

Petaluma River Park Site Analysis Memorandum (Revised)

Prepared by CMG for the Petaluma River Park Foundation

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Introduction

Site Analysis is the first phase of the landscape design process. The goal of site analysis is to understand the context of project from a regulatory, demographic, circulation (ie bike or vehicle routes), historic, geologic, and ecological perspective. This research informs decisions and the design—examples of this include:

- site requirements (fire access routes, stormwater treatment areas, handicap accessible routes)
- allowable uses and amenities (informed by city, county or state regulations)
- proposed planting (based on site uses, habitat value and climate)
- how the park interfaces with it's current surroundings or with future plans for adjacent properties
- interpretive elements that tell the story of a site (current or past)

This memo is a summary of information gathered by CMG as part of the Discovery scope of the Petaluma River Park Dream It! Phase. The Dream It! Phase is the first stage of the concept design, devoted to visioning, analysis and determining constraints and opportunities. This memo includes a review of histories and regulatory and planning documents developed by city and state agencies, non-profits and others. This memo is not a comprehensive view of the Petaluma community and it's histories nor does it solely determine the future of the park. Information gathered from the community engagement, with a focus on centering voices that have been historically left out of placemaking in Petaluma, will be a critical addition to this research.

Boundaries and Jurisdictions



Petaluma River Park (Figures 1 and 2) sits in the heart of the city of Petaluma. The peninsula site, located between the main channel of the Petaluma River and McNear Channel, has historically been known as McNear’s Peninsula and Steamer’s Landing. The Hopper site is across McNear Channel from the peninsula at 500 Hopper Street.

The Petaluma River Park Foundation land site is comprised of four parcels (numbers 136-010-023 , 007-181-002, 136-010-024, and 007-171-023) for a combined total of 67.09 acres, though not all of that property will necessarily become Petaluma River Park. The parcels are under the jurisdiction of the City of Petaluma and the San Francisco Bay Region of the Water Quality Control Board. The site is subject to Site Plan and Architectural Review (SPAR) through the Planning Department and Fire Department and must submit for approval through the California Environmental Quality Act (CEQA). During this process it is anticipated that the project team will solicit feedback from the following city agencies and committees:

- City Council
- Historic and Cultural Preservation Committee
- Pedestrian and Bicycle Advisory Committee
- Petaluma Public Art Committee
- Recreation, Music and Parks Commission
- Tree Advisory Committee

Petaluma River Park is just outside of the jurisdiction of the Bay Conservation and Development Commission (BCDC), which states its oversight includes the “Petaluma River in Marin and Sonoma Counties, to its confluence with Adobe Creek and San Antonio Creek to the easterly line of the Northwestern Pacific Railroad right-of-way.” The edge of the site, between the ordinary high water and ordinary low water mark, would be subject to the California State Lands Commission and any uses must be consistent with the public trust, which includes public serving, water-related activities. Public trust lands can include docks and piers, fishing, swimming, boating, habitat and wildlife refuges, open space and visitor services like restrooms, hotels or restaurants. Housing and office space are not allowed on trust lands, nor are uses that are not deemed to serve the broader California public.

The Park Site

The peninsula site is mostly surrounded by water with the Petaluma River to the south and McNear Channel to the north. The only land access to Petaluma River Park is through Steamer Landing Park, a public open space owned and managed by the City of Petaluma. Steamer Landing Park is 9.7 acres and is the home of the David Yearsley River Heritage Center, which is currently locally tended by the Friends of the Petaluma River.

The peninsula site has steep banks along the riverfront. Above the river embankment, the site varies between about 11 to 25 feet above sea level. The north and eastern edges of the site are generally higher and more sloped, while the southern side is more level. The low point of the park is near the southwest edge, where water gathers in a vernal pool in the wet season.

The Hopper Site, formerly a pre-cast concrete plant, is accessed off Hopper Street and unnamed streets adjacent to the Riverfront housing development to the south. The site sits next to North Bay Animal Services and a City of Petaluma Public Works facility. The site ranges from 6-13' above sea level and generally slopes toward the river and channel.

History of the Place and Change over Time

The land and water of Petaluma River Park has been a landscape of change and transformation for millennia. We acknowledge that the history included here was primarily written by white people in positions of power and does not represent a full picture of Petaluma's history. The research and articles referenced are not inclusive of Indigenous Peoples, Asian, Latino and Black people experiences. For the Petaluma River Park site and the creation of a Park, the history available is compiled because it is important to understand physical changes that happened to the land overtime, and to use the information as we make decisions going forward.“

Geology and Formation

The Petaluma River lies within the southern portion of the northern Coast Ranges of California.

The Petaluma Marsh formed over thousands of years as sea levels began to rise at the end of the last glacial period – 10,000 to 12,000 – years ago. The rising tides rapidly filled the valleys and coastal wetlands and the waters of San Pablo Bay extended inland as far as the City of Petaluma, bringing younger geological silt deposits known as Bay Mud. (Figure 3)

Petaluma Marsh

Today's oldest tidal marshes in the San Francisco Estuary, including the Petaluma Marsh, began to form during a period of slowing sea level rise. Colonizing plants that had migrated upstream with the rising seas facilitated the growth of the high marsh plain, by trapping sediment and accumulating plants and seeds.

Occupying 45% of the Petaluma River watershed, the tidal wetlands were composed of a range of estuarine habitat types including tidal marsh, tidal mudflats, subtidal channels, and marsh ponds/pannes. The Petaluma River entered the estuary near present-day Payran Street, upstream from Petaluma River Park, and followed a meandering course for 17 miles to its mouth at San Pablo

Bay. Influenced both by saltwater tides from the Bay and by freshwater from the Petaluma River, the tidal wetlands were and are a dynamic landscape that supported a wide variety of California native plants and animals, including Ridgeway's rail, salt marsh harvest mouse, and soft bird's beak. Tidally influenced land transition zones bordered the estuary, forming a link between the tidal wetlands and the adjacent upland and river habitats.

Freshwater non- tidal seasonal wetlands such as wet meadow and vernal pools formed in areas that received freshwater from rainfall, flooding, or groundwater. The largest non-tidal wetland was a wet meadow that occupied much of the alluvial plain on the east side of the Petaluma River, today's East Petaluma neighborhood. The Petaluma River Park has a 1.5-acre vernal pool today. In the past, many streams flowed from the hills toward the Petaluma River. Most streams historically draining towards the estuary were disconnected channels that disappeared into the extensive wet meadows that bordered the marsh perimeter.

The interaction between freshwater creeks and the tidal saltwater produced brackish conditions that provided habitat for a diversity of fish and wildlife. Smelt, considered to be a "true estuarine resident," were caught in abundance. Similarly, land and tidal transition zones provided crucial habitat for ecotone specialists that moved between the marsh and upland. Several shrew species inhabited the historical Petaluma Marsh and depended on the middle marsh-high marsh ecotone for nesting and foraging.

9000 years ago - 1776

Evidence suggests that humans have lived here for 9,000 years. The Coast Miwok (now known as the Federated Indians of Graton Rancheria) lived throughout Sonoma and Marin Counties, and the Coast Miwok lands extended from the mouth of the Golden Gate in the south, to approximately 5 miles north of Bodega Bay in the north, to approximately 4 miles east of Sonoma Creek.

