks providing shelter. Plant species include bay, willow, redwood, live oak, big leaf maple, and valley oak. Invasives include tree of heaven, Himalayan blackberry, and periwinkle.

This reach is recommended for preservation, due to its habitat value for fish and wildlife. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation.

Recreation, Access, and Transportation

The creek flows through a mix of public and private property. An existing Class 1 paved trail extends on the south/left bank from White Oak Drive to Timber Springs Road. A proposed on-street connection along Timber Springs Road would connect to an existing unpaved road/trail in Annadel State Park. This trail is proposed to be paved. At Channel Drive a proposed on-street connection would continue to Spring Lake Park and along Montgomery Drive. A parallel on-street connection on the north bank would follow Oakmont Drive and Stone Bridge Road, passing along the driveway to the City's Oakmont Treatment Plant to cross on an existing trail bridge (#1) to Channel Drive.

4.2. BRUSH CREEK WATERSHED

WATERSHED SETTING

Brush Creek and its tributaries begin in the unincorporated hillsides surrounding Rincon Valley in northeast Santa Rosa. A little over half of the watershed lies within the urban boundary. About two-thirds of the land use within the urban boundary is residential and commercial properties while the remaining third consists of open land.

The Brush Creek watershed includes nine creek reaches. The major tributaries are Rincon, Ducker, and Austin Creeks. Although many parts of Brush Creek have been modified over time, it is still home to migrating steelhead trout, the western pond turtle, sprawling oak trees, and many other riparian plants and animals. Trails follow both banks of the creek from its confluence with Santa Rosa Creek at Flat Rocks upstream to Montecito Boulevard.

BRUSH CREEK

For the purposes of the Master Plan, Brush Creek is organized into three reaches, which are covered in five map tiles, moving downstream.

Reach 1: Urban boundary to Montecito Boulevard

Maps: BRUSH A, B, C

Type: Natural Creek

Length: 9,149 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

The headwaters of Brush Creek include two branches that join at the Brush Creek Reservoir which is owned by the Sonoma County Water Agency. From this confluence the creek flows through private parcels before entering a Sonoma County Water Agency flood control channel that starts half a mile above the confluence with Rincon Creek. There are many mature trees, forming a mostly healthy canopy. Plant species include valley oak, live oak, Oregon ash, and many understory invasives, including ivy and Himalayan blackberry. These invasives appear to be preventing regeneration of natives. Pools and riffles are present, with boulders and roots to provide shelter for fish. A channel scour just downstream of the bridge at Badger Road presents a barrier to migration upstream, due to a lack of water depth and excessive jump height.

The scour at Badger Road should be addressed to ensure adequate fish passage to the uppermost portion of this reach. Additional pools could be created if instream structures such as boulders or large woody debris were placed within the channel. Habitat enhancement involving removal of invasive species and replanting with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

The Brush Creek Reservoir is normally dry and provides open space for ball fields. Only high flood flows are diverted off stream and into the reservoir. No creekside trails exist

or are proposed. The southern portion of the reach is paralleled to the east by Class 2 bicycle lanes on Middle Rincon Road and to the west by a proposed on-street connection along Green Meadow Drive and Bridgewood Drive.

Street crossing treatments would include using the existing crossing at Mission Boulevard to cross Montecito Boulevard (#54).

Reach 2: Montecito Boulevard to Highway 12

Maps: BRUSH C, D, E

Type: Modified-Natural Creek

Length: 7,062 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Brush Creek is channelized throughout this reach, but trees along the banks provide some shade to the channel. Plant species include valley oak, live oak, madrone, willow, cattail, and buckeye. Invasive species include Himalayan blackberry, ivy, and Scotch broom. Aquatic pools are long, and there are limited riffles. Larger pieces of riprap and some overhanging vegetation provide shelter. Grouted riprap at the confluence of Brush and Austin Creek may present a grade change and thus a barrier to migrating fish. The culvert at Montecito Boulevard may present a migration barrier to some life stages of steelhead.

Habitat restoration is recommended for this reach. However, the presence of a trunk sewer line underneath the left bank service road between Austin Creek and Highway 12 prevents the restoration of this portion of the reach. With improved detention in the upper watershed, it may be possible to restore this reach within the current channel cross-section. Without such a change in reach hydrology, restoration is recommended only between Montecito Boulevard and Austin Creek. Restoration would include the removal of grouted riprap and concrete. The service road along the left bank would be removed to enlarge the creek channel area, creating room for a meandering low-flow channel, instream habitat structures such as boulders and rootwads to encourage pool formation, and planting of native vegetation.

Recreation, Access, and Transportation

For the entire reach an existing paved Class 1 service road/trail follows the west/right bank and an unpaved service road/trail runs along the east/left bank. The unpaved service/road trail is proposed to be removed for creek restoration north of Austin Creek. A trail bridge exists 600 yards downstream from Montecito Boulevard with midblock access points from Shadyoak Place (#60) and Mission Boulevard (#61). Existing midblock entry points also exist on the west/right bank from Adobe Court (#76), Jennifer Court (#77), and upstream of the Highway 12 crossing (#78). An entry point (#65) is possible from the development that borders the creek on the left bank about 1,000 feet downstream from the confluence with Austin Creek.

In order to cross Austin Creek, the left bank trail is routed to the sidewalk on Mission Boulevard. A trail bridge (#24) is proposed downstream of the Austin Creek confluence near the midblock entry point at Sherbrook Drive (#64). An undercrossing allows the

paved trail on the west/right bank to continue under Highway 12. A sidewalk on the north side of the Highway 12 bridge provides access from the east/ left bank to the undercrossing.

Street crossing treatments would include installation of a crosswalk across Highway 12 on the east side of Brush Creek, or using the existing underpass on the west side of the creek at Highway 12 (#79).

Reach 3: Highway 12 to Santa Rosa Creek

Map: BRUSH E

Type: Restored Creek

Length: 1,278 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Brush Creek includes the Flat Rock area and approximately 1000 feet of restored stream channel. Much of the tree canopy is intact along the right bank, while revegetation plantings along the left bank are progressing and eventually will provide more shade to the channel. Several species have come into the project area naturally with the high winter flows. Dominant plant species include willow, alder, cattail, valley oak, and live oak. Invasive species include eucalyptus, Himalayan blackberry, vinca, and Scotch broom.

Aquatic habitat includes several long pools with some riffles. Rootwads, boulders, and overhanging bank provide shelter for fish. Western pond turtles sun themselves on boulders, and water birds frequent the riffles. Bird species observed during a July, 2005, morning survey include mourning dove, Anna's hummingbird, acorn woodpecker, Nuttall's woodpecker, black phoebe, oak titmouse, western scrub jay, American crow, house finch, western tanager, and California towhee.

Habitat enhancement involving removal of invasive species and replanting with native vegetation is recommended throughout the reach. The restoration project area monitoring should continue, and adaptive management actions taken if the vegetation or other aspects of the project are not performing as intended.

Recreation, Access, and Transportation

Within this reach there is a paved Class 1 service road/trail on the west/right bank and a soft path and unpaved service road/trail on the east/left bank. A trail bridge exists near Flat Rock Circle.

RINCON CREEK

Rincon Creek is a tributary to Brush Creek and is covered in three map tiles, moving downstream.

Urban boundary to Brush Creek

Maps: BRUSH A, B, C

Type: Natural Creek

Length: 9,324 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is relatively natural, characterized by healthy canopy and isolated pools, with boulders and roots providing shelter for fish. Dominant tree species include bay, Oregon ash, live oak, valley oak, big leaf maple, willow. Also present are eucalyptus, Scotch broom, periwinkle, and Himalayan blackberry. The bridge at Brush Creek Road was determined to be a potential barrier to fish migration, due to lack of depth and excessive jump height. Culverts at Deer Trail Road, Amber Lane, and Riebli Road were also determined to be potential barriers due to lack of depth.

This reach is recommended for preservation, due to the habitat value for fish and wildlife. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation. The fish passage barriers at Deer Trail Road, Amber Lane, Riebli Road, and at Wallace Road need to be addressed.

Recreation, Access, and Transportation

Over half of this reach flows through Water Agency and City property. A proposed dirt/soft surface trail would extend from the beginning of the reach at the Urban Growth Boundary on the east/left bank to Deer Trail Road. A parallel Class 3 signed bike route along Wallace Road is proposed in the Sonoma County Outdoor Recreation Plan.

At Deer Trail Road the proposed dirt/soft trail would follow a proposed on-street pedestrian connection south on Wallace Road to Wild Lilac Lane. A paved trail exists paralleling the creek on the east side of Brush Creek Road between Wild Lilac Lane and Creek Meadow Drive. A City-owned parcel on the west bank south of Wild Lilac Lane offers a potential open space opportunity (#10.) A proposed on-street connection on the east bank would follow Cox Court, Greenmeadow Drive, and Bridgewood Drive south to Montecito Boulevard. A small potential park area exists at Greenbriar Way (#11).

Street crossing treatments would include installation of a crosswalk at Fistor Drive (#52).

AUSTIN CREEK

For the purposes of the Master Plan, Austin Creek is organized into three reaches, which are covered in three map tiles, moving downstream.

Reach 1: Urban boundary to St. Francis Road

Maps: BRUSH H, I

Type: Natural Creek

Length: 5,846 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Austin Creek is fairly natural within this reach, with a mature canopy. Plant species include willow, valley oak, alder, live oak. Some invasives are present, including ivy and Himalayan blackberry. Aquatic habitat includes shallow pools and riffles. Roots, woody debris, and boulders provide shelter for aquatic species. Culverts at St. Francis Road and San Ramon Way were determined to be potential barriers to fish migration, due to lack of depth.

This reach is recommended for preservation, due to the habitat value for fish and wildlife. Habitat enhancement is also recommended, including removal of invasive species and replanting with native vegetation. Fish passage barriers at St. Francis Road and San Ramon Way should be addressed.

Recreation, Access, and Transportation

This reach passes through both public and private parcels. Between San Ramon Drive and St. Francis Road, an unpaved trail is proposed along the south/left bank while Owls Nest Drive and Desoto Drive provide a potential on-street connection.

Reach 2: St. Francis Road to Brush Creek

Maps: BRUSH D, I

Type: Natural Creek, Modified-Natural Creek

Length: 10,261 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Austin Creek is channelized from Boas Drive to Brush Creek, but does include some mature trees that provide shade to the channel. The main plant species include valley oak, live oak, Oregon ash, and redwood. Also present are invasives such as ivy, eucalyptus, Himalayan blackberry, periwinkle, and pampas grass. Regeneration here, however, is high. Aquatic habitat within this reach includes long pools with some boulders providing shelter. The culverts at Acacia Lane, Jack London Drive, and Boas Drive, and the bridge at Mission Boulevard may present barriers for migrating fish, due to lack of depth.

The portion of this reach downstream of Middle Rincon Road is recommended for restoration. There are two channels at this location, the natural channel (now abandoned) and a modified channel that carries the waters of Austin Creek. Uniting the channels would enlarge the cross-sectional area and allow for the introduction of a meandering low-flow channel, along with instream habitat structures like rootwads and boulders to create pools, and plantings of native trees and shrubs. Fish passage barriers should be addressed at the road crossings mentioned above. Habitat enhancement is recommended throughout the reach, including removal of invasive species and replanting with native vegetation.

Recreation, Access, and Transportation

The creek is contained largely within public parcels with two short stretches of private parcels upstream of Calistoga Road and downstream of Boas Drive. A proposed on-street connection from St Francis Road follows El Encanto Drive to an existing trail

bridge (#31) that crosses to the north bank of the creek, and continues on Marit Drive to Calistoga Road. A potential paved trail could be developed along the south/left bank of the creek between El Encanto Drive and Calistoga Road. West of Calistoga Road on the north/right bank, a short length of existing paved path could be connected by a proposed paved trail to an existing short stretch of unpaved trail that leads to Boas Drive.

At Boas Drive, access would be required across 100 yards of private property in order to access City and Water Agency parcels with unpaved service roads/trails that encompass the rest of the reach. A paved trail is proposed for either bank of the creek in order to eliminate this gap. A trail bridge (#32) would be necessary if access were to be developed on the south bank of the creek. An on-street connection would follow Boas Drive south, Highway 12 west, and Jack London Drive north.

The unpaved service road/trail that begins downstream of Boas Drive follows the north/right bank to Middle Rincon Road. Downstream of Middle Rincon Road the service road/trail is located on the south/left bank. An on-street connection would extend north on Middle Rincon Road to Benicia Drive.

The paved and unpaved service road/trails extend to Acacia Lane, where an on-street connection would lead south to Highway 12. The creek flows in twin channels through this stretch and two existing trail bridges (#27, 28) are required to cross the creek near Benicia Drive. A proposed trail bridge over Ducker Creek (listed under reach 2 for that creek) would allow access from Acacia Lane to the unpaved trail on the right bank of Austin Creek that extends to Mission Boulevard. On the left bank, an existing paved path along Prospect Avenue leads to a short segment of soft path connecting to Mission Boulevard.