There were historically 44 recorded villages within the Coast Miwok territory, many of which provide present place names. Ethnographic accounts indicate that the Coast Miwok resided in large villages, each of which had a headman, but cannot be said to have a universal tribal organization. A headman (*hóypuh*), a "woman chief" (*hóypuh kulé(·) yih*) and a third female leader (*máien*) split responsibilities of tending to people and organizing religious ceremonies.

The native Coast Miwok lived in many villages throughout the Petaluma watershed, organized around the Olompali community, near San Antonio Creek, and the Petaluma community, centered around the Petaluma River.

One version of the origin of the word Petaluma, from *pe'ta*, flat, and *luma*, back, was derived from the Miwok people.

The Coast Miwok followed a cyclical pattern of subsistence, using natural resources that were available on a seasonal basis. The Coast Miwok had a diversified subsistence economy based on fishing, hunting, and gathering with a particular dependence on acorns. Important water resources included fish, eels, clams, mussels, and seaweed, while land resources included acorns, bear, deer, elk, and small game. The Coast Miwok managed the land in a number of ways, including transplanting California Bay trees. The Coast Miwok had a rich culture of religion, ritual, and dance, with music and games being a large part of their cultural expression.

1776- 1850

Coast Miwok communities were disrupted by Spanish colonization (late 18th and early 19th centuries), and thousand migrated or were forcibly removed to nearby Franciscan Missions and Mexican ranchos, including Rancho Petaluma, located on the east side of the river on Adobe Road, east of present day Petaluma River Park.

The first documented European exploration of the Petaluma area was in 1776, when Fernando Quiros sailed up Petaluma River in search of a water passage to Bodega Bay. Rancho Petaluma, granted to Mariano Vallejo in 1834, occupied almost 44,000 acres encompassing the entire eastern portion of Petaluma Valley, and supported cattle herds totaling an estimated 50,000 in the mid-1840s.

1850-1960

In the 1850s, as large numbers of American settlers came to the area at the time of the Gold Rush, San Francisco Bay and its rivers and streams became the primary way to transport goods. Petaluma Creek, even though it was narrow, shallow, and difficult to navigate, became a vital way of transporting goods from the North Bay throughout the Bay Region. (Figures 4 and 5)

As the commercial shipping industry grew, efforts were made to modify the river channel to make maritime navigation easier. The first attempts to dredge the river were made in 1860, and additional dredging, and straightening occurred during the late 19th century and early 20th centuries. John McNear, on the largest employers of Chinese in the area, employed Chinese immigrants to alter the course of the river and reclaim wetland areas, creating the McNear Canal. (Figure 6) Dredged sediment was used to fill parts of the surrounding tidal marsh or former tidal channels, and the McNear Peninsular was created and used to place dredged sediment. A slough within the 500 Hopper site area was also filled, and the area was further filled between 1914 and 1939 to build residences.

The McNear Canal accessed Petaluma's docks, Steamer's Landing, and the Santa Rosa Railroad, connecting Santa Rosa and North Bay farms, produce and eggs to the Petaluma River and the San Francisco Bay region.

The town of Petaluma, incorporated in 1858, became one of the wealthiest towns in California. By 1852, schooners were a common sight on the creek as people began to find that it was cheaper to transport goods along the calm creek rather than go overland or sail from a coastal town. By 1855, farming and other businesses along the creek's banks had contributed so much debris and mud that it became impossible for larger boats to go all the way to Petaluma. Despite constant problems, the creek continued to be a steady source of revenue for the residents of Petaluma. By 1915 the area was shipping out an estimated ten million eggs a year.

Beginning in 1956, the Pomeroy Corporation, located at 500 Hopper Street, constructed concrete products used throughout the Bay Area, including the foundations for the Golden Gate Bridge. Later, innovative pre-stressed precast concrete system supplied materials for the Bart system and Candlestick Park. Products were hauled to and from Petaluma on river barges.

In 1959, the tidewater estuary of the Petaluma River was declared a river by an Act of Congress. (Figure 7) Within a year, much of the poultry industry moved to southern California. By 1961 the major cargo moved via the Petaluma River was fuel.

1960 to Present

Highway 101 was constructed through Petaluma in 1956, and by the 1960s urban development had begun to accelerate, with the population increasing from approximately 14,000 to 34,000 between 1960 and 1980. Much of the urban development during the later portion of the 20th century occurred in East Petaluma.

By 2003, the Petaluma River was classified as a "low use" waterway, placing future dredging by the Army Corps of Engineers in jeopardy. The Pomeroy Corporation closed its Petaluma facility in 2006. <https://patch.com/california/petaluma/the-david-yearsley-river-heritage-center>

By 2017, river traffic consisted almost entirely of recreational boats which, while contributing tourism revenues to the city, did not fit the Army Corps of Engineers criteria for dredging. In 2020, the Army Corps completed their final dredging of the Petaluma River.

Current Context

Petaluma River Park sits in the river between downtown Petaluma to the south and East Petaluma to the north. Petaluma has just under 60,000 residents. The population of Petaluma is 68%

white/caucasian, 22% Latino/Latinx, 1% Black/African American, 5% Asian + Pacific Islander, .05% Indigenous. About 21% of the population is under 24 and 18.7% of the population is over 65.

The areas immediately surrounding the park are zoned for mixed-use with some industrial, diverse low density residential and neighborhood commercial within a half mile. The neighborhoods near the River Park, especially to the east, have a higher percentage of low-income households (averaging 80% of area median), a high percentage of adults with less than high school education, and a higher percentage of People of Color as compared to Petaluma as a whole. The census block that includes the peninsula and Hopper site has a Tree Equity Score of 39, making it the area with the least canopy cover in the city of Petaluma. Its density and relative lack of tree cover also make it more susceptible to urban heat island effects. The California Office of Environmental Health Hazard Assessment Cal Enviroscreen Map places the census tract at the 72 percentile for pollution burden, with traffic and diesel particulate matter being some of the main concerns.

The 2024 point-in-time count estimates there are 245 people experiencing homelessness in Petaluma. Several service providers in the area, including the HOST (Homeless Outreach Services Team), the SAFE Team, the Mobile Support Team and the Critical Response Team, work with the unhoused community. Additionally, the Downtown Streets Team partners with the city to provide services and employment to unhoused residents.

Steamer Landing Park

In 2003 the Petaluma Parks and Recreation Department developed a concept plan for Steamer Landing Park (Figure 8) that includes improvements to Copeland Street, a Hopper Street entrance, new pathways, fencing, shade trees, a new tidal marsh, picnic area and benches, bike racks, trash cans and drinking fountains. The plan also included potential for a memorial grove, marsh overlook and boardwalk and an outdoor amphitheater. Portions of the design, like the parking lot, were constructed, but most of it remains unrealized.

Within Steamer Landing Park, the David Yearsley River Heritage Center is former livery stable that was brought to the site in 2004. The center is home to the Friends of the Petaluma River, a non-profit organization dedicated to connecting the community with the Petaluma watershed. The organization is focused on conservation and education and hosts stewardship days and nature camps at the park.

Adjacent Land Use

A ready-mix concrete manufacturing facility owned by Vulcan Materials sits across the channel from the peninsula and Hopper sites. When under operation, the plant is loud enough to impact programs at the River Park. A large barge is dry-docked at the southern edge of the site and is a

prominent visual landmark in the area. Vulcan owns navigation rights to the channel, though it is too shallow to be a viable transportation route. Petaluma River Park Foundation will need to coordinate changes to the channel that may impact the navigability of the waterway, including a potential pedestrian and bike bridge, with Vulcan.

At the entry to the site, off Copeland Street, the Oyster Cove Development (Figure 9) is planning 132 residential units in 20 new buildings surrounding the end of McNear Canal. The existing public parking lot and waterfront paths will remain, and the development project is adding about 10 new parking spaces near the David Yearsley River Heritage Center. This project received preliminary approval from the City of Petaluma in September 2023 and will proceed into the design review process. The Petaluma River Park Foundation will need to coordinate with the Oyster Cove Development team for site access and utilities for the new park. New utility lines for the park's water, sewer, electrical and communications will have to connect through Steamer Landing Park to the Oyster Cove Development.

The Petaluma River Access and Enhancement Plan

The River Park and its surrounding area is considered part of the Warehouse and Downstream segments in *The Petaluma River Access and Enhancement Plan* (Figures 10 and 11). The plan was completed in 1996, was adopted into the city general plan and is funded by the State Coastal Conservancy. The plan is divided into zones, with the area surrounding the River Park characterized by historic warehouse buildings and mixed-uses along the river, including industrial and restaurant/retail. Most of this segment has industrialized or 'hard' banks to the river and has little habitat value. The banks along McNear Peninsula are steep, which makes it difficult for plants to grow and can lead to erosion. The plan recommends laying back the slope or including engineered methods to stabilize the banks and encourage vegetation to grow. (Figure 12)

In the area of the River Park and downtown Petaluma, the plan calls for:

- Prioritization of river-dependent commercial and industrial uses over public access.
- Adaptive reuse of the historic buildings.
- A riverfront boardwalk for more public access to the river, especially at the ends of F, G and H Streets.
- New amenities like lighting and benches to the river's edge, facilities for temporary docking of small boats and fishing.
- More and safer sidewalks and bike routes along the river and through downtown.
- Street trees along trail routes.
- A public park suitable for passive recreation at McNear Peninsula.

- Restoration of tidal marshes (20-25' wide) in portions of McNear Peninsula and McNear Canal.
- Interpretive elements that educate the public about the wreckage of the steamer Petaluma, habitat restoration and the ecosystem, and the history or industry of the area.

Petaluma Parks

[Petaluma Parks and Open Spaces](#)

Petaluma has an extensive network of parks and open spaces with various amenities, resources, facilities, programming, and types of open spaces accessible to both neighboring communities and the broader Petaluma community. (Figure 13) The park network demonstrates both successes and challenges. Petaluma boasts several parks that stand out for their unique features. Helen Putnam Park is a true gem with exclusive hiking trails and breathtaking city views. Luchessi Park offers diverse recreational opportunities, featuring an artificial lake, sports fields, community center, and multiple playground types. McNear Park's popularity stems from its open plan layout and large canopy cover, while Shollenberger Park distinguishes itself for its ecological richness.

Like many local jurisdictions, Petaluma's park system faces challenges, particularly in terms of deferred maintenance, especially for facilities like hardscaping and irrigation controllers. The annual budget for park maintenance in Petaluma has seen a decline from \$2.36 million in 2008 to \$1.83 million in 2021, representing a decrease of nearly 23 percent. Despite this reduction in budget, there has been an increase in the number of park properties and facilities, total park land acreage, and the square footage of recreational buildings and facilities over the same period. The city currently lacks a strategic approach for addressing, prioritizing, and funding deferred maintenance, as noted in the City of Petaluma General Plan Update.

[Categorization of Petaluma's Parks](#)

[Community Parks](#)

Community parks are designed to cater to the entire population of a city, offering a variety of essential recreational features. These include well-lit sports fields, diverse sports courts, swimming pools, recreation buildings, and specialized facilities for specific activities. Additionally, these parks are equipped with amenities like restrooms and parking lots.

- Luchessi Park
- McNear Park
- Prince Park

- Petaluma Community Sports Fields
- Wiseman Park
- Leghorns Park
- Kenilworth Park
- Petaluma Swim Center and Skate Park

Neighborhood Parks

Neighborhood parks typically cater to a smaller area, easily reachable by walking or biking from nearby homes. These parks may have features like playgrounds for children, ball fields, open lawns, and picnic tables. However, they are usually not set up for organized recreational activities.

- Arroyo Park
- Bond Park
- Del Oro Park
- Eagle Park
- Grant Park
- La Tercera Park
- McDowell Park
- Meadow View Park
- Miwok Park
- Oak Hill Park
- Penry Park
- Sunrise Park
- Fox Hollow Park
- Walnut Park
- Wickersham Park
- Southgate Park

Pocket Parks

Pocket parks, found throughout the city, are compact spaces, usually less than one acre in size. They cater to specific neighborhoods and offer modest amenities like benches or drinking fountains.

- Center Park
- Crinella Park



- Putnam Plaza
- Sunset Park
- Anna’s Meadow Park
- Cherry Valley Park
- Cavanagh Landing (Weller Street Park)

Open Space Areas

Open Space Areas offer more relaxed park experiences. These areas are designed for passive recreation, education, and habitat preservation/restoration.

- Alman Marsh
- Denman Reach
- Lafferty Ranch
- Mannion Knoll Park and Open Space
- Paula Lane Nature Preserve
- Shollenberger Park
- Steamer Landing Park
- Westridge Park and Open Space
- Westhaven Park and Open Space

Regional Parks

Regional parks are areas of land preserved on account of their natural beauty, historic interest, or recreational use.

- Helen Putnam Regional Park

Petaluma River Park Context:

Within a two-mile radius of the River Park is a network of 14 established parks and/or open spaces, alongside an additional five parks that are being proposed.

Park Name	Sports Courts	Designated Gathering area (plaza, gazebo, etc)	Seating	Play-ground	Exercise Equipment	Art	Bike Parking	Rest-rooms	Food	BBQ Grills	Tree Canopy for respite

McNear Park	✓	✓	✓	✓	x	x	x	✓	x	✓	✓
Wickersham Park	x	x	✓	x	x	x	x	✓	x	x	✓
Walnut Park	x	✓	✓	✓	x	x	x	✓	x	x	✓
Penry Park	x	x	✓	x	x	x	x	x	x	x	✓
Kenilworth Park	x	x	✓	✓	x	x	x	x	x	✓	✓
Liberty Park	x	x	✓	x	x	x	x	x	x	x	✓
Petaluma Swim Center/Skatepark	✓	x	✓	x	x	x	✓	✓	x	x	x
Grant Park	x	x	✓	✓	x	x	x	x	x	x	x
Weller Street Park	x	x	✓	x	x	✓	x	x	x	x	✓
Center Park	x	x	✓	x	x	x	x	x	x	x	x
Putnam Plaza Park	x	✓	✓	x	x	x	x	x	✓	x	✓
McNear Landing Park	x	✓	✓	✓	x	x	x	x	x	x	✓
Riverview Park	x	x	✓	✓	x	x	✓	x	x	x	✓
Sunset Park	x	x	✓	x	x	x	✓	x	x	x	✓

Many of these nearby parks lack facilities such as sport courts, restrooms, exercise equipment, art installations, designated bike paths, bike parking, food service establishments, and BBQ grills. While seating is available to some extent in most of these parks, some often fall short of meeting the needs of park visitors. Nonetheless, a notable success observed in most of these neighboring parks is the provision of tree canopy, which serves as a valuable source of respite for park visitors.