Street crossing treatments would include Type V at Calistoga Road (#84), Type I at Jack London Drive (#71), Type IV at Middle Rincon Road (#72) and Type VI on the south side of the creek at Mission Boulevard (#62).

Reach 3: Garfield Park Avenue to Middle Rincon Road (north fork)

Maps: BRUSH C, D, I

Type: Modified-Natural Creek

Length: 4,193 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

The creek has a Modified-Natural type channel through Oaklake Green and Tanglewood Parks. From Jack London Drive the creek flows through a culvert under private parcels to Middle Rincon Road and then through 100 yards of Modified-Natural channel to the end of the reach.

Tanglewood Park includes turf and paved pathways. Habitat value is low, though there are some large trees. A low water crossing within the park and the culvert at Middle Rincon Road may pose barriers to fish migration, due to lack of depth. Plant species include valley oak, willow, sycamore, nut sedge, and privet. There is some Himalayan blackberry but the primary invasive species is turf grass.

Habitat enhancement is recommended throughout this reach. Additional trees should be planted to shade the channel, and invasive species removed and replaced with native understory vegetation.

Recreation, Access, and Transportation

The creek is accessed by a network of existing paved paths through both parks. The sidewalk along Benicia Drive provides access to the “Twin” trail bridges in Reach 2. A proposed on-street connection via Jack London Drive, Hansen Drive, and Middle Rincon Road would parallel the western half of the reach, connecting north to Austin Creek Reach 3 and Ducker Creek. The low water crossing in Tanglewood Park could be replaced with a trail bridge.

DUCKER CREEK

For the purposes of the Master Plan, Ducker Creek is organized into two reaches, which are covered in three map tiles, moving downstream.

Reach 1: Urban boundary to Middle Rincon Road (south fork)

Maps: BRUSH C, F, G

Type: Modified-Natural Creek

Length: 9,738 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is mostly channelized, characterized by variable tree canopy. The creek has a natural channel down to Calistoga Road at which point it becomes a modified natural channel before entering a culvert at St. Marys Drive that extends to the end of the reach. Plant species include willow, valley oak, and live oak. The main invasive species is Himalayan blackberry. The majority of the above-ground portions are on private property, including a mobile-home park. There are pools and riffles, with some boulders providing shelter for aquatic species.

Habitat enhancement is recommended throughout this reach, including invasive species removal and replacement with native vegetation.

Recreation, Access, and Transportation

The creek passes through both public and private parcels. No public trails are existing or proposed.

Reach 2: Calistoga Road to Austin Creek (north fork)

Maps: BRUSH C, D, AND G

Type: Natural Creek, Modified-Natural Creek

Length: 8,966 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach begins near Maria Carillo High School property as a culvert which then surfaces in Rincon Valley Community Park and continues as a Modified channel to Montecito Boulevard, which it parallels in a culvert. The creek surfaces again as a Modified-Natural channel at Benjamins Road.

Steelhead trout were found during a September, 2005, survey of Ducker Creek within Rincon Valley Park. Tree canopy is minimal through this area, with cattail common. Aquatic habitat consists of a storm drain overflow channel, three ponds, and a channelized creek, which then flows through a storm drain pipe and daylights at Benjamins Road. West of Middle Rincon Road, a mature tree canopy thoroughly shades the creek channel. Common plant species within the reach include valley oak and willow. Invasives include Himalayan blackberry, pampas grass, privet, and cotoneaster. The culverts at Rinconada Drive and Middle Rincon Road may present barriers to migrating fish, due to lack of depth.

Habitat restoration is recommended through Rincon Valley Park. The concrete basins and channel bottom would be removed and replaced with a meandering creek, incorporating a low flow channel and boulders for aquatic habitat, and native vegetation to filter runoff from turf areas. Additional trees would be planted to increase shading of the channel. The basin currently used for the dog park could be reconstructed away from the creek. In addition, habitat enhancement is recommended throughout this reach, including invasive species removal and replacement with native vegetation.

Recreation, Access, and Transportation

From Rincon Valley Park to Middle Rincon Road the creek flows through private property. The creek parallels an existing Class II bikeway along Montecito Boulevard to Benjamins Road. Downstream of Middle Rincon Road, an unpaved service road follows the creek on its east/left bank to its juncture with the Ducker Creek Reach 1. One hundred yards upstream of this point an existing trail bridge crosses the creek to an unpaved service road that continues on to Benicia Drive. Downstream of Benicia Drive an unpaved service road follows the south/left bank to Culebra Avenue where another trail bridge crosses to Rinconada Park. (All service roads in this reach are proposed to be opened to the public.) An existing paved trail extends through the park. From the park an unpaved trail follows the west/right bank to the confluence with Austin Creek and the end of the reach. A trail bridge (#26) is proposed above the confluence with Austin Creek to connect east to Acacia Lane.

Street crossing treatments proposed include Type II at Benicia Drive (#57), and Type I at Rinconada Drive (#56), and Type IV at Middle Rincon (#55).

4.3. MATANZAS CREEK WATERSHED

Matanzas Creek flows from the northern slopes of Sonoma Mountain and across the agricultural and rural residential land of Bennett Valley before entering the City near Galvin Community Park. Within the City, the creek flows mainly through private property. Downstream of South “E” Street, Matanzas Creek is routed underground to its confluence with Santa Rosa Creek at Santa Rosa Avenue near City Hall. The Matanzas Creek watershed is comprised of ten creek reaches.

The largest tributary to Matanzas Creek is Spring Creek, which begins in Annadel State Park. Matanzas Reservoir and the Spring Creek Dam and Diversion to Spring Lake are major flood control structures. Spring Creek joins Matanzas Creek at the western tip of Doyle Park. Lornadell Creek begins near Galvin Community Park and flows through a flood control channel for most of its length, before joining Matanzas Creek downstream of Tachevah Drive. Arroyo Sierra Creek is a tributary to Spring Creek, beginning at Summerfield Drive as a natural stream but later flowing through channelized sections until it meets Spring Creek downstream of Mayette Avenue. Cooper Creek joins Matanzas Creek in Doyle Park. Within the City, the creeks flow mainly through private property.

MATANZAS CREEK

Matanzas Creek is organized into four reaches, which are covered in four map tiles, moving downstream.

Reach 1: Urban boundary to Bennett Valley Golf Course

Maps: MATANZAS A, B

Type: Natural Creek

Length: 5,100 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach includes Galvin Community Park and the Bennett Valley Golf Course. The creek is fairly natural except for three barriers to fish passage, including a crossing with riprap and concrete and two culverts. Aquatic habitat within this reach is otherwise intact, and includes pools, riffles, and a floodplain along the lower end of the golf course. Boulders, roots, and vegetation are present to provide shelter. Plant species include bay, Oregon ash, live oak, willow, alder, and buckeye. Himalayan blackberry, eucalyptus, and periwinkle are among the invasive species present.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat restoration recommended for this reach is focused on providing migratory fish passage upstream. Existing culverted crossings should be replaced with span bridges. In addition, habitat enhancement involving invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are public. However, due to conflicts with golf course use, additional public use is not proposed on the existing paved and unpaved pathways within and adjacent to the Bennett Valley Golf Course.

Reach 2: Bennett Valley Golf Course to Hoen Avenue

Maps: MATANZAS B, C

Type: Natural Creek

Length: 8,091 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is relatively natural, with good canopy cover. Pools and riffles are present, with boulders, large woody debris, roots, and overhanging banks for shelter. Plant species include bay, big leaf maple, live oak, valley oak, Oregon ash, willow, alder, and sedges. Invasives include privet, ivy, periwinkle, eucalyptus, and Himalayan blackberry. Erosion has been observed within this reach of the creek. The arched culvert at Bethards Drive is backwatered at low flows, which may allow for passage of juvenile fish.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are private, except for Creekside Park. From the north end of Bennett Valley Golf Course to Bethards Drive, there is no creek trail. At Bethards Drive, a proposed on-street connection on the right/north bank of the creek follows Creekside Road and Cypress Way to Hoen Avenue. This route passes Creekside Park, an existing open space parcel (#12.)

Reach 3: Hoen Avenue to confluence with Spring Creek

Maps: MATANZAS C, D

Type: Natural Creek

Length: 6,278 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Conditions

This reach of Matanzas Creek is relatively natural, with good stream canopy and varied aquatic habitat. Pools and riffles are present, and boulders, vegetation, and undercut banks provide shelter. Trout have been seen within this reach (considered to be rainbow trout, since they could be resident fish). A bridge apron/concrete slab at Monterey Court may serve as a barrier to fish passage. Some bank erosion and incision was noted during field surveys. Plant species include bay, alder, elderberry, maple, buckeye, live oak, and Oregon ash. Invasive species include ivy, periwinkle, and Himalayan blackberry. Giant reed was noted at the intersection of Hoen Avenue and Hoen Court.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are largely private until Doyle Park, except for the Caltrans Highway 12 right-of-way. Along Hoen Avenue from the beginning of the reach to the Doyle Park entrance, an existing Class 3 signed bike route (with a short section of Class 2) parallels the north/right bank of the creek and connects to the network of paved paths in Doyle Park. There is a potential park site (#13) at Hoen Avenue Frontage Road. A proposed paved path would follow the Caltrans Highway 12 right-of-way east along the Spring Creek Diversion pipeline.

At Farmers Lane, a proposed on-street connection links Matanzas Creek with Spring Creek. Doyle Park has an existing trail bridge (#43) and two existing restrooms and two public parking areas. Along Doyle Park Drive a proposed on-street connection would link to Santa Rosa Creek.

Reach 4: Confluence with Spring Creek to confluence with Santa Rosa Creek

Map: MATANZAS D

Type: Natural Creek, Modified Creek, Culvert

Length: 3,301 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is fairly natural except for a channelized section downstream of South "E" Street and the approximately 1500 foot culvert underneath Sonoma Avenue. This culvert presents a significant fish barrier, as there is no fish ladder present. Aquatic habitat includes pools and riffles, with boulders, roots, and undercut banks for shelter. Dominant plant species include bay, redwood, box elder, live oak, big leaf maple, alder, Oregon ash, and buckeye. Invasive species include ivy, tree of heaven, periwinkle, and Himalayan blackberry.

The majority of this reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Consideration should be given to the daylighting and restoration of Matanzas Creek near the confluence of Santa Rosa Creek. If daylighting is not feasible, a fish ladder should be constructed to open up access to several miles of healthy habitat upstream for migrating steelhead trout.

Recreation, Access, and Transportation

The parcels through which the creek passes are mostly private with no existing creek trails. A City owned parcel at the northwest corner of the creek and Brookwood Avenue presents the potential opportunity for a creekside park (#14.)

SPRING CREEK

Spring Creek is organized into three reaches, which are covered in four map tiles, moving downstream.

Reach 1: Spring Creek from Annadel State Park to Summerfield Road

Maps: MATANZAS E, F

Type: Natural Creek

Length: 5,512 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Spring Creek is fed from Annadel State Park, and flows along Park Trail Drive. Flow is seasonal, but there are maturing trees providing canopy cover, including live oak, bay, buckeye, valley oak, Oregon ash, and black walnut. The invasive Himalayan blackberry is abundant downstream towards and along Summerfield Road. At the upstream end of the reach the Spring Creek Dam and Diversion divert flood flows into Spring Lake. The culverts at Stonehedge and Summerfield Road are severely undersized, and may present barriers to fish migration.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

From the diversion, an existing dirt/soft path on City property follows the south/left bank of the creek along Park Trail Drive to the street's intersection with Summerfield Road. The creek bends away from the trail 250 feet before this point and travels mostly through private parcels before crossing Summerfield Road. A proposed on-street connection from Park Trail Drive would lead via Summerfield Road and Brookshire Circle to the trails along Arroyo Sierra Creek at Siskiyou Avenue.

Reach 2: Spring Creek from Summerfield Road to Franquette Avenue

Maps: MATANZAS C, F

Type: Natural Creek, Modified-Natural Creek

Length: 5,734 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Storm flows are diverted from Spring Creek underground through a Sonoma County Water Agency conduit at Summerfield Road, flowing westward to downstream of Farmers Lane. This reach has good canopy cover where trees have been allowed to mature. Pools are present, and overhanging vegetation provides some cover. Trees include alder, willow, Oregon ash, black walnut, big leaf maple, bay, and buckeye. Cattail and coyote bush are also present. Invasive species include Himalayan blackberry, fennel, and silk tree.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Restoration of natural stream meanders and native vegetation may be possible through the Caltrans right of way between Hoen Avenue and Mayette Avenue.