Petaluma Parks Projects

It is essential to consider other projects that are in process/development in Petaluma because that could influence or deter certain types of recreational programming at the Petaluma River Park. Some important projects to note:

1. **Kenilworth Park Revitalization Project:** Currently the Kenilworth Park Revitalization project is in the process of gathering feedback on current concerns and ideas for the future of the park from community to develop the concept plan.
2. **The Fairgrounds Development Project:** The Petaluma community actively participated in planning the future of the Fairgrounds property by engaging in a unique democracy experience facilitated by Healthy Democracy, involving a lottery-selected resident panel that spent over 90 hours learning about community needs and developing recommendations for the City Council.
3. **Lucchessi Skatepark:** The City Council unanimously approved the Lucchessi Skatepark concept plan and anticipates breaking ground on the first phase of the project in Summer 2024.

Other Community Gathering Spaces

Other community groups and spaces in Petaluma include:

1. The Phoenix theater (A non-profit community building and performing center)
2. Buffalo Billiards Pool Hall
3. The AMF Boulevard Lanes (bowling alley)
4. The Petaluma Arts Center
5. The Boulevard 14 Cinema
6. The Petaluma Historical Library and Museum
7. The Petaluma Library
8. The Mystic Theatre
9. Polyklass Theater
10. Miracle League (Park) (accessible playground + community center)
11. Luchesi Field-community hub
12. Aqus Café (non-profit arm)
13. Hall of the Above
14. Café Puente
15. Grand Central
16. Luchesi Community Center
17. Several Churches- Catholic Church Yard
18. Petaluma Wildlife Museum (High School Natural History Museum)
19. Artaluma
20. Kenilworth Park Teen Center (park under construction)
21. Skate park near Swim Center

22. Petaluma Gardens Club
23. Petaluma Women's Club
24. Rotary, Lions, Moose Clubs
25. Farms with pseudo-public programs:
26. Open Field Farm (summer camps, CSA)
27. Wind Rush Farm
28. Terra Firma
29. Rusty Hinges

Park Opportunities

- **Enhance the overall Park Network:** Petaluma has a diverse array of parks, including community, neighborhood, pocket, open space, and regional parks. This diversity creates opportunities for Petaluma River Park to serve as a central nexus. Figure 13 demonstrates that community parks are heavily weighted on the East side of highway 101. This is a great opportunity to provide more community park space on the West side of the freeway (and central Petaluma).
- **Inclusive Design:** Parks like Luchessi Park, with accessible playgrounds, set a positive precedent for inclusive design. Implementing universally inclusive play structures can enhance the accessibility of Petaluma River Park.
- **Intergenerational Engagement:** Parks fostering intergenerational interactions contribute to their role as communal spaces. Creating diverse activities will enrich the park experience for various age groups.
- **Distinct Park Identity:** Parks with unique features, such as integrated community centers and iconic structures, contribute to a distinct park identity. This can foster community activation and a lasting connection with the local community.
- **Strategic Planning for Maintenance:** Addressing deferred maintenance requires a strategic approach for the City of Petaluma. Petaluma River Park, being a non-profit with independent funding, has an opportunity to prioritize and fund maintenance opportunities to showcase how Petaluma River Park can be adequately maintained.
- **Proximity to Petaluma River Park:** The surrounding area, within a two-mile radius of Petaluma River Park, lacks parks with amenities, presenting an opportunity for a connected network of parks and open spaces. Collaboration and development in this context can enhance the overall recreational experience.
- **Support local habitat:** Protect the most sensitive areas of the park and provide public access where appropriate.

Park Constraints:

- **Budget and Staffing Constraints in Surrounding Parks:** The decline in the annual park maintenance budget and limited staffing affects the maintenance and functioning of Petaluma's park infrastructure, creating possible constraints for connectivity.
- **Increased Park Infrastructure:** Despite a decrease in the annual park maintenance budget by the city of Petaluma, the number of park properties, total acreage, and recreational building square footage has increased. This expansion could result in less maintenance in surrounding parks.
- **Facility Limitations in Surrounding Parks:** Many nearby parks lack essential facilities, such as sport courts, restrooms, exercise equipment, art installations, and designated bike paths.
- **Incomplete Amenities in Surrounding Parks:** Some nearby parks fall short of meeting visitors' needs, lacking amenities like bike parking, food service establishments, and BBQ grills.
- **Parking and Park Access:** Parking and access to Petaluma River Park present significant challenges due to physical and wayfinding conflicts.
- **Utilities and Infrastructure:** The location and accessibility of utilities (water, electricity, sewage) influence the placement of amenities, structures, and the overall layout of the park.

The city's park network, coupled with an expanding infrastructure, offers a promising foundation for Petaluma River Park to become a central hub. Inclusive design principles, the encouragement of intergenerational engagement, and strategic programming are opportunities for the park experience, fostering a sense of community and inclusivity.

Despite these opportunities, challenges emerge from budgetary constraints, staffing limitations, and incomplete amenities in the surrounding parks. The need for a strategic maintenance approach by the city of Petaluma is evident, requiring concerted efforts to prioritize needs, allocate resources effectively, and enhance overall park conditions. Addressing facility limitations and parking challenges, particularly in the context of Petaluma River Park's location, becomes crucial for ensuring seamless connectivity and accessibility.

Collaborative initiatives within the two-mile radius surrounding Petaluma River Park present an opportunity to create a connected network of parks and open spaces. By addressing constraints in neighboring parks and strategically planning for maintenance, Petaluma River Park can emerge as a central hub within a cohesive recreational experience for the community.

In navigating these opportunities and constraints, a thoughtful and inclusive approach to park development, maintenance, and collaboration will be key to realizing the full potential of Petaluma River Park as a dynamic and cherished asset for the city.

Petaluma River Park Access

The peninsula side of Petaluma River Park is accessed off Copeland Street, just north of the D Street Bridge. There is a parking lot that serves Steamer Landing Park and Petaluma River Park at the end of Copeland, but the park is not visible from the street. The park property is about a quarter mile away, or 5-minute walk along McNear Channel through Steamer Landing Park. (Figure 14)

The Hopper site is across McNear Channel from the peninsula and accessed off Hopper Street. The SMART train tracks create a barrier between the site and eastern Petaluma since there are few opportunities to cross the tracks. The crossing at Caulfield Lane is closest to the Park. (Figure 15)

Several nearby streets are considered high-injury corridors for pedestrians and bikes—these include D Street through Downtown, Lakeville Street and East Washington Street. (Figure 16)

Pedestrian

The peninsula site is central to Petaluma and is walkable from Downtown and nearby eastern neighborhoods. The streets connecting to the site have sidewalks, but there is no stop control at the D Street crossing at the park entry. From the parking lot, the SMART train, Downtown Petaluma and the eastern neighborhoods are all within a 5-10 minute walk. From the parking lot to the far end of the park is about $\frac{3}{4}$ of a mile or about a 15 minute walk. A loop from the parking lot and back is about a mile and a half or a 30 minute walk.

The Hopper site is difficult to reach by foot. Hopper Street does not have continuous sidewalks and the next main street, Lakeville, only has sidewalks on the north side and is considered a high-injury corridor. To walk from the parking lot at the peninsula site to Hopper on sidewalks is a little over a mile, or about a 25 minute walk.

Bicycle

Most of the City of Petaluma is within a 10 minute bike ride of the peninsula, and within 20 minutes cyclists can connect from the park to other regional destinations like Petaluma Adobe State Park, Shollenberger Park and Helen Putnam Regional Park.