Recreation, Access, and Transportation

The parcels through which the creek passes are public and private. At Summerfield Road, the creek crosses the Caltrans Highway 12 right-of way where a paved trail is proposed to follow the right-of-way westward across Arroyo Sierra Creek and on to Hoen Ave. A proposed on-street connection would provide access along Summerfield Road, Wyoming Drive, and Spring Creek Drive. The creek borders Spring Creek Elementary School property, with a proposed trail bridge (#46) at the northwest corner. An existing unpaved path by Village Elementary School extends west from the end of Spring Creek Drive. This path is proposed to be paved to Yulupa Avenue. From Yulupa Avenue until the end of the reach at Franquette Avenue, there is no public creek access. A proposed on-street connector along Spring Creek Drive would parallel the creek.

Street crossing treatments proposed include a pedestrian barrier and directing users to cross at Hoen for Summerfield Road (#95), and Type IV for the north side of Yulupa Avenue (#88).

Reach 3: Franquette Avenue to confluence with Matanzas Creek

Maps: MATANZAS C, D

Type: Modified-Natural Creek

Length: 6,696 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is channelized near Farmers Lane and more natural downstream to Doyle Park. Pools and riffles are present, with good canopy in the downstream portion. Roots, undercut banks, and boulders provide cover. Plant species include bay, buckeye, willow, live oak, black walnut, big leaf maple, Oregon ash, and valley oak. Invasive species include Himalayan blackberry, ivy, periwinkle, and eucalyptus. Culverts at Hahman Drive and Farmers Lane may present barriers to fish migration, due to lack of depth.

This reach is recommended for preservation, due to habitat value for fish and wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended. Restoration of natural stream meanders and native vegetation may be possible along the frontage with Montgomery High School, between Franquette Avenue and Hahman Drive.

Recreation, Access, and Transportation

The parcels through which the creek passes are public and private. A trail bridge (#41) exists at Franquette Avenue. An on-street connection would parallel the creek along Spring Creek Drive with connections south to the creek at Franquette Avenue and

Hahman Drive. A proposed paved trail would follow along the creek's south/left bank, through Montgomery High School property. At Hahman Drive, the route would follow a proposed on-street connection along Rock Creek Drive. At Farmers Lane the proposed connection leaves Spring Creek and heads south to connect with the Class 2 bike lanes and Class 3 bike route extending west on Hoen Avenue paralleling Matanzas Creek. The bike route connects with a network of existing paved paths in Doyle Park. These paths serve as creek access for the remainder of Spring Creek.

LORNADELL CREEK

Lornadell Creek is a tributary of Matanzas Creek and is covered in two map tiles, moving downstream.

Galvin Community Park to confluence with Matanzas Creek

Maps: MATANZAS A, B

Type: Natural Creek, Modified Creek

Length: 7,596 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Lornadell Creek is channelized and minimally vegetated, with more vegetation and canopy cover downstream of Tachevah Drive, towards the confluence with Matanzas Creek. Portions of this creek have concrete banks and a concrete channel bottom. As such, canopy cover is very low, and habitat value for aquatic life is minimal. Valley oak, cottonwood, willow, and alder occur in some places. Invasives include ivy, privet, eucalyptus, and Himalayan blackberry. Cattail are common. Culverts at Tachevah Drive and Bethards Drive may present a barrier to fish migration due to lack of depth.

Some stream meanders and native vegetation could be restored to Lornadell Creek along the frontage with Yulupa School and Mesquite Park. A detailed hydrology analysis of the watershed for this creek will be necessary before development of a habitat restoration plan. Habitat enhancement involving invasive species removal and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

The parcels through which the creek passes are public and private. Mesquite Park and Yulupa Elementary School on the south/left bank provide an existing trail connection between Cactus Avenue and Tachevah Drive. Two existing trail bridges connect Cactus Avenue to the Bennett Valley Shopping Center and Yulupa School to Tamarisk Drive.

ARROYO SIERRA CREEK

Arroyo Sierra Creek is a tributary of Matanzas Creek and is covered in two map tiles, moving downstream.

Summerfield Road to confluence with Spring Creek

Maps: MATANZAS E, F

Type: Natural Creek, Modified Creek

Length: 5,787 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Arroyo Sierra Creek is fairly natural, with very good canopy cover as well as pools and riffles, between Summerfield Road and Horseshoe Drive, but then is channelized down to the confluence with Spring Creek. Arroyo Sierra Creek flows through the Caltrans right of way between Hoen Avenue and Mayette Avenue. Valley oak, walnut, cottonwood, live oak, bay, and willow are common. Invasives include Himalayan blackberry, privet, and ivy. Culverts at Mayette Avenue, Hoen Avenue, and Siskiyou Avenue may be barriers to migrating fish due to lack of depth. Just downstream of Hoen Avenue, there is a large concrete structure that diverts all but the highest flows from Arroyo Sierra Creek to the Spring Creek diversion pipe. This structure is definitely a barrier to fish migration.

Birds noted during the field survey included American crow, mourning dove, Stellars jay, mockingbird, black phoebe, red-shouldered hawk, and California towhee. Since the creek flows through riparian forest and open grassland habitats, the area would be expected to support a diverse mix of bird species.

Preservation of Arroyo Sierra Creek upstream of Hoen Avenue is recommended due to habitat value for wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is recommended throughout the reach. Fish passage barriers should be addressed, but only after passage is secured through the concrete diversion structure just east of Hoen Avenue.

Recreation, Access, and Transportation

Except for one private parcel the creek passes through public parcels. An existing paved trail runs along the north/right bank of the creek from Summerfield Road and, past Strawberry Park, to Horseshoe Drive. A trail bridge (#44) is proposed to connect with Alejandro Drive. An existing unpaved trail begins at Siskiyou Avenue and continues to Hoen Avenue, with a proposed entry point and trail bridge (#47) at Sacramento Avenue near Calaveras Drive. A proposed on-street route would connect from Spring Creek via Summerfield Road, Brookshire Circle, Siskiyou Avenue, and Calaveras Drive to proposed bridge #47. Water Agency parcels with unpaved service roads on the northeast/right bank downstream of Hoen Ave and upstream of Mayette Avenue are proposed to be opened and paved to allow connection to the proposed paved trail in the Caltrans right-of-way.

COOPER CREEK

Cooper Creek is a tributary of Matanzas Creek and is covered in one map tile.

Urban boundary above Cooper Drive to confluence with Matanzas Creek

Map: MATANZAS G

Type: Natural Creek, Culvert

Length: 5,903 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach begins as a healthy seasonal creek but at Cooper Drive is directed into a culvert that leads to Matanzas Creek. Observed plant species upstream of Cooper Drive include Oregon ash, willow, valley oak, and poison oak, with Himalayan blackberry also present. Cobbles, gravel, and clay form the stream substrate, and pools and riffles are present. Shelter for aquatic life consists mainly of overhanging bank.

Preservation of the remnant portion of Cooper Creek upstream of Cooper Drive is recommended, due to habitat value for wildlife. Habitat enhancement involving invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are public and private. There is no creek trail access existing or proposed for Cooper Creek.

4.4. PINER CREEK WATERSHED

WATERSHED SETTING

Piner Creek (along with tributaries Coffey, Paulin, Steele, Indian, and Russell Creeks) and Peterson Creek drain the northwest portion of Santa Rosa. For the purposes of the Citywide Creek Master Plan, Paulin Creek and its tributaries Poppy and Pomo Creeks are treated as a separate watershed. Peterson Creek flows directly to Santa Rosa Creek, but was included, along with its tributary Forestview Creek, in the Piner watershed because of its proximity to Piner Creek. In all, there are ten creek reaches within the Piner Creek watershed.

Piner and Russell Creek start east of Highway 101, in the Fountaingrove neighborhood. Piner Creek flows into Fountaingrove Lake, then loses elevation as it continues to the west, crossing under Highway 101, and then flows across level terrain until joining Santa Rosa Creek west of Fulton Road. Russell Creek is fed by several draws, which meet near Bicentennial Way. From there, Russell Creek flows through a storm drain, daylights again west of Mendocino Avenue next to Kaiser Hospital, crosses under Highway 101, and flows west to meet Piner Creek. Coffey Creek and Steele Creek both begin west of Highway 101. Peterson Creek and Forestview Creek start in northwest Santa Rosa and flow southwest towards Santa Rosa Creek.

Most westward reaches of these creeks have been engineered for flood control and are accessible by public trails on Sonoma County Water Agency property. Portions of Piner Creek and Russell Creek are surrounded by predominately residential development, with some commercial property. Mature trees shade much of the main channel, which is home to quail, waterfowl, and steelhead trout.

PINER CREEK

For the purposes of the Master Plan, Piner Creek is organized into three reaches, which are covered in six map tiles, moving downstream.

Reach 1: Headwaters to Highway 101

Maps: PINER A, B

Type: Natural Creek

Length: 8,751 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Piner Creek is more natural than the reaches west of Highway 101. It starts near the Fountaingrove golf course, flowing into Fountaingrove Lake. The lake is thought to support Western pond turtle, a Species of Special Concern. Below the lake, abundant canopy from mature trees and a wide riparian corridor create habitat for wildlife. Dominant plant species include live oak, valley oak, Oregon ash, torrent sedge, horsetail, and willow. Invasive species present include privet, Himalayan blackberry, and acacia trees. Aquatic habitat includes pools and riffles, with roots and overhanging banks for cover.

Preservation is recommended for the more natural portions of this reach, upstream of Old Redwood Highway. Habitat enhancement is recommended throughout the reach, involving removal of invasive species and replacement with native vegetation.

Recreation, Access, and Transportation

An existing Class 1 paved path parallels the creek on the south side of Fountaingrove Parkway and on Round Barn Boulevard.

Reach 2: Highway 101 to Northwestern Pacific Railroad

Maps: PINER B, C

Type: Modified-Natural Creek

Length: 7,365 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

The creek is in a culvert under U.S. 101, and extending to Airway Drive, where it daylights as a Modified type channel to a junction with a small tributary channel that enters from the north. From this point to the end of the reach the creek is in a Modified Natural type channel.

Though lower Piner Creek is channelized, there are many mature trees along the creek, providing shade and cover for fish and wildlife. The most common plant species include live oak, walnut, and willow. Invasive species include cattail, fennel, eucalyptus, Himalayan blackberry, pampas grass, and ivy. Aquatic habitat in this reach includes long pools and short riffles, with some overhanging vegetation providing shelter for fish. Riprap is present along some of the bank area. This reach flows through a mix of commercial and residential neighborhoods.

During a September, 2005, survey by the Sonoma County Water Agency, steelhead trout were found within this reach. The culvert at Hopper Avenue may present a barrier to migrating fish, due to lack of depth. The culvert at Coffey Lane was categorized as a barrier to certain life stages of fish, but Taylor et al. (2003) determined that passage is adequate due to proper sizing and culvert condition. A concrete bottom at the railroad crossing may present a barrier to migrating fish, but has not been classified.

Habitat enhancement is recommended throughout the reach, involving removal of invasive species and replacement with native vegetation.

Recreation, Access, and Transportation

An unpaved service road exists on the east/left bank north of Hopper Avenue, but this is not proposed to be opened because it would not connect through. A potential pocket park (#15) is identified on the southeast bank of the creek north of the crossing of Hopper Avenue. The public trail would start on an unpaved service road on the west/right bank south of Hopper Avenue, continuing to Piner Road. The service road south of Piner is not proposed to be opened. An on-street connection follows Piner Road west from the creek trail to the SMART tracks and trail.

Street crossing treatments proposed include Type VII at Piner Road (#105) and Type VI at Hopper Avenue (#102).

Reach 3: Northwestern Pacific Railroad to Santa Rosa Creek

Maps: PINER C, D, F

Type: Modified-Natural Creek

Length: 12,559 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Though this lowest reach of Piner Creek is channelized, there are many mature trees along the creek, providing shade and cover for fish and wildlife. The most common tree species include live oak, valley oak, walnut, alder, big leaf maple, and willow. Regeneration is high, despite the presence of invasive species that include cattail, fennel, eucalyptus, Himalayan blackberry, and ivy. Aquatic habitat in this reach includes long pools and short riffles, with boulders and vegetation providing shelter for fish. During a September, 2005, survey steelhead trout were found within this reach.

This reach should be restored. The channel could be enlarged to make room for a low-flow channel, instream habitat structures like boulders or rootwads to promote pool formation, and planting of native vegetation. One service road could be removed along the left bank from Marlow Road to Paulin Creek, the right bank from Paulin Creek to Steele Creek, and the left bank from Steele Creek to Santa Rosa Creek. In addition, habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

The reach is entirely owned by Sonoma County Water Agency. An unpaved service road/trail exists on the west/right bank the entire reach, with a culvert crossing of Coffey Creek. An unpaved service road/trail exists on the east/left bank from Marlow Road also to the end of the reach at Santa Rosa Creek.

A paved trail is proposed to run the entire length of the reach. However, it will have to twice cross to the opposite bank to coordinate with proposed creek restoration. The service road would be paved on the west/right bank from the SMART Trail to downstream of the confluence with Paulin Creek. At this point, a proposed trail bridge (#66) would cross to the east/left bank, also providing a connection to the Paulin Creek trail. Another proposed trail bridge near the Steele Creek confluence (#49) would return the paved trail to the west/right bank for the rest of the reach.

The service roads on the bank opposite the proposed paved trail route would be restored, namely: the east/left bank from Marlow Road to the Paulin Creek confluence, the west/right bank from this confluence to Steele Creek, and on the east/left bank from Steele Creek to Santa Rosa Creek.

Potential entry points are identified on the east/left bank at Creekfield Drive and Marlow Court. Undercrossings are proposed at Guerneville Road and Fulton Road. A parallel

on-street connection is provided by Class 2 bike lanes on Marlow Road and Guerneville Road

Street crossing treatments proposed include Type VI at Marlow Road (#111), Type VII and a proposed undercrossing at Guerneville Road (#115), and Type VII at Fulton Road (#121).

STEELE CREEK

Steele Creek is a tributary of Piner Creek and is covered in two map tiles, moving downstream.

Frances Street to Piner Creek

Maps: PINER E, J

Type: Modified-Natural Creek

Length: 11,099 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Storm water runoff from the area around the Santa Rosa Junior College campus flows through storm drain lines under Highway 101, before surfacing as Steele Creek, near Frances Street. From there it flows west through a Sonoma County Water Agency engineered channel until it joins Piner Creek. Several stretches include fairly mature riparian vegetation, including willow, cottonwood, valley oak, and live oak. There are also areas with mature eucalyptus trees, and other invasive species such as Himalayan blackberry, privet, and tree of heaven.

Aquatic habitat within this reach consists of long pools with slow-moving water. A Sonoma County Water Agency aqueduct crossing the creek downstream of the railroad tracks presents a barrier to migrating fish. Culverts at Gamay Street, Marlow Road, Ridley Street, Lance Drive, and Dutton Avenue are considered barriers due to a lack of depth. The confluence of Steele Creek and Piner Creek consists of a pair of culverts, which are considered barriers due to excessive slope.

The valley oaks along the Northwestern Pacific right of way should be preserved. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. The fish migration barriers should be addressed, most importantly the barrier at the confluence of Steele Creek and Piner Creek.

Recreation, Access, and Transportation

The creek passes through both public and private parcels. At the start of the reach, an on-street connection would lead east to the future pedestrian-bicycle overcrossing of Highway 101 to the Santa Rosa Junior College campus.

An unpaved service road/trail follows the east/right bank from upstream of Jennings Avenue to Guerneville Road. An existing trail bridge crosses the creek at Jennings

Avenue. Potential park/open space sites are identified north and south of Jennings Avenue (#19 and #18).

A short segment of paved trail exists on the south/left bank between the SMART tracks and North Dutton Avenue. A Class II bike lane parallels the creek on Guerneville Road. Ridley Avenue provides an on-street connection from the bike lanes to the unpaved service road/trail extending from Ridley Avenue to Marlow Road on the south/left bank of the creek. An unpaved service road/trail exists on the north/right bank between Guerneville Road and Ridley Avenue, but this will remain closed. An on-street connection is proposed to extend south on Ridley Avenue, and a parallel east-west on-street connection is proposed on Jennings Avenue.

From Marlow Road a dirt/soft path and then sidewalk along Jennings Avenue follows the creek on the south/left bank to Gamay Street. On the north/right bank, a proposed paved path in the Olive Grove subdivision connects to a proposed on-street connection using the sidewalk along Zinfandel Avenue. A proposed trail bridge (#48) would connect across the creek at this point. The sidewalk serves as a creekside path until connecting to an existing dirt/soft path for the final 250 feet above the junction with the Piner Creek Trail. This dirt/soft path is passable only at low water flows and is proposed to be paved.

Street crossing treatments proposed include using the crosswalk at Jennings to cross Marlow Road (#117).

INDIAN CREEK

Indian Creek is a small tributary of Russell Creek, and is covered in two map tiles.

Highway 101 to confluence with Russell Creek

Map: PINER B, C

Type: Modified Creek

Length: 1,464 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Indian Creek is channelized, conveying water from near Highway 101 south to Russell Creek. The creek is mostly above ground. Observed plant species include cattail, Himalayan blackberry, with an occasional willow, cottonwood, or walnut. There is very little shade for the channel. Aquatic habitat consists of long pools with some riffles possible due to the cattails.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

No access is proposed for this reach.

COFFEY CREEK

Coffey Creek is a tributary of Piner Creek and is covered in two map tiles, moving downstream.

Dennis Lane to Piner Creek

Maps: PINER C, H

Type: Culvert, Modified-Natural Creek

Length: 7,349 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Coffey Creek flows through a mix of commercial and residential areas southward to where it joins Piner Creek. The creek has been routed underground through most of the urban area but several fairly natural areas remain. This reach does support mature vegetation in some areas. Tree cover includes live oak, valley oak, willow, redwood, and some Oregon ash. Invasive species present include Himalayan blackberry, fennel, and tree of heaven. Other portions of this reach have little canopy cover and the dominant plant species are annual grasses. Aquatic habitat includes pools and some riffles, with some roots and overhanging vegetation providing shelter in selected areas.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

Coffey Park has a system of paved trails. A parallel on-street connection follows Coffey Lane in the form of a Class 3 bike route. A paved trail is proposed on the east/left bank from Piner Road south to Piner Creek.

PETERSON CREEK

Peterson Creek is a tributary of Santa Rosa Creek, but has been included in the Piner Watershed due to its proximity. The creek is covered in two map tiles, moving downstream.

Fulton Road to Santa Rosa Creek

Maps: PINER F, G

Type: Natural Creek and Modified-Natural Creek

Length: 8,153 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Peterson Creek is channelized downstream of Youth Community Park but supports mature vegetation that shades the channel. Adjacent parcels include parkland, rural residential and agricultural land, featuring seasonal wetlands and vernal pools that support various state and federally-protected species. Dominant plant species within the creek corridor include bay, Oregon ash, willow, live oak, valley oak, and buckeye. Many invasive species are present, including purple thistle, French broom, tamarisk, bamboo, acacia, teasel, Himalayan blackberry, pampas grass, silk tree, and giant reed. Aquatic

habitat includes some pools and riffles, with some overhanging vegetation and roots in the Youth Park portion that provide shelter for fish. At the confluence with Santa Rosa Creek the grouted riprap bottom and a drop in elevation presents a barrier to migrating fish. The culvert at Fulton Road may also be a barrier due to lack of depth.

Preservation is recommended for Peterson Creek through Youth Park, due to habitat value for fish and wildlife. Habitat restoration is recommended where possible. The most likely location would be between Guerneville Road and Santa Rosa Creek, with channel enlargement possible through removal of one of the service roads. Instream habitat structures and native vegetation could be placed in the creek channel. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. Fish passage at the confluence of Peterson Creek and Santa Rosa Creek should be addressed.

Recreation, Access, and Transportation

Existing paved trails on the south/left bank of the creek in Youth Community Park are connected to the north/right bank by an existing trail bridge. An unpaved service road exists on the northwest/right bank from the park all the way to Santa Rosa Creek. The section between the park and Guerneville Road would be opened for public use and paved. To continue to the Santa Rosa Creek Trail, a short on-street connection follows Guerneville Road east to the unpaved service road/trail on the southeast/left bank of Forestview Creek and Peterson Creek. This service road is also proposed for paving. The existing unpaved service road on the west/right bank downstream of Guerneville Road to Santa Rosa Creek would be removed to support restoration efforts.

The proper street crossing treatment should be jointly determined by the City and County for Guerneville Road (#123) due to the high speed of traffic there. The addition of a crosswalk at the north side of the Piner High School driveway is recommended for crossing Fulton Road (#125).

FORESTVIEW CREEK

Forestview Creek is a tributary of Peterson Creek and is covered in two map tiles, moving downstream.

Peterson Lane to Piner Creek

Maps: PINER F, G

Type: Culvert, Modified-Natural Creek

Length: 6,114 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Forestview Creek is a channelized waterway leading from east of Fulton Road westward to Peterson Creek. A remnant of the original channel flows through Peterson Lane Park and a nearby apartment building complex. West of Fulton Road, the feeling of the channel quickly becomes more rural, with several open parcels adjacent to the creek. Tree species such as live oak, walnut, and valley oak provide some canopy cover. Invasive species such as eucalyptus, French broom, oleander, Himalayan blackberry,

cotoneaster, periwinkle, and water primrose are also present. Aquatic habitat includes pools, with shelter limited to overhanging blackberry and a few boulders. A possible fish barrier is present at the confluence with Peterson Creek. Culverts at Fulton Road and Country Manor Road are considered barriers due to lack of depth.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

Paved trails and a trail bridge exist in Peterson Lane Park. An on-street connection is proposed via Yardley Street, Apple Tree Drive, and Fulton Road to the open channel of Forestview Creek, where an unpaved service road/trail extends westward on the north/right bank to Guerneville Road. Here the trail switches to the south/left bank and is proposed to be paved as discussed under Peterson Creek. A potential park/open space opportunity (#17) exists at the end of Ivy Manor Court.

The proper street crossing treatment should be jointly determined by the City and County for Guerneville Road (#124) due to the high speed of traffic there.

RUSSELL CREEK

Russell Creek is a tributary to Piner Creek, and is organized into two reaches, which are covered in two map tiles, moving downstream.

Reach 1: Russell Creek from headwaters to Highway 101

Map: PINER I

Type: Natural Creek, Modified-Natural Creek

Length: 7,874 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Russell Creek starts from several unnamed intermittent tributaries in the Fountaingrove neighborhood, a few of which flow into Nielsen Lake, and then continue down a steep slope to near Bicentennial Way. Except for the lake, the creek in this area is very natural, with mature trees and natural features providing aquatic habitat including riffles and pools, and shelter for fish. Plant species include live oak, madrone, and willow. The main invasive species present is scotch broom. Portions of the creek near Bicentennial Way are underground, leading to an aboveground section between Mendocino Avenue and Highway 101. This latter section is channelized, but does include trees and understory plants.

Preservation is recommended for the portions of this reach upstream of Bicentennial Drive. Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach.

Recreation, Access, and Transportation

An existing paved Class 1 trail extends along the creek from Nielson Ranch Park west to Bicentennial Way where it enters a culvert, after crossing the creek once on a trail bridge. West of Mendocino Avenue, the creek daylights until it enters a culvert again at Highway 101. There is an existing unpaved service road/trail along the north/right bank along this aboveground section. A proposed paved trail would skirt the cloverleaf northeast of Highway 101 and Bicentennial Way, providing a connection to the existing Class 3 bike route crossing of Highway 101.

Reach 2: Russell Creek from Highway 101 to Piner Creek

Maps: PINER C, I

Type: Modified-Natural Creek

Length: 4,206 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

West of Highway 101, Russell Creek is a channelized waterway, flowing through predominately commercial and residential areas. There is a long culvert underneath Highway 101 to Range Avenue. Plant species present include live oak, bay, walnut, cattail, and Monterey pine. Invasive species include eucalyptus, French broom, cotoneaster, privet, pampas grass, and Himalayan blackberry. Aquatic habitat includes long pools with slow moving water and a few riffles. A concrete check dam structure half way between Range Avenue and the confluence with Piner Creek may present a barrier to migrating fish. This location was considered a barrier due to excessive jump height.

Habitat enhancement involving removal of invasive species and replacement with native vegetation is recommended throughout the reach. The fish passage barrier at the check dam should be addressed.

Recreation, Access, and Transportation

An unpaved service road/trail extends west on the north/right bank from Range Avenue to the end of the reach and the Piner Creek Trail.

4.5. PAULIN CREEK WATERSHED

WATERSHED SETTING

Paulin Creek (with its tributaries Poppy and Pomo Creeks) forms the main tributary to Piner Creek. Starting in the fir covered hillsides of Hidden Valley, the creek drops 680 feet in elevation to Mendocino Avenue in the first half of its journey and, after disappearing under Highway 101, loses only an additional 60 feet in elevation before entering Piner Creek west of Marlow Road. The creek is accessible in many areas by creekside trails and City parks. In 2001, the Sonoma County Agricultural Preservation and Open Space District created a 43 acre open space preserve along Paulin Creek near Chanate Road. The Paulin Creek watershed is comprised of nine creek reaches.

Poppy Creek begins as an intermittent drainage north of the Proctor Terrace neighborhood, and makes its way towards two City owned ponds located north of the Rural Cemetery on Franklin Avenue. From the ponds the creek flows underground until resurfacing at Wright Street. Winding through the Santa Rosa Junior College neighborhood, the creek disappears underground again at Mendocino Avenue. It resurfaces downstream of Steele Lane, flows through Steele Lane Park, and joins Paulin Creek downstream of Major Drive. Pomo Creek travels a short distance through Northwest Community Park before joining Paulin Creek.