The peninsula park entry off Copeland Street does not currently have dedicated bicycle routes linking it to other nearby cycling facilities. D Street has a ‘sharrow’ alerting cars to the presence of bikes, but the Petaluma Active Transportation Plan considers this corridor a higher stress area for bikes, ranking it as a 3 out of 4 for the level of stress, with 4 being considered the most stressful bike routes. The park entry is linked to the eastern side of the city with a shared bicycle and pedestrian path from Hopper Street to the existing parking lot.

The Hopper site is difficult to reach by bicycle as no dedicated bicycle facilities lead to the park site. Hopper Street has traffic from large vehicles travelling to the Vulcan Materials site and a Public Works site near Caulfield Lane. Lakeville Street has bicycle lanes in each direction, but is considered a high-injury corridor.

[Regional Trail Links](#)

The park is near several regional trails including the Petaluma Ring Trail, the Lynch Creek Trail, the Adobe Creek Trail, the Bay Area Ridge Trail, and the SMART Pathway (Figure 17). The 2008 City of Petaluma Bike and Pedestrian plan calls for more links to regional trails, including the Bay Area Ridge Trail. The plans for Petaluma River Park will be reviewed by the City of Petaluma Pedestrian and Bicycle Advisory Committee and representatives of the Bay Area Ridge Trail for connections to the city and regional systems.

The Bay Area Ridge Trail currently follows the path of the Petaluma Ring Trail and the Lynch Creek Trail, from Adobe Creek past the airport, through Prince Park and Lucchesi Park and connecting to the Petaluma River north of Payran Street. The trail then follows the Petaluma River to the Copeland Crossing, a bicycle and pedestrian bridge, and then east and south through Downtown Petaluma to Helen Putnam Regional Park. The River Park is considered a spur on the trail and there is currently no direct connection from the Ridge Trail/Lynch Creek Trail down Copeland Street to the park, though there is a planned connection included as part of the Petaluma Active Transportation Plan.

Future plans for the Ridge Trail also show a realignment down Adobe Creek through Shollenberger Park, and then along the Petaluma River and McNear Channel directly to Petaluma River Park, which will make the park a more integral part of the regional trail system. A portion of trail has been constructed by the Riverfront housing development to the south. A waterfront trail at the Hopper site would connect to this existing segment of trail and

could eventually link with planned trails to Shollenberger Park through the Petaluma Marsh to the Bay Trail along CA 37.

When fully constructed, the SMART Pathway will run along the rail corridor north of Petaluma, through Downtown and south along 101, creating a bike link from Petaluma to the city's north and south. Currently a segment of separated multi-use path runs from 101 along the train tracks to Lakeville Street. From there the Pathway runs on a series of on-street bike routes through Downtown to the Haystack Rail Bridge. In the southern area of Petaluma, there is a gap in the pathway along Petaluma Boulevard.

A pedestrian and bike bridge linking the peninsula and Hopper sides of the park would alleviate many of the access issues for both sites and create a missing link in the trail network. The bridge would allow people to connect from the Lynch Creek trail to the future improvements on Copeland, through the River Park peninsula to the Hopper side and south through the Riverfront development and eventually to Shollenberger Park and beyond.

Vehicular

Cars arrive at the peninsula site from Copeland Street and park in the lot for Steamer Landing Park, which has 17 spots, including 1 accessible space. The Oyster Cove development is planning a small, public parking lot near the David Yearsley River Heritage Center. There is also a 4-story city parking garage across the D Street Bridge, a 5-minute walk from the Peninsula parking lot.

Vehicular access to the Hopper site would come off Hopper Street or from the Riverfront development to the south. There is currently no public road into the site and no parking facilities.

For regional visitors, the main connections to Petaluma River Park from Highway 101 are Lakeville Street (Highway 116), Washington and D Streets. These streets each have a bridge crossing the Petaluma River and are all major corridors through the city and are often congested at peak traffic. The City is currently planning a new bridge, the Caulfield Extension Bridge, which should take some pressure off these streets. Construction of the bridge is projected to start in 2026.

Transit

Petaluma River Park peninsula site is close to several local and regional transit lines. A bus depot located on Copeland Street is a transit hub connecting many bus lines to the SMART

train station. The depot, however, does not have any facilities or indoor waiting area and many of the bus lines have long wait times between buses.

The following lines have stops within a 5 minute walk of the peninsula parking lot entry:

- City of Petaluma buses 10, 11 and 24
- Sonoma County Transit routes 40, 44 and 48
- Golden Gate Transit routes 101 and 172
- SMART Train

The Hopper site is not as well connected with the City of Petaluma line 24 and Sonoma County Transit line 40 running along Lakeville Street.

Water

The park is also located near several trailheads of the Bay Area Water Trail, which connects down the Petaluma River, through Petaluma Marsh to San Pablo Bay. Currently the nearest Water Trail access points are:

- Petaluma River Turning Basin, 15 minute kayak (.5 miles)
- Petaluma Marina, 30 minute kayak (1 mile)
- Black Point Boat Launch, 6 hour kayak (12 miles, along CA 37)

The Central Petaluma Specific Plan and The Petaluma River Access and Enhancement Plan encourage more opportunities for public river access and waterborne transportation and specifically call out Petaluma River Park (McNear Peninsula) as a recommended location for additional river access points. The Friends of the Petaluma River have recently completed construction of an accessible dock at Steamer Landing Park which currently provides water access to the Peninsula.

Future Planning

The City of Petaluma is in the process of developing the Petaluma Active Transportation Plan. A draft of the plan should be released later in 2023. The website shows some proposed projects near Petaluma River Park (Figure 18) including:

- A Class IV (separated, dedicated bike lane) bike lane along D Street between the D Street Bridge and Lakeville Street
- A new multi-use path along Copeland Street from E Washington to D Street, linking the River Park to the Lynch Creek Trail

- Improvements to the trail at Steamer Landing Park, including upgrades to paving and lighting
- New shared use trails along the southern bank of the Petaluma River from Oak Street through Downtown to 101 and along McNear Channel from West Hopper Street to 101

Climate

Understanding Petaluma's climate is crucial for planning for the proposed Petaluma River Park, as it informs the design for human comfort, planting and habitat. (Figure 19) Climate-related factors to consider include:

1. **Watershed and Tides:** Recognizing that the park is part of a larger watershed system and understanding how tidal fluctuations impact the park's edge conditions is essential for riverfront park design.
2. **Geographical Region and Wind Patterns:** Petaluma's location in a unique geographical region affects wind patterns, resulting in distinct climate conditions. These patterns should inform park layout and shelter design.
3. **Temperature and Sun Exposure:** Petaluma experiences hot summers, making shade provision crucial for visitor comfort. Designing shade structures and planting shade-providing trees should align with temperature and sun patterns.
4. **Rainfall:** A thorough understanding of rainfall patterns can guide choices in topography and vegetation selection, ensuring proper drainage and soil management for the park's sustainability.

Watershed and Tides

The Petaluma River Watershed covers 146 square miles and is roughly 19 miles long and 13 miles wide, with the city of Petaluma located near its center. The highest point in the watershed is Sonoma Mountain at 2,295 feet, with its western slopes draining into the Petaluma River via tributaries. The lower 12 miles of the Petaluma River flow through the Petaluma Marsh, the largest remaining salt marsh in San Pablo Bay.