PAULIN CREEK

For the purposes of the Master Plan, Paulin Creek is organized into six reaches, which are covered in six map tiles, moving downstream.

Reach 1: Headwaters to Sleepy Hollow Drive (east fork)

Maps: PAULIN A, B

Type: Natural Creek

Length: 5,178 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is comprised of a privately-owned canyon with seasonal flow, with a steep gradient leading down to the residential neighborhood below. Plant species include bay, valley oak, and live oak, and the most abundant invasive species is Scotch broom.

Preservation is recommended for this reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

No trails exist or are proposed for the East Fork of Paulin Creek. A proposed on-street connection along Aaron Drive is described in Reach 6.

Reach 2: Sleepy Hollow Drive to Chanate Road (near Parker Hill Road)

Maps: PAULIN B, C

Type: Natural Creek
Length: 6,634 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

The stream corridor is fairly narrow with pools and riffles. Overhanging vegetation and boulders provide shelter for aquatic life. Plant species include valley oak, and willow, with the most abundant invasive species being Himalayan blackberry and privet. Above this reach, part of the flow was diverted into a culvert that roughly follows the path of Aaron Drive.

Preservation is recommended for this reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

This reach is partly on private property and partly on public property. Downstream of Sleepy Hollow Road existing dirt/soft trails follow both sides of the creek. The trail on the west/right bank connects via an existing trail bridge (#60) to the existing paved paths in Hidden Valley Park. The trail on the east/left bank crosses trail bridge (#59) over a small tributary stream before entering the park. An existing trail bridge (#76) at Castle Rock Court connects via a proposed on-street connection to an existing Class 3 bike route along Parker Hill Road. A dirt/soft surface trail is proposed along the west/right bank of the creek from this crossing to Chanate Road, provided an easement could be obtained across a private condominium complex property. A parallel on-street connection is proposed from Hidden Valley Park on Bonita Vista Lane to the existing Class 2 bike route on Chanate Road.

Reach 3: Chanate Road (near Parker Hill Road) to Mendocino Avenue

Map: PAULIN D
Type: Natural Creek
Length: 2,301 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is more natural, with a step-pool pattern to the creek channel and a wider, relatively undisturbed riparian corridor. There is abundant canopy cover. Plant species include willow, valley oak, and alder, with a strong presence of the invasive species Himalayan blackberry, privet, and Scotch broom. Aquatic habitat includes pools and riffles, with woody debris, boulders, and overhanging banks for shelter. Potential barriers for fish include culverts at Mendocino Avenue, three crossings of Chanate Road, and Piner Reservoir.

Preservation is recommended for this reach, due to habitat value for wildlife. The barriers to fish migration should be addressed. In particular, passage through the Piner Reservoir would allow access to upstream habitat for steelhead. Habitat enhancement

including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The Class 2 bike lanes along Chanate Road provide an on-street connection to the Paulin Creek Preserve. Sonoma County Agricultural Preservation and Open Space District is developing a trail and management plan for the County, Water Agency and Open Space District properties that encompass the preserve. An existing service road on the north bank at the upstream end of the preserve would be opened, connecting from an existing parking area on the south side of Chanate Road. Existing dirt/soft trails and an existing service road on the south/left bank of the creek would be opened, continuing the route downstream to Chanate Road. A proposed on-street connection would extend south of the Preserve on Beverly Way.

Downstream of Paulin Creek Preserve the creek passes almost exclusively through private property. A proposed on-street connection that roughly parallels the creek would follow the existing Class 2 bike lane along Chanate Road to Mendocino Avenue.

Reach 4: Mendocino Avenue to Highway 101

Map: PAULIN D

Type: Natural Creek

Length: 2,315 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Paulin Creek flows alongside the County Administrative Center. Poppy Creek enters Paulin here. The banks are fairly steep, with a good amount of canopy cover but very little understory species except for invasive species. There is some concrete reinforcement of banks in this reach. Aquatic habitat consists of pools and riffles. Boulders, roots, and undercut banks provide shelter for fish. The culverts underneath Highway 101 and at Mendocino Avenue may present fish barriers. Plant species include redwood, willow, live oak, and bay, with invasive species including Himalayan blackberry and giant reed.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended. Habitat restoration may be possible with removal of some of the landscaped area. Ground water contamination may be an issue for restoration activities within this reach.

Recreation, Access, and Transportation

This reach is a mix of public and private property. An existing paved trail follows the north/right bank between Mendocino Avenue and County Center Drive. Private property borders the opposite bank. A trail bridge (#62) is proposed to connect this trail to the end of Meyers Drive, which would start on-street connections to Poppy Creek trails. Highway 101 can be crossed by either using the existing Class 3 bike route on County Center Drive and then west on Steele Lane to the Class 3 route north on Range Avenue,

or by traveling on the Class 3 route that follows Ventura Avenue north, Bicentennial Way to the west, and south on Range Avenue.

Street crossing treatments proposed include using the existing crosswalk at Mendocino Avenue (#139).

Reach 5: Highway 101 to the confluence with Piner Creek

Maps: PAULIN D, E, F

Type: Modified-Natural Creek

Length: 9,941 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Aquatic habitat in this reach includes long pools and glides separated by several short riffles, with boulders and vegetation providing shelter for fish. During a September, 2005, survey steelhead trout were found within this reach. The culvert underneath Highway 101 may present a barrier to fish due to its length and lack of adequate resting areas. In addition, the culverts at Cleveland Avenue, Coffey Lane, and Steele Lane may pose barriers to fish migration. However, Taylor et al. (2003) note that at stream grade at these three locations there would be 100% passage. Tree species include live oak, willow, Oregon ash, walnut, and valley oak. Understory vegetation is dominated by grasses, with few shrubs. Invasive species include English ivy, vinca, Himalayan blackberry, eucalyptus, French broom, and Scotch broom.

During a September, 2005 bird survey, several bird species were observed, including: black phoebe, mallard, scrub jay, mourning dove, California towhee, chickadee, black throated warbler, Wilson's warbler, American crow, white breasted nuthatch, yellow warbler, Canada goose, orange crowned warbler, Hutton's vireo, spotted towhee, downy woodpecker, barn swallow, Townsend's warbler, warbling vireo, starling, and Western tanager.

Habitat restoration is recommended between West Steele Lane and Piner Creek. The channel could be enlarged by removing a service road along the right bank, allowing for placement of instream habitat structures such as rootwads and boulders to promote pool formation, and revegetation with native plant species. Crossings may be necessary to accommodate trail users. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

This creek is mostly within Sonoma County Water Agency property. An unpaved service road/trail exists on the north bank from Mc Bride Lane to Hardies Lane, where it switches to the south bank. Two entry points are proposed on the south bank between Hardies Lane and Coffey Lane. A potential park/open space opportunity (#20) is identified at Santa Rosa Charter School near Hardies Lane.

A proposed on-street connection would extend south on Mc Bride Avenue and east and west on Steele Lane to connect to existing bike lanes west of Range Avenue. A proposed paved trail extending west on the south/left bank from Coffey Lane would

connect to the proposed SMART trail on the west side of the railroad tracks. This is an important rail crossing for the creek trail system. A park/open space opportunity (#21) is located northeast of the intersection of the tracks and the creek.

Beyond the tracks an unpaved service road/trail extends on the right/north bank to West Steele Lane. A proposed entry point is located at the east end of Mohawk Street. Where the creek turns south near Sioux Street a potential pocket park (#22) is identified on a triangle of Water Agency land.

South of West Steele Lane the route switches to an unpaved service road/trail on the south/left bank. The service road on the north/right bank will remain closed and will possibly be removed in the future as part of creek restoration efforts. An existing paved trail system parallels the creek trail through Northwest Community Park between West Steele Lane and Marlow Road. It is proposed to remove existing fencing between the park and the creek trail. An existing large culvert carries Pomo Creek under the park trail and service road/trail.

Downstream of Marlow Road, unpaved service road/trails follow both banks of the creek to the confluence with Piner Creek. The left bank is proposed to be paved. The right bank trail could be removed to accommodate creek restoration efforts.

Street crossing treatments include Type III at McBride Lane (#141), Type VI at Range Avenue (#142), Type I at Hardies Lane (#143), Type III at Coffey Lane (#146), Type I at Apache (#149), Type III at Steele Lane (#150), and using the Monroe School pedestrian signal at Marlow Road (#153).

Reach 6: Headwaters to Leete Avenue (west fork)

Maps: PAULIN A, B

Type: Natural Creek, Culvert

Length: 5,897 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach is the west fork, starting near a water tank off Blue Sage Court. It is a Natural type channel crossing private property south to Parker Hill Road, where it enters a culvert in the street right-of-way before emerging at Stagecoach Road. From there, the creek flows in a Modified-Natural type channel south to near Leete Avenue, where it again enters a culvert until its confluence with the east fork.

This reach may have been originally in another location, possibly moved when a hillside housing development was built. There are riffles and small pools present. Some boulders are present. Culverts and the underground portion along Aaron Drive present a migration barrier for fish. Plant species include cattail, willow, and valley oak. Himalayan blackberry, acacia, and scotch broom are abundant.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation

An existing Class 1 paved path with two existing trail bridges, (#57 and #58) follows Stagecoach Road and Parker Hill Road to Leete Avenue. An existing paved trail is located on the east/left bank parallel to Bent Tree Place. A proposed trail bridge (#56) would connect this trail the existing Class 1 path along Parker Hill Road. An on-street connection is proposed to continue the route on Leete Avenue, Aaron Drive and Sleepy Hollow Drive to Paulin Reach 2.

POPPY CREEK

Poppy Creek is a tributary of Paulin Creek and is organized into two reaches covered on two map tiles.

Reach 1: Norte Way to Wright Street

Map: PAULIN G

Type: Modified-Natural Creek, Culvert

Length: 4,162 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Poppy Creek is narrow and runs dry in the summer months. The creek is hydrologically connected to the ponds north of the Rural Cemetery, and a portion of the creek is underground. Vegetation includes valley oak, live oak, bay, and willow. Invasive species include Himalayan blackberry, ivy, and periwinkle.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended.

Recreation, Access, and Transportation

The creek is primarily privately owned within this reach. A proposed on-street connection north of the Parsons Drive creek crossing would be continued as a paved trail along the east sides of the City's retention ponds. A dirt/soft path is proposed along the south sides of the ponds to provide a connection to existing unpaved paths in the Rural Cemetery. A proposed on-street connection heading south from the Parsons Drive creek crossing follows Terrace Way and Mc Donald Avenue to connect with the existing Class 3 bike route on Pacific Avenue. Other proposed on-street connections would extend north on Parsons Drive to the proposed path east of the reservoirs, and west along Poppy Drive to Franklin Avenue.

Reach 2: Wright Street to confluence with Paulin Creek

Maps: PAULIN D, G

Type: Modified-Natural Creek, Culvert

Length: 5,616 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Poppy Creek is fairly narrow in this reach, flowing between backyards towards its confluence with Paulin Creek. The creek appears to have been channelized, and the banks are reinforced with concrete in some places. A section of the creek was routed underground near the intersection of Mendocino Avenue and Steele Lane. There are some pools and riffles, but at the time of field surveys this reach held little water. Plant species include live oak, valley oak, willow, Oregon ash, bay, and cattail. The main invasive species are Himalayan blackberry, with some giant reed noted at the confluence.

Habitat restoration is recommended at Franklin Park, where there is room to enlarge the channel and reintroduce stream meanders and native vegetation. Native trees should be planted along this portion of the reach. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

A park/open space opportunity (#23) is located on a City right-of-way at King Street and Carr Avenues where an existing trail bridge (#77) crosses the creek.

An existing paved paths follows the right/north bank of the creek in Steele Lane Park to Major Drive, with two trail bridges crossing the creek. A paved path is proposed to extend south from the existing trail bridge #64 past Steele Lane Elementary School to the Steele Lane Community Center. An on-street connection is proposed to head west on Major Drive and then both north on Meyers Drive to the proposed trail bridge (#62) over Paulin Creek and south on Meyers Drive and to and along Steele Lanepast the Community Center. Another on-street connector from the park would head east on Schurman Drive and then north on Mendocino Avenue to the Paulin Creek Trail near the County Center, or south on Rowe Drive connecting to the Steele Lane Community Center.

POMO CREEK

Northwest Community Park to confluence with Paulin Creek

Maps: PAULIN E, F

Type: Culvert, Natural Creek

Length: 6,391 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Pomo Creek originates near Highway 101 near the Coddington Mall. There is one short stretch above ground at the corner of Guerneville Road and Range Avenue. However, the creek is contained within storm drain pipe until it surfaces in Northwest Community Park, flowing through the park before joining Paulin Creek. Within the park, mature trees line the channel, including valley oak, willow, and alder. Himalayan blackberry, cattail, English ivy, and privet are also present. Aquatic habitat includes pools and riffles, with overhanging bank and roots for shelter.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation

Paved trails exist in the park, but don't follow Pomo Creek.