The tides at the Petaluma River Park fluctuate throughout the year. According to the NOAA Datum MLLW, the tides fluctuated in 2022, from tides as high as 8.3' to as low as -1.6' with Mean High High Water at 5.7'. These tide oscillations will be instrumental in guiding the design process for the areas along the park's edge.

The Petaluma Gap

The Petaluma Gap is a geographical region that covers an area of low-lying land in Sonoma County, California, spanning 21 to 30 miles wide, extending from the Pacific Ocean to San Pablo Bay. The Petaluma Gap serves as a passage in the hills allowing marine air to flow into the Bay Area and Russian River Valley. This region experiences a "wind tunnel effect," which results from the break in the coastal mountain range. Thanks to its relatively low elevation, the Petaluma Gap encounters minimal resistance to the daily inflow of marine air, accompanied by refreshing coastal fog. A typical day in this region begins with a layer of cool and damp morning fog. As the day progresses, around 11:00 am, the sun drives out the fog, leading to temperature increases of up to 50° F. In the afternoon, brisk onshore breezes gain momentum, bringing back the nightly fog and resulting in a drop in temperature.

Wind

Petaluma experiences mild seasonal variation in wind speed, with windier months from February to July, peaking in May. The average hourly wind speed varies between 6.8 and 8.5 miles per hour. Petaluma experiences a prevailing west-northwest wind that aligns with the outgoing ebb tide creating ideal conditions for downstream paddling or canoeing. Conversely paddlers attempting to return against wind and or tide can be particularly challenged!

Temperature

The warm season spans from June to October, with July and August being the hottest months, with an average high of 82°F. The hottest temperature recorded in Petaluma was 110°F. In contrast, the cool season lasts from November to February, with an average daily high temperature below 61°F, with January being the coldest. The average low temperature in December and January is 38°F, with nighttime frost occurring between late October and mid-April, with about 30 frost days on average.

Rainfall

On average Petaluma received 31 inches of rain. Rainfall in Petaluma shows extreme seasonal variation, with a rainy period from September to May and a dry season from May to September. February is the wettest month, with an average rainfall of 5.1 inches, while July sees the least rain, with an average of 0.0 inches.



Petaluma is under the jurisdiction of the San Francisco Bay region of the State Water Resources Control Board. Any new project on the site that adds or replaces more than 10,000 sf of impervious surface, like paving, roofs or other surfaces that don't allow water to percolate, will need to treat the stormwater to remove pollutants before it infiltrates into the ground or is released into the river. The plans for the River Park will almost certainly pass this threshold so stormwater treatment areas will need to be part of the concept plans. This treatment often includes biotreatment areas, like rain gardens or swales, which are depressions that gather water and use plants and the soils to remove pollutants.

Climate Change and Sea Level Rise

Predicted changes to the climate of Petaluma will impact the River Park. Climate change is expected to decrease the average annual rainfall and increase the average temperature of the region. Over the next century, rainfall is projected to decrease from 31 inches per year to about 26.3 inches per year. This average does not account for larger variances between years with predictions including longer droughts or dry spells without rain and more intense atmospheric rivers producing heavier events and more potential for flooding. At the same time the average annual temperature of Petaluma is predicted to increase 3.6 degrees by 2040 and 10 degrees by 2100. Currently Petaluma sees an average of 3 extreme heat days per year, which would increase to 18 days by the end of the century.

Planting at the River Park should be more drought and heat tolerant to withstand these droughts and higher temperatures. Shade structures and trees will be even more important to mitigate the impacts of heat and make the park more comfortable on hot days. Parks and green spaces are both escapes for people during heat events and can help cool the spaces around them. Given that the surrounding neighborhoods are more vulnerable to urban heat island than the average areas in Petaluma, increasing planting and shade and allowing for breezes from the river may help to decrease the temperatures of the surrounding community.

Wildfires are also a greater risk as the climate heats and droughts worsen. There is relatively low risk of wildfires within the city, however, dry vegetation within the park poses a risk for fire. Long grasses and other vegetation are important habitat sites so the benefits to wildlife will have to be weighed against the risk of fire.

Flooding and sea level rise are not great risks at the river park. Urban flooding is unlikely to impact the River Park site itself, but the peninsula entry and parking area are within the FEMA 500-year floodplain, so access to the park may be cut off during extreme floods. The relatively high average elevation means the park will have minimal impacts until over 5' of sea level rise, at which point the lower areas of the site, near the vernal pools, will see flooding from the river.

Environmental + Natural Resources

Regional Context

Petaluma River Park sits between the Petaluma Marsh and upstream freshwater habitats. It is along important corridors for migrating fish and birds (Figure 21). Petaluma Marsh remains the largest and least disturbed remnant of tidal marsh that historically existed in the San Francisco Estuary. At the park, the river water is brackish.

Soils

The soils of the peninsula site are Holocene bay mud, built up from dredging the river. This type of soil is unconsolidated, or not compacted, and is considered weak. Weight added to the park in the form of paving, buildings or other structures will likely cause some subsidence and will need to be a factor during design and construction. Bay mud is subject to heavy shaking during earthquakes and will be a factor in the engineering of any buildings and structures.

The Hopper site is mostly Clear Lake clay with some sandy, alluvial land at the eastern property line. The Clear Lake soils formed from the sediments of the Petaluma creek and surrounding wetlands and the fine texture of the clay makes the soil easily compacted and poorly drained. The ground water table is relatively shallow in the wet months. In its current condition, the poor drainage and shallow water table will limit the type of plants that will grow well on the site.

Contaminated soil and groundwater are present on the Hopper Site. Lead, diesel gas and volatile organic compounds (VOCs), including benzene and tetrachloroethene (PCE), have been found on-site. A Soil Management Plan will be required to guide site activity and track soil movement. Approximately 5,500 cubic yards of soil will need to be removed to a waste facility licensed to handle Class II polluted soils.

There is currently an active case with the San Francisco Bay Regional Water Quality Control Board to track the progress of the clean-up.

Habitat

Petaluma River Park currently has several types of habitat (Figure 20):

- **River**

- The Petaluma River is considered critical steelhead and green sturgeon habitat. These fish migrate upriver past the River Park site and would benefit from improved habitat along the park's banks.
- Sacramento splittail fish live in nearby wetlands and would benefit if there is more tidal marsh habitat.

- **Tidal Marsh**

- Tidal or Brackish Marshes ring the edges of the site along the river.
- These areas are home to gumplant, salt grass and pickleweed plants and are used by birds like herons, egrets, hawks, ducks and shorebirds including the saltmarsh common yellowthroat, California black rail, California Ridgway's rail, San Pablo song sparrow, and mammals like shrews, bats, mice, racoons and river otters.
- Many tidal marsh species are in decline due to habitat loss. Expanding the marsh would add more foraging areas for animals and fish.

- **Vernal Pool**

- A 1.4 acre vernal pool sits on the southwest side of the peninsula site. The water in this area is generally less than 12" deep and fills from the winter rain and dries in early summer.
- Currently the area has many non-natives but there is some native popcorn flower and buttercup.

California has lost over 90% of its vernal pools, which are important habitat for specially adapted wildflowers, crustaceans, amphibians and insects.

The River, tidal marsh and vernal pool meet the standard for jurisdictional wetlands under State and Federal criteria and are subject to protections that may limit the types of uses permitted in these areas.

- **Grasslands + Coyote Brush Scrub**

- Both River Park sites are currently mostly non-native grassland habitat with low habitat value.
- Stands of coyote brush in center of the peninsula are intermixed with non-native grasses/plants. These shrubs provide cover for rabbits and birds.