4.6. SOUTHERN SANTA ROSA CREEKS WATERSHED

WATERSHED SETTING

The Southern Santa Rosa Creeks Watershed includes several creeks that flow not to Santa Rosa Creek but more or less directly to the Laguna de Santa Rosa. Creeks in this watershed include Roseland Creek, Colgan Creek, Naval Creek, Gravenstein Creek, Irwin Creek, Countryside Creek, and Old Cooper Creek. These creeks are not generally considered to support steelhead trout, due to warm water temperatures, lack of instream habitat complexity, and limited summertime flows. This watershed is comprised of thirteen creek reaches.

ROSELAND CREEK

Roseland Creek flows more than six miles westward across the Santa Rosa Plain, from its headwaters southwest of the Highway 101 and Highway 12 interchange to its confluence with the Laguna de Santa Rosa southeast of Sebastopol. The creek runs through predominantly private property to about 600 feet downstream of Burbank Avenue where an engineered channel maintained by the Sonoma County Water Agency begins.

Roseland Creek is organized into four reaches, which are covered in four map tiles, moving downstream.

Reach 1: Roseland Creek from the Northwestern Pacific Railroad to McMinn Avenue

Map: SOUTHERN A

Type: Natural Creek

Length: 3,622 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This uppermost reach of Roseland Creek begins at an outfall east of the Northwestern Pacific Railroad tracks. A few yards downstream, the creek is characterized by a fairly natural, meandering channel, with some large trees shading the water. Small pools and riffles are present, with shelter provided by roots and woody debris. The primary plant species include Oregon ash, live oak, and valley oak. Himalayan blackberry is the dominant invasive species. This reach is predominately privately owned. The culvert at Dutton Avenue may present a barrier to fish movement.

This reach is recommended for preservation. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are private. There is no creek trail on this reach. A potential park or open space site (#24) is identified on the north bank near

Grandberg Court and Dutton Avenue. A planned park site exists to the northeast of Sheppard Elementary School, along West Avenue. An existing trail bridge is located on West Avenue (#67).

Street crossing treatments proposed include Type I at McMinn Avenue (#156).

Reach 2: Roseland Creek from McMinn Avenue to Burbank Avenue

Map: SOUTHERN A

Type: Natural Creek, Modified Creek

Length: 1,232 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Roseland Creek is characterized by a more natural, meandering channel, with large trees shading the water. Pools and riffles are present, along with large woody debris. The primary plant species include Oregon ash, willow, live oak, and valley oak. Regeneration of native species is high in this area despite an abundance of Himalayan blackberry. Pampas grass is also present. Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting. This reach includes an area that may be annexed by the City of Santa Rosa in the future.

This reach is recommended for preservation. Compliance with the City's 50 foot setback requirement is proposed for this reach, due to habitat value for wildlife. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended.

Recreation, Access, and Transportation

The parcels through which the creek passes are mostly private. A paved trail is proposed on the south/left bank. The route of the proposed trail will be detailed in the Roseland Creek Concept Plan.

Reach 3: Roseland Creek from Burbank Avenue to Stony Point Road

Maps: SOUTHERN B, C, D

Type: Modified Creek

Length: 4,038 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

The majority of this reach of Roseland Creek is characterized by a grass-lined flood control channel consisting of long, isolated pools (the creek is fairly natural, however, along the upper 600 feet, with several large Oregon ash trees). Some trees and shrubs are present within a narrow riparian zone, but they do not yet provide any canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, bottlebrush, and black oak. A few willow, coyote brush, and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and eucalyptus. Adjacent parcels include

grasslands used by raptors for foraging, with large trees for nesting. Bird species observed during a September, 2005 morning survey include rock pigeon, Anna's hummingbird, willow flycatcher, pacific slope flycatcher, northern mockingbird, oak titmouse, western scrub-jay, American crow, European starling, American goldfinch, yellow warbler, Wilson's warbler, California towhee, song sparrow, Lincoln's sparrow, and white-crowned sparrow.

Habitat restoration is recommended for this reach. Removal of one service road where present would allow for channel enlargement to accommodate a meandering low-flow channel, instream habitat structures, and replanting of native vegetation. See Appendix I for a more detailed description of the restoration concept and plan drawings.

Recreation, Access, and Transportation

The creek has 200 yards of Natural Channel on private parcels at the top of the reach before turning into a Modified type through the Water Agency parcels that comprise the rest of the way to Stony Point Road. The proposed paved trail in Reach 2 is proposed to continue on the north/right bank. It will connect to the existing Water Agency unpaved service road which is proposed to be paved for the rest of the reach. Potential park or open space opportunities are identified on private property next to an extension of Trombetta Avenue (#26) and on another parcel at the bend in the creek (#27). The extension of Northpoint Parkway provides the opportunity for a creek crossing and connection to Southwest Community Park. A potential public parking area (#28) is identified in the right-of-way of Old Stony Point Road near its intersection with Stony Point Road. A trail bridge (#80) is proposed to cross the creek at the east end of Giffen Avenue. More details are available in the Roseland Creek Concept Plan (Appendix I)

Street crossing treatments proposed include Type II at Burbank Avenue (#157), and Type V at Stony Point Road (#161).

Reach 4: Roseland Creek from Stony Point Road to Ludwig Avenue

Maps: SOUTHERN B, C, D

Type: Modified Creek

Length: 8,511 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Roseland Creek is characterized by a grass-lined flood control channel, consisting of long pools and glides, with few riffles. Some trees and shrubs are present within a narrow riparian zone, but they do not yet provide any canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, big leaf maple, and toyon at the top of bank. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and pampas grass.

Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting. The California tiger salamander has been found within the FEMA preserve, on the southeastern bank of the sharp bend in this reach of Roseland Creek. Vernal pools at that site also support rare plant species, including Sonoma sunshine (*Blennosperma*

bakeri), and Sebastopol meadowfoam (*Limnanthes vinculans*). The Yuba preserve is located downstream of Yuba Drive. Both preserves are managed by the California Department of Fish and Game.

Habitat restoration is recommended for this reach. Removal of the service road along the left bank between Maitland Avenue and Ludwig Avenue would allow for channel enlargement to accommodate a meandering low-flow channel, instream habitat structures, and replanting of native vegetation. Crossings may be needed to accommodate trail users.

Recreation, Access, and Transportation

The creek passes through public parcels. An existing Class 1 paved trail with multiple access points follows the left/south bank of the creek downstream from Stony Point Road to a State owned parcel that is identified as a potential park or open space site (#28) The creek turns to the south around this parcel. At this point a proposed trail bridge (#68) will cross to the right/west bank. An existing paved trail runs along Fresno Avenue from Northpoint Parkway to south of Yeager Drive, where a proposed paved trail will continue south to Ludwig Avenue. A potential parking area (#29) is identified along Fresno Avenue near Earhart Avenue. The existing service road on the left/east bank is proposed to be removed as part of creek restoration efforts. A second trail bridge (#69) is proposed at Yuba Drive to allow a connection west to the proposed trail. A second potential parking area (#30) is identified on the north side of Ludwig Avenue. This parking area could be built on either side of the creek.

The Sonoma County Bikeways Plan 1997, proposes a Class 1 bike path from Stony Point Road to Ludwig Ave, which would also continue downstream to Llano Road. The Draft Outdoor Recreation Plan March 2003, extends the 'Roseland Creek Trail' to the Laguna de Santa Rosa.

COLGAN CREEK

Colgan Creek flows westward from its headwaters in the oak woodlands on Taylor Mountain to Hearn Avenue and then southwest past the Laguna Treatment Plant before joining with the Laguna de Santa Rosa. Just under half of the nearly 5,000 acre drainage area lies within Santa Rosa's urban boundary and includes residential, commercial, and undeveloped lands. Colgan Creek is mostly channelized within the urban area. A restoration concept plan (Reach 3) was adopted by the Santa Rosa City Council in 2002. A second plan, including a portion of Reach 2, is near completion.

Colgan Creek is organized into three reaches, which are covered in three map tiles, moving downstream.

Reach 1: Colgan Creek from city limits to Petaluma Hill Road

Map: SOUTHERN E

Type: Natural Creek

Length: 4,477 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Colgan Creek is characterized by a more natural, meandering channel, with large trees shading the water. Pools and riffles are present, along with large woody debris. The primary plant species include valley oak, willow, buckeye, and live oak. Some Himalayan blackberry is present. Adjacent parcels include grasslands used by raptors for foraging, with large trees for nesting.

Preservation is recommended for this reach, due to habitat value for wildlife. Habitat enhancement including invasive species removal and replacement with native vegetation is also recommended. Some bank stabilization may also be needed to prevent excess sediment from entering the stream.

Recreation, Access, and Transportation

The parcels through which the creek passes are both public and private. Upstream of the reach and beyond the Urban Growth Boundary is future Taylor Mountain Regional Park (#29.) A paved trail is proposed to run on the north/right bank of the creek from the beginning of the reach to Kawana Springs Road near Kawana Terrace, where an on-street connection would continue the route following existing Class 2 bike lanes on Kawana Springs Road and north on Petaluma Hill Road. The route passes through a planned City park (#30) located on parcels south of Kawana Springs Road

Street crossing treatments proposed include using the crosswalk at Kawana Springs Road to cross Petaluma Hill Road (#178).

Reach 2: Colgan Creek from Petaluma Hill Road to Highway 101

Maps: SOUTHERN E, F

Type: Modified Creek, Culvert

Length: 4,093 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Colgan Creek consists of a flood control channel, the majority of which is owned by the Sonoma County Water Agency. The channel is grass-lined in some locations, and concrete-lined in others, with some underground sections. Shallow pools dominate the aquatic habitat. Some trees and shrubs are present within a narrow riparian zone, but they do not provide a large amount of canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry, pampas grass, and eucalyptus. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting.

Habitat restoration is recommended for this reach. The channel could be recontoured to include a meandering low-flow channel, instream habitat structures, and replanting of native vegetation. See Appendix J for a detailed description of the restoration concept and plan drawings.

Recreation, Access, and Transportation

The parcels through which the creek passes are public with a culverted section running under private property at Costco. A Class 1 paved trail follows the creek from Petaluma Hill Road, through Colgan Creek Park, and on to Colgan Avenue. The trail is on the left/south bank until Costco where a series of three existing trail bridges (#70, #71, and #72) begin crossings of the creek before Colgan Avenue. An on-street connection is proposed to continue the route west on Colgan Avenue, north on Santa Rosa Avenue using existing Class 2 bike lanes, across Highway 101 on the Baker Avenue overcrossing, and along Baker Avenue to the SMART Trail route.

The Upper Colgan Creek Concept Plan proposes additional improvements to the trail system in this reach, including a trail bridge (#79) connecting to a paved trail on the right/north bank. See Appendix J.

Reach 3: Colgan Creek from Highway 101 to Victoria Drive

Map: SOUTHERN F

Type: Modified Creek

Length: 4,643 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Colgan Creek consists of a Sonoma County Water Agency flood control channel, part of which is under easements to cross private properties. The channel includes grass-lined and concrete sections, and consists of long, isolated pools. Some trees and shrubs are present within a narrow riparian zone, but they do not provide a large amount of canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry, ivy, bamboo, and eucalyptus. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting. Kingfisher and northern mockingbird were observed within this reach during a June, 2005 daytime survey. Electrofishing surveys conducted during September, 2005, recorded California roach, green sunfish, and mosquitofish in a pool downstream of Corby Avenue. The Northwestern Pacific Railroad bridge concrete footing may present a barrier to fish migration.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation

The parcels through which the creek passes are public and private. This reach has no existing public access. An on-street connection via Baker Avenue and Beachwood Drive would connect to the proposed SMART trail alignment at the west end of Cherrywood Drive. From this point the SMART trail would function as the creek trail route with a proposed trail bridge upstream of Hearn Avenue. At Hearn Avenue, the SMART trail crosses to the west side of the tracks and will continue to parallel the creek for 250 yards. A proposed on-street connection would run west along Hearn Avenue to a point

where a future street could provide a connection to the existing unpaved service road/trail on the west/right bank that begins 100 yards downstream of Victoria Drive.

Street crossing treatments proposed include Type V at Hearn Avenue (#183).

Reach 4: Colgan Creek from Victoria Drive to Bellevue Avenue

Map: SOUTHERN G

Type: Modified Creek

Length: 6,704 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

This reach of Colgan Creek consists of a flood control channel, the majority of which is owned by the Sonoma County Water Agency. Most of the channel is grass-lined with long pools and glides. Stretches are also concrete-lined and grouted riprapped. A concrete grade control structure immediately downstream of Victoria Drive may pose a barrier to migrating fish. Another concrete structure check dam is present just upstream of Bellevue Avenue at Elsie Allen High School. Some trees and shrubs are present within a narrow riparian zone, but they do not yet provide any canopy cover to shade the channel. Dominant plant species include cattail, Himalayan blackberry, and nutsedge, with some plantings of live oak, valley oak, and walnut. A few willow and cottonwood have come into the reach naturally. Invasive species present include Himalayan blackberry and eucalyptus. Bird species observed during a July, 2005 morning survey by Madrone Audubon include great egret, turkey vulture, mourning dove, black phoebe, western kingbird, barn swallow, northern mockingbird, house finch, American goldfinch, song sparrow, red-winged blackbird, Anna's hummingbird, western scrub-jay, European starling, house sparrow, spotted towhee, California towhee, and brewer's blackbird. Adjacent parcels include some grasslands used by raptors for foraging, with large trees for nesting.

This reach is recommended for restoration, as described in the Lower Colgan Creek Restoration Concept Plan, adopted by City Council in 2002 (See Appendix K). A meandering low-flow channel would be restored to the creek, with instream habitat structures and native revegetation. The existing service road along the left bank between Victoria Drive and Bellevue Avenue would be removed to allow for more room in the channel for improvements. From this point downstream to Burgess Drive the right bank service road would be removed. See Appendix K for a detailed description of the restoration concept and plan drawings.

Recreation, Access, and Transportation

The creek passes through property owned by Sonoma County Water Agency and Santa Rosa High School District. Unpaved service roads exist along both banks from near the top of the reach to where the creek approaches Bellevue Avenue and makes a 90 degree bend to the west. As part of the Lower Colgan Creek Restoration Concept Plan, the service road on the east/left bank is proposed to be removed; and the service road/trail on the west/right bank is proposed to be paved. A proposed trail bridge (#78) will connect the proposed paved trail to the existing Class 1 bike path along Bellevue Avenue on the south/left bank of the creek.

From the proposed trail bridge (#78) downstream to Burgess Drive, the north/right bank service road would be decommissioned to allow for creek restoration. At Burgess Drive the Class 1 paved trail on the south/left bank of the creek crosses to the north /right bank and continues to the end of the reach.

South of the urban boundary at Bellevue Avenue, Sonoma County Regional Park's Class 1 paved Colgan Creek Trail follow the left/east bank to Stony Point Road while an unpaved Water Agency service road allows access on the opposite bank of the creek.

A planned park site is identified where the Northpoint Parkway Extension crosses the creek (#34). A planned park or open space (#37) is identified near the 90 degree bend in conjunction with the Creek Restoration Project.

Street crossing treatments proposed include Type III at Dutton Meadows (#191), Type III at Burgess (#192), and Type IV at Bellevue Avenue (#193).

GRAVENSTEIN AND NAVAL CREEKS

Naval Creek is a tributary to the Laguna de Santa Rosa and is covered one map tile. Gravenstein Creek is a tributary to the Laguna de Santa Rosa and is covered one map tile. The parcels through which the creeks pass are private.

Reach: Old Santa Rosa Air Center to South Wright Road

Map: SOUTHERN C

Type: Modified-Natural Creek

Length: 5,404 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Both creeks begin near the old Santa Rosa Air Center site, and flow westward, joining together before Gravenstein Creek continues on towards the Laguna de Santa Rosa. The surrounding landscape features a complex of grasslands, seasonal swales, and vernal pools, supporting federally-protected species including the California tiger salamander and Sebastopol meadowfoam. Common plant species include willow, valley oak, cottonwood, Oregon ash, and walnut. Invasive species include Himalayan blackberry and eucalyptus. Giant reed was observed on a nearby parcel. During the winter season, adjacent vernal pools and swales fill with rainwater, and water has been observed to flow across the surface of South Wright Road.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation

There is no creek access.

IRWIN AND COUNTRYSIDE CREEKS

Irwin Creek is a tributary to the Laguna de Santa Rosa and is covered two map tiles. The parcels through which the creek passes are private except for Wilson Elementary School

and Live Oak Park. Countryside Creek is a tributary of Irwin Creek and is covered one map tile. The creek in this reach is a Modified-Natural type. The parcels through which the creek passes are private.

Reach: Occidental Road to urban boundary west of Fulton Road

Map: SOUTHERN H, I

Type: Modified-Natural Creek

Length: 11,502 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Irwin Creek is first observed just north of Occidental Road and west of Stony Point Road, though it may have historically began near Dutton Avenue. The creek then continues underground, surfacing at Fulton Road, where it flows west of the urban boundary, joins Countryside Creek, and continues west to meet the Laguna de Santa Rosa. Vegetation observed within these creeks included cattail, willow, redwood, and privet.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation

There is no creek access except for a short piece of existing paved path at the beginning of Irwin Creek.

OLD COLGAN CREEK

Old Colgan Creek is a tributary of Colgan Creek and is covered one map tile. The creek in this reach is Modified and in culverts. The parcels through which the creek passes are public and private. There is no creek access.

West of Brookwood Avenue to confluence with Colgan Creek at Colgan Avenue

Map: SOUTHERN J

Type: Modified Creek, Culvert

Length: 6,312 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

With the development of the Sonoma County Fairgrounds area, much of what we are calling Old Colgan Creek was rerouted through drainage ditches and storm drain pipe. The creek joins Colgan Creek in a concrete box culvert at Colgan Avenue.

4.7. TODD CREEK WATERSHED

The Todd Creek watershed is comprised of three creek reaches. Tributaries to Todd Creek that flow through the Citywide Creek Master Plan area include Hunter Creek and Moorland Creek.

TODD CREEK

The Todd Creek Watershed is located in the far southern portion of the Urban Growth Boundary. It is covered in four map tiles, moving downstream.

Eastern urban boundary to Southern urban boundary

Maps: TODD A, B, C, D

Type: Natural Creek, Modified Creek

Length: 17,684 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Todd Creek begins near Taylor Mountain, and flows to the south and west towards the Laguna de Santa Rosa. Within the urban boundary, Todd Creek is a grass-lined, channelized stream, with a service road on each bank beginning just downstream of what is proposed as a Farmers Lane/ Bellevue Avenue connection. An eastern fork joins the main channel near Robles Avenue. Vegetation includes willow, cattail, and Himalayan blackberry.

Removal of one service road along the right bank would allow for channel enlargement to accommodate a low flow meandering channel and revegetation with native species. Crossings may be needed to accommodate trail users.

Recreation, Access, and Transportation

The creek is in a Natural type channel flowing through rural private property until becoming a Modified channel where it enters Sonoma County Water Agency property. The creek is outside the Urban Boundary for roughly 500 yards upstream and downstream of its crossing of Petaluma Hill Road.

A paved trail is proposed on the east/left bank from the point where the proposed Farmers Lane Extension would cross the creek to the confluence with Hunter Creek. This would include paving the Water Agency service road/trail that is currently open to the public. A proposed trail bridge (#74) would connect to Bellevue Union Elementary School District land on the west bank. A proposed trail bridge over Hunter Creek (#75) would connect the trail to Sonoma County Regional Park's existing paved Class 1 Hunter View Creek Bikeway that follows the south/left bank of Todd and Hunter Creeks to the east of Santa Rosa Avenue.

The entire unpaved Water Agency service road existing on the west/right bank from downstream of East Robles Avenue to the end of the reach is proposed to be removed to support creek restoration. The south/left bank service road between Santa Rosa Avenue and Highway 101 would remain closed because there is no access past the

highway. The east/left bank service road would be paved from South Moorland Avenue to the end of the reach at Scenic Avenue. There would be an on street connection north along Santa Rosa Avenue, across Highway 101 at Todd Road, and south along Moorland Avenue.

Street crossing treatments proposed include Type IV-B at Santa Rosa Avenue (#199), and crossing Moorland Avenue (#200) using a crosswalk.

HUNTER CREEK

Urban boundary to confluence with Todd Creek

Map: TODD D

Type: Modified Creek

Length: 982 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Hunter Creek flows westward to join Todd Creek near Santa Rosa Avenue. The creek is a grass-lined flood control channel, with some trees present along the banks including live oak and valley oak. Himalayan blackberry, pyrocantha, and periwinkle were also observed. Some riprap is present.

Removal of the right bank service road would allow for channel enlargement to accommodate a low flow meandering channel and revegetation with native species.

Recreation, Access, and Transportation

The creek runs through Water Agency property. Sonoma County Regional Park's paved Class 1 Hunter View Creek Bikeway, with a 4 foot wide soft shoulder, runs along the south/left bank of the creek within the Urban Boundary and continues beyond the Urban Boundary to Snyder Lane near Petaluma Hill Road (not on map.) A proposed trail bridge over Hunter Creek (#75) would connect to a trail on the left/east bank of Todd Creek. A planned creek restoration would remove the existing unpaved service road on the north/right bank.

MOORLAND CREEK

This creek has a Modified type channel. It passes through rural private land to the east of the Northwest Pacific/ SMART rail line.

Northwest Pacific Railroad to confluence with Todd Creek

Maps: TODD C, D

Type: Modified Creek

Length: 4,944 linear feet

EXISTING CONDITIONS AND RECOMMENDATIONS

Natural Resources

Moorland Creek is channelized, originating along the Northwest Pacific Railroad and flowing south to join Todd Creek. There are some concrete sections, specifically under Todd Road and along the railroad. Adjacent land uses include industrial, commercial, and open fields. At Cresco Court the creek was routed into a storm drain pipe which outfalls to Todd Creek. Native vegetation within this reach is confined to willows, with invasive species including Himalayan blackberry, eucalyptus, and annual grasses.

Habitat enhancement including invasive species removal and replacement with native vegetation is recommended for this reach.

Recreation, Access, and Transportation

A short section of proposed paved path would connect Cresco Court to the proposed SMART trail that runs along much of the reach.

5. IMPLEMENTATION STRATEGY



“The key to the success of a natural waterways program is the continued active support of the citizens of the community, and cooperation between all agencies involved in water projects.”

--Santa Rosa Natural Waterways Study, 1969

CHAPTER 5. IMPLEMENTATION STRATEGY

The Citywide Creek Master Plan includes many recommended projects within seven different watershed areas. Full implementation of the Plan will not occur within the next year, ten years, or even twenty years. Rather, the Plan provides guidance on where incremental habitat enhancements and trail improvements should occur, ultimately resulting in a comprehensive and integrated network of healthy creeks and improved recreation, access, and transportation opportunities.

5.1. OVERSIGHT OF PLAN IMPLEMENTATION

Policy OSC-D-13 of the Santa Rosa 2020 General Plan states the following:

“Develop a Citywide Creek Master Plan that will identify opportunities for natural habitat restoration, enhancement of fisheries, protection of health and safety along creek channels, open space preservation, multi-use transportation routes, and recreation. The Plan will include text with a citywide creek map with proposed restoration concepts and associated text with a description of each creek, and in some cases, specific reaches. The Waterways Advisory Committee will phase the Plan to most effectively preserve and enhance existing resources.”

The Waterways Advisory Committee was created subsequent to the adoption of the Santa Rosa Creek Master Plan in 1993. The Committee is an advisory body, making recommendations to decision-making bodies, such as the Design Review Board, the Planning Commission, and the City Council, on projects that may affect local creeks. Implementation of the Citywide Creek Master Plan will occur primarily through the City’s Capital Improvement Project Program and as part of private development projects. Approvals of both types of projects will be made by decision-making bodies with guidance and input from the Waterways Advisory Committee.

5.2. PRIORITY REACHES

Some proposed projects would be ongoing efforts in every watershed area. For example, habitat enhancement including removal of invasive species and replacement with native species would be appropriate citywide. Similarly, replacement of entry gates with bollards at trail entries, and opening of service roads to the public as multiple use trails would also occur across the Master Plan area. Signage for identifying creek crossings, location information for emergency personnel, regulatory signage for public safety personnel, and interpretive signage for education purposes also would apply citywide. These projects could be accomplished over time, with initial actions beginning soon after Plan adoption.

Other projects proposed in this Plan are more site-specific, including habitat restoration, addressing barriers to fish passage, trail upgrades, development of a new trail or trailhead/access point, or construction of a new creek crossing. A list of site-specific projects by watershed and the Citywide Creek Master Plan goals met by each are listed in Table 5.