- Grasslands + scrub are used by birds, small + medium sized mammals like rabbits, otters, and skunks, and reptiles like western fence lizards, alligator lizards, western skinks, gopher snakes and garter snakes for foraging and nesting.
- Small mammals and rodents like gophers, mice and voles provide food for red-tailed hawks, red-shouldered hawks, white-tailed kites and northern harriers.

Though not currently found in the park, native oak woodlands would be beneficial to the habitat value of the site. Oak woodland species including live oaks, buckeyes, coyote brush, elderberry and native rose would add shade and habitat value to the park.

Sensitive and Special Status Species

Several special status species either currently live in the River Park or have potential to use the park if the right habitat conditions are restored. Special status species are either those that are listed as threatened or endangered, or those that are proposed for listing. These species include:

- Birds
 - **San Pablo song sparrow:** lives in tidal salt marshes of northern San Francisco Bay and San Pablo Bay. Requires dense vegetation for nesting. Primary threat is habitat loss and fragmentation.
 - **Northern harrier:** medium-sized hawk that prey in grasslands and marshes. Would benefit from improved foraging and nesting sites in the park.
 - **White tailed kite:** small raptor with a white tail that hunt in grasses and meadows and feed on rodents.
 - **Saltmarsh common yellowthroat:** small yellow bird with a black facemask that live in freshwater and saltwater marshes and willows and documented to live 0.5 miles downstream from the park. The San Francisco subspecies is in severe decline due to habitat loss.
- Reptiles
 - **Western pond turtle:** small to medium sized turtle that lives in marshes, streams and rivers. Listed as vulnerable due to habitat destruction and competition from invasive species. Expanded wetlands at the park would provide more turtle habitat. Foraging and nesting may be disturbed by public access.
- Fish
 - **Green sturgeon:** can live up to 80 years and grow to 8' long, migrate between saltwater to feed and freshwater to spawn. Currently listed as threatened due to habitat loss and rising temperatures.
 - **Steelhead:** Central California DPS (distinct population segment) is listed as threatened. Steelhead are a species of rainbow trout that spawns in freshwater

and migrate to the ocean as adults before returning to spawn in rivers. The Petaluma River is designated as a critical habitat for these fish. Would benefit from additional marsh habitat along the River.

- **Sacramento Splittail:** Small relative of carp that grow up to 1' long with a population living in the Petaluma River estuary. Adding more shallow water zones would benefit juvenile fish.
- Mammals
 - **Pallid bat:** small bat (around 5") with large ears, rare but found throughout the western US, very sensitive to disturbance of roosting sites. More tree and shrubs at the park would provide cover and more habitat complexity for foraging.
 - **Townsend's big-eared bat:** very small bat (2.5") that can live 15-30 years. Sensitive to disturbance. Would use the River Park site for foraging.
- Plants
 - **Franciscan onion:** Threatened species of wild onion. Perennial bulb with purple flowers.
 - **Alkali milk vetch:** annual with pink-purple flowers, live in grasslands and vernal pools.
 - **Point Reyes checkerbloom:** spreading perennial up to 3' tall, lives in coastal marshes and vernal pools.
 - **Popcorn-flower:** annual with small, white flowers. Lives in vernal pools and other wet areas.
 - **Round-leaved filaree:** Small plant with white flowers tinged with red or purple. Lives in grasslands and scrub. Common statewide, but a species of local concern.

Habitat Corridors and Connections

Habitat loss and fragmentation is a threat to many populations of plants and animals that rely on marshes, pools and wetlands. Petaluma River Park is located upstream of marshes in Shollenberger Park and the 5,000 acre Petaluma Marsh and could provide another critical habitat connection for species that live and forage in these areas. Additional marsh habitat and improvements to the riverbank would benefit colonies of snowy egrets, great blue herons and great egrets that live nearby.

The Pacific Flyway is one of the main bird migration routes through North America and runs along the California coast. Tidal marsh, vernal pools and depressional wetlands are important foraging and resting places for birds as they migrate.

Habitat Recommendations

The site design affects the habitat value of the park. Recommendations for areas with habitat priority include:

- Adding program areas/features in the areas with the lowest habitat value and most disturbance.
- Reduce the presence of humans and dogs – keep some areas of the site free of people and limit off-leash dogs.
- Keep people and dogs out of vernal pools, wetlands and marshes to avoid disturbing wildlife and compacting soils.
- Limit nighttime lighting or amplified sound.
- Prevent litter.
- Limit mowing and maintain some grasslands.

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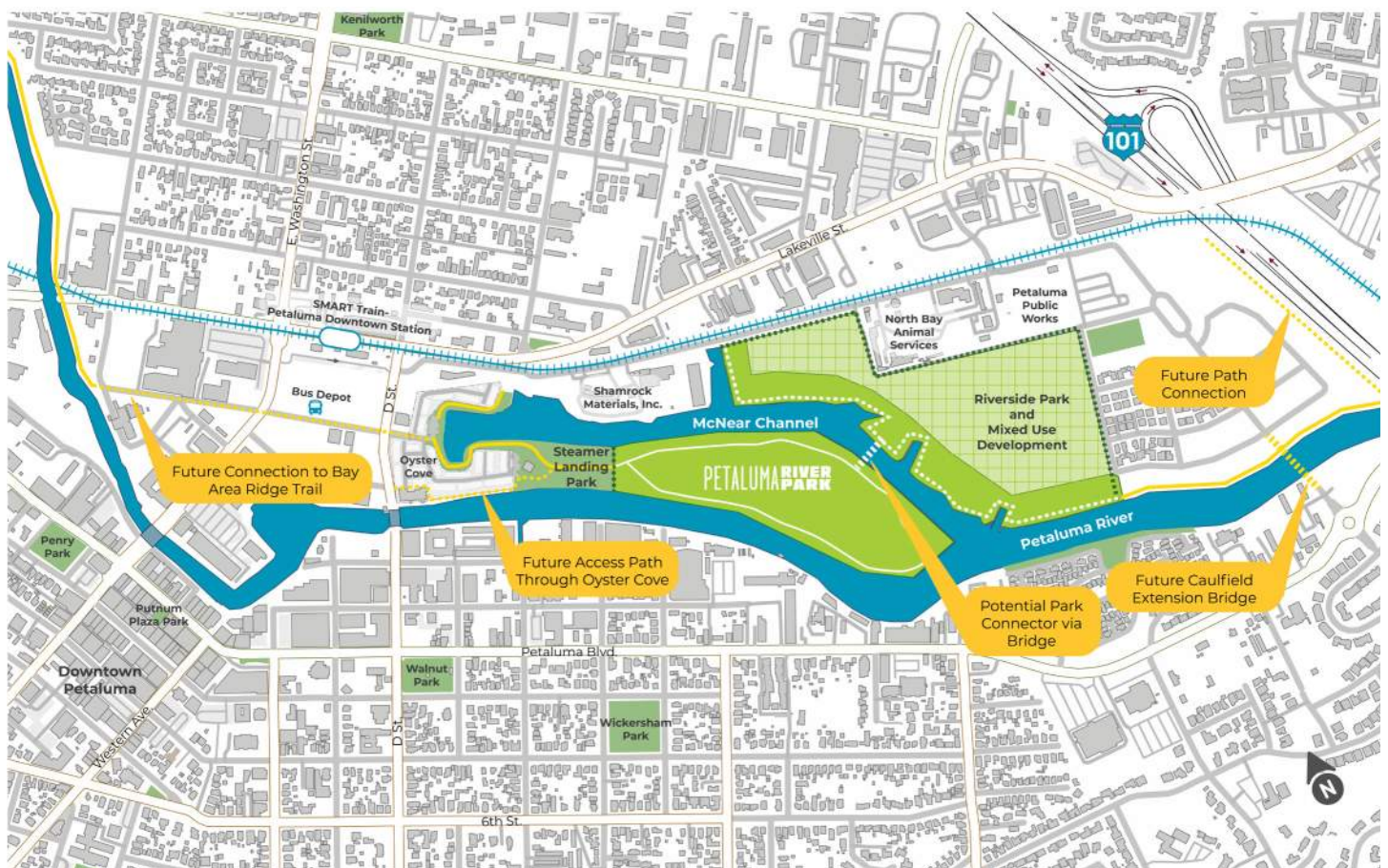