All projects described in this document are important contributions to meeting the Master Plan goals. Each listed project represents a step towards creating healthy riparian

habitat and a comprehensive creekside trail system. Prioritization of projects is based on multiple factors. A project would be considered high priority if it would:

- **Meet multiple goals of the Citywide Creek Master Plan.** No single project can meet all of the goals, but several do meet multiple goals. The projects that address several community issues at once should be a higher priority than projects that only meet one or two goals.
- **Result in a significant benefit to special-status fish and wildlife species.** Steelhead trout (*Oncorhynchus mykiss*) are listed as Threatened under the federal Endangered Species Act. Several creeks in Santa Rosa support or have the potential to support steelhead trout migration, spawning, and rearing. Projects that benefit this and other special-status species through enhancement or restoration of habitat should be a higher priority than projects that only benefit more common species.
- **Result in a significant benefit to water quality.** Habitat enhancement and restoration projects that would result in a benefit to water quality should be a higher priority than projects that would result in no change in water quality.
- **Enhance alternative transportation routes.** Projects that provide additional opportunities to travel to and from work, shopping, and recreation destinations via bicycle or on foot should be given higher priority than projects that would result in no change in the available alternative transportation routes.
- **Can be accomplished in association with a development project.** Projects that are located in areas where a development project is proposed should be a high priority, since project proponents are already involved in the design of related improvements, and improvements could occur simultaneously.
- **Present potential for partnerships.** Projects that bring together several different stakeholders and will result in an expansion of current partnerships involving a large portion of the community, should be a higher priority.
- **Can be accomplished within existing right of way.** Projects that can be implemented within existing right of way should be given higher priority than projects that would require acquisition or dedication of additional property.

Considering the above criteria, the following reaches include a mix of projects that are considered high priority:

Santa Rosa Creek Watershed

- Santa Rosa Creek, Reach 4 (Farmers Lane to E Street)
- College Creek

Brush Creek Watershed

- Brush Creek, Reach 2 (Montecito Avenue to Highway 12)
- Rincon Creek
- Austin Creek, Reach 2 (St. Francis Road to Brush Creek)

Matanzas Creek Watershed

- Matanzas Creek, Reach 4 (Spring Creek to Santa Rosa Creek)
- Spring Creek Reach 2 (Summerfield Road to Franquette Avenue)
- Spring Creek Reach 3 (Franquette Avenue to Matanzas Creek)

Piner Creek Watershed

- Piner Creek Reach 3 (Northwestern Pacific Railroad to Santa Rosa Creek)
- Peterson Creek

Paulin Creek Watershed

- Paulin Creek Reach 4 (Mendocino Avenue to Highway 101)
- Paulin Creek Reach 5 (Highway 101 to Piner Creek)

Southern Santa Rosa Creeks Watershed

- Roseland Creek Reach 3 (Burbank Avenue to Stony Point Road)
- Roseland Creek Reach 4 (Stony Point Road to Ludwig Avenue)
- Colgan Creek Reach 2 (Petaluma Hill Road to Highway 101)
- Colgan Creek Reach 4 (Victoria Drive to Bellevue Avenue)

Todd Creek Watershed

- Todd Creek

Detailed descriptions of recommended projects within each of these high priority reaches are included in Chapter 4 of the Master Plan.

5.3. PRELIMINARY COST ESTIMATE

The Citywide Creek Master Plan provides conceptual detail of recommendations, not construction drawings or detailed site plans, and so all cost estimates must be viewed as preliminary. Cost estimates will be updated based on construction drawings at the time of implementation. A summary of preliminary cost estimates are shown in Table 6. Detailed estimates and explanation of assumptions are included in Appendix L.

Natural Resources

Natural Resources projects include habitat restoration, fish passage, and habitat enhancement projects. Cost estimates are based on previous projects by the City of Santa Rosa and others.

Recreation, Access, and Transportation

The cost estimate for the future creek trail system must be based on many assumptions and generalizations about the improvements that will be required over a wide range of site conditions and timeframes. Preliminary cost estimates were prepared to be as

detailed and realistic as possible. The assumptions used to create the “per item” costs, and summary reach-by-reach cost estimates, are presented in Appendix L, Preliminary Cost Estimate. Cost details for street crossing improvements are contained in Appendix E, Project Details to allow future planners and implementers of creek trail projects to understand and update the estimates.

Public access improvements in the cost estimates typically include: new paved trails, paving of existing gravel service road/trails, new dirt or ‘soft’ trails, trail bridges, trail street crossing improvements, trail entry improvements, and trail signage, including wayfinding, information/direction, interpretive, and traffic control/warning signs. No estimates are provided for support and recreational facilities such as restrooms and parking, or for new parks and open space, or on-street connections. These are assumed to be separate facilities or projects from the creek trail system. New vehicular overcrossings of the creek that may provide new trail undercrossings are identified but not estimated because they are assumed to be separate roadway improvement projects. Similarly, a proposed overcrossing of the SMART rail line is also assumed to be a separate project.

5.4. FUNDING SOURCES

The Citywide Creek Master Plan will be implemented through funding such as grants and special appropriations programs – some requiring a local matching contribution; general funds of the City and County; redevelopment agency funds; bonds and special assessments; mitigation for off-site projects; land donations and dedications; and construction of some improvements by developers as conditions for approval of their projects.

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, creek-compatible projects may occur through the normal private development process, guided by appropriate governmental regulations and possible financial contributions by agencies.

A list of funding programs is included in Appendix M.

5.5. PARTNERS FOR PLAN IMPLEMENTATION

The creation of the Citywide Creek Plan has involved many different partners, including citizens, private and public property owners, the business community, non-profit community organizations, the development community, elected officials, and federal, state, and local agencies. The implementation of the Plan will require a similarly cooperative approach.

Each partner involved with the implementation of a particular project can contribute. For example, agencies can work together to secure the appropriate regulatory approvals necessary to carry a project forward. Community organizations can provide information on a particular topic of interest or concern before, during, and after a project. Local businesses can take advantage of creekside locations for compatible uses such as creekside outdoor seating areas, and encourage improvements to the health of the

creek by sponsoring creek walks/runs, caring for native plantings near their businesses, and supporting employee involvement in creek clean-up days. Developers can design their projects to accommodate and highlight the creek, creating a more livable and aesthetically pleasing community, contributing to higher property values.

Of special note are the volunteers that are the 'eyes and ears' on the creeks: the Creek Stewards. The Creek Stewardship Program was created by the Sonoma County Water Agency and City of Santa Rosa to provide organizational support to citizens who live, travel, and recreate along Santa Rosa's creeks. The program offers the opportunity for interested members of the community to protect and enhance the creeks they enjoy. An informed, supportive, and proactive community strengthens desirable qualities such as wildlife protection and public safety while reducing problems such as illicit dumping, water pollution, illegal camping, bank erosion and growth of non-native invasive plants. Creek Stewards provide a vital link between the community and the governments and agencies responsible for the protection and care of creeks. Anyone who spends a little time along creeks can volunteer as a Creek Steward.

The Creek Stewardship Program is key to the successful implementation of the Citywide Creek Master Plan, since many of the project recommendations involve tasks that Stewards are already working on. Removal of invasive species and revegetation with native plants is essential to improving habitat for fish and wildlife, and keeping an eye out for new invasions helps to catch them early. Health and safety of trail users is improved by more use of trails by regular, aware, citizens reporting locations of illegal encampments to the Program Coordinator. Monitoring of restoration areas, education events, and light maintenance of trails all contribute towards healthier creeks and an integrated creek trail system.

5.6. OPERATION AND MANAGEMENT OF THE TRAIL SYSTEM

The Creek Trail System is envisioned to be a very low maintenance facility consisting primarily of paved and unpaved trails and natural or naturalized vegetation areas. Potential management, maintenance, and repair tasks are outlined below as a guide for estimating the necessary staff and resources. Potential responsible parties for these tasks, depending on the location and maintenance agreements or arrangements, include:

- City of Santa Rosa Public Works Department;
- City of Santa Rosa Recreation and Parks Department;
- City of Santa Rosa Utilities Department
- Creek Stewardship Program, including coordination of volunteers;
- Sonoma County Water Agency;
- Sonoma County Regional Parks;
- Sonoma County Agricultural Preservation and Open Space District
- Utility companies and others using service roads that are part of the Creek Trail System.

Facility Management

General management activities would include:

- Inspection of conditions and addressing general use issues.
- Coordination with user and interest groups, neighboring property owners associations, and individual property owners, residents and citizens.
- Active use management - Volunteer Creek Stewards, and other formal volunteer trail patrol groups, as well as informal groups, could share active management duties, potentially including:
 - Patrol and oversight of trail use; notifying violators about rules, and notifying Police about criminal activity.
 - Observation and reporting of trail conditions and issues.
 - Posting of signs, notices and information about changed conditions, events, etc.
 - General coordination with City staff, Water Agency staff, Regional Parks staff, etc. regarding trail management issues.
 - Emergency contact point for police, fire, etc.
 - Help coordinate volunteer clean-up, trail maintenance, weed management and re-planting, environmental education, and special events.
 - Maintain a log of trail maintenance, management and coordination activities.
- Coordination with agencies, organizations, businesses, schools, churches, etc. with adjacent or overlaying property, facilities, or interests in the Creek Trail System.
- Coordination with schools and environmental organizations that may conduct environmental education activities, or low-intensity recreation activities such as nature walks and day camps.
- Law enforcement and fire protection - the City of Santa Rosa Police and Fire Departments or the comparable agencies in the unincorporated area will be directly responsible for addressing crime and fire safety issues.

Maintenance

Basic trail maintenance requirements would include the following tasks:

- Maintenance and minor repair of boundary fences;
- Annual mowing, trimming, and spraying of adjacent vegetated areas to keep the trail clear and manage fuel load for fire protection purposes.
- Conventional landscape maintenance of portions of the trail corridor that have formal landscaping.
- Cleaning of drainage culverts, inlets, and ditches.
- Minor repairs, painting, etc. on signs, benches, kiosks, artwork.
- Graffiti removal
- Litter pick-up and emptying trash receptacles.
- Periodic sweeping of the paved trails.
- Maintenance and repair of unpaved trails, especially after storms.
- Periodic tree pruning and clean-up of branches and leaf litter.

Repair and Replacement

Staff or contractors will eventually be required to undertake the following types of repairs:

- Repair and re-surfacing of the paved trails/service roads (potentially shared with the Water Agency and utilities companies that also may use the trails as roads).
- Repair and re-grading of unpaved and dirt/soft trails.

- Replacement of signage due to age and vandalism.
- Repair and replacement of restroom facilities.
- Repair and replacement of light fixtures.
- Repair and replacement of entry structures, such as bollards.
- Repair and replacement of fencing.
- Repair and replacement of irrigation systems.
- Replanting of formal landscaping.

6. MAP PRODUCTS AND GEOGRAPHICAL INFORMATION SYSTEM



“Night and day the river flows. If time is the mind of space, the River is the soul of the desert. Brave boatmen come, they go, they die, the voyage flows on forever. We are all canyoneers. We are all passengers on this little mossy ship, this delicate dory sailing round the sun that humans call the earth. Joy, shipmates, joy.”

---Edward Abbey

CHAPTER 6. MAP PRODUCTS AND GEOGRAPHICAL INFORMATION SYSTEM

MAP PRODUCTS

The Citywide Creek Master Plan maps are available on the City's website. Site visitors can view a map of the Plan area, and select a watershed area of interest. This will bring them to an index map for that watershed. The visitor can then select one of the indicated map sheets to view Adobe Acrobat pdf files of detailed 11x17 maps at 1:500 scale. Each map has a summary legend of the features displayed. For a complete legend of all map features, viewers should refer to Figure 17, and the corresponding text in Chapter 3. The Master Plan and Appendices present the design concepts, standards, and cost estimate assumptions for the features shown on the maps.

GEOGRAPHICAL INFORMATION SYSTEM

A Geographical Information System (GIS) can be extremely helpful in the analysis, planning, design, and presentation of technical information. Using GIS, a dataset can be queried for specific information, with the results displayed in a spatial (map) format. Data are displayed in map layers, and the user can decide which layers to view alone or in combination with other layers. Objects or features within each layer are comprised of a combination of points, lines, and polygons. Surfaces may also be used as a layer, including a raster, or matrix of identically sized square cells. Each cell represents a numeric value of some measurable unit. Each feature is linked to a geographic location, with x and y coordinates. Features are also linked to tables of information, including labels, numeric measures, and other attributes. Photographs and other files can be linked to features to provide the user with additional information.

Using ArcView software, the Citywide Creek Master Plan maps were created from existing data layers and new tables of data specific to the project. The Citywide Creek Master Plan maps will be incorporated into the City of Santa Rosa's City GIS Maps website, and made available to the public. In the future, the Citywide Creek Master Plan GIS could be expanded to include additional project information and monitoring results for completed projects.

The creek reach-specific maps, descriptions, and estimates, along with the system-wide design standards and concepts, can be used or modified to provide a relatively detailed plan for improvements in any part of the creek trail or restoration system. The estimate spreadsheets are designed to allow automatic update when mapped creek system features or reach/project limits are updated. This will make it easier to prepare future grant applications, and make the transition to more detailed site-specific preliminary plans and construction documents. The GIS format also makes it easier to overlay and coordinate Master Plan proposals with other plans and future projects and studies.

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