Figure 2 Context Map

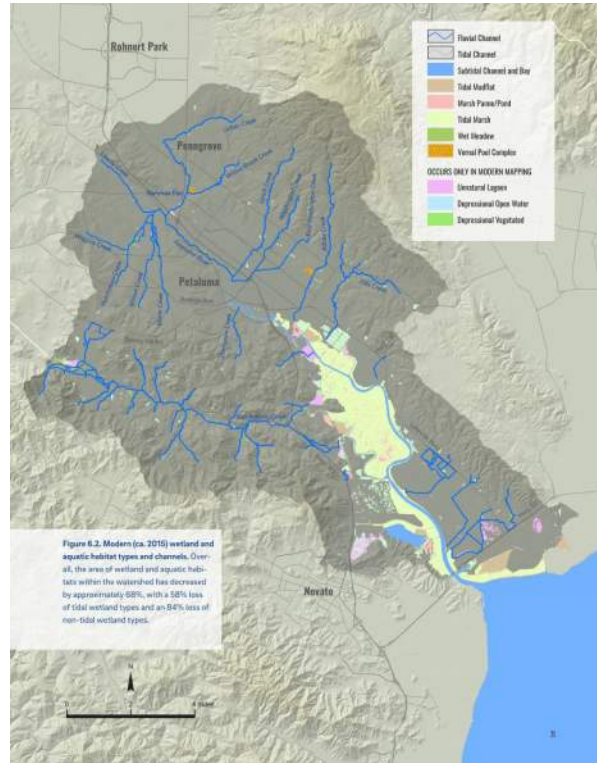
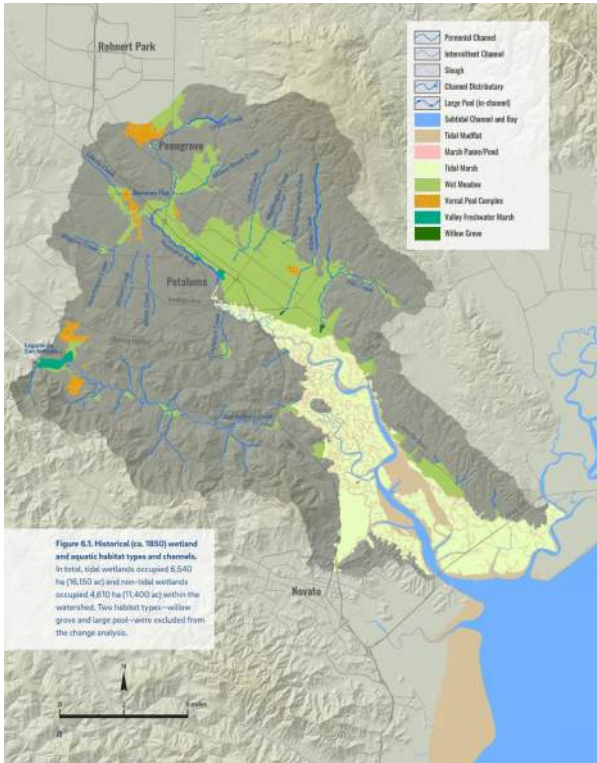


Figure 3 Petaluma Marsh



Figure 4 Dredger on Petaluma Creek



Figure 5 Schooner on Petaluma River



Figure 6 Chinese Laborers in California

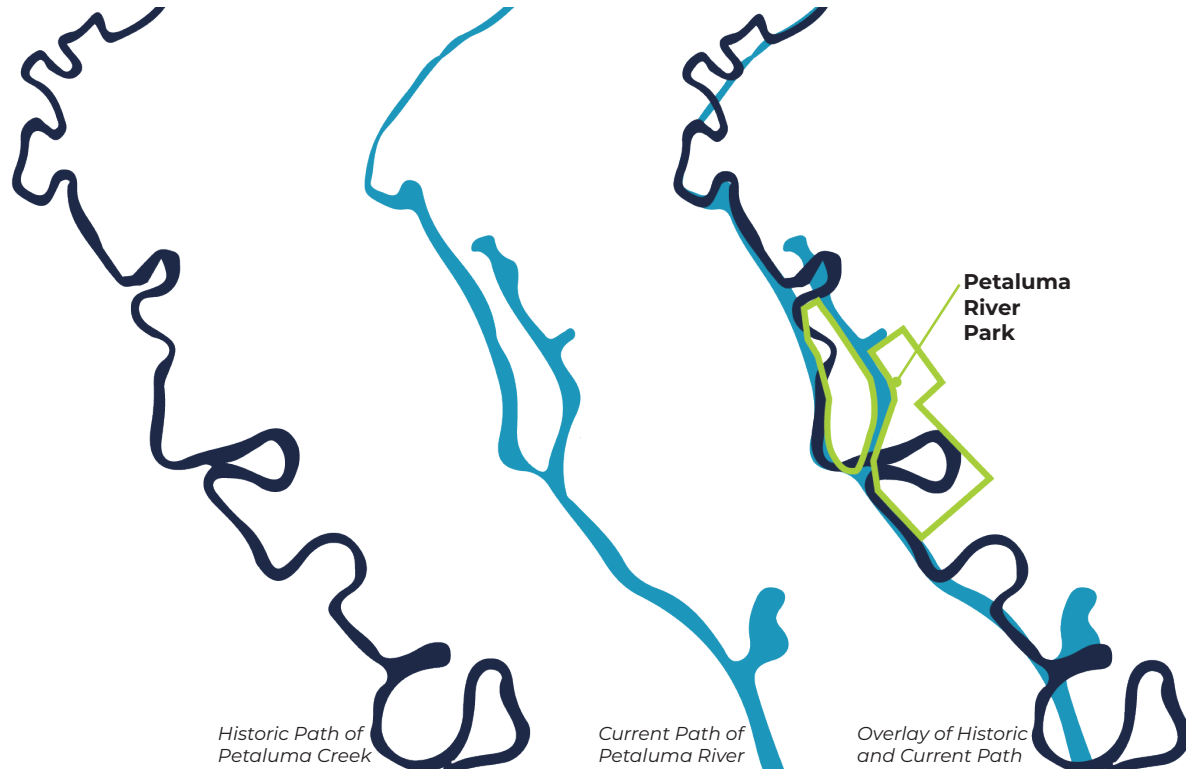


Figure 7 Changes to the Petaluma River Park Site



Figure 8 Steamer Landing Park Concept Plans



Figure 9 Oyster Cove Development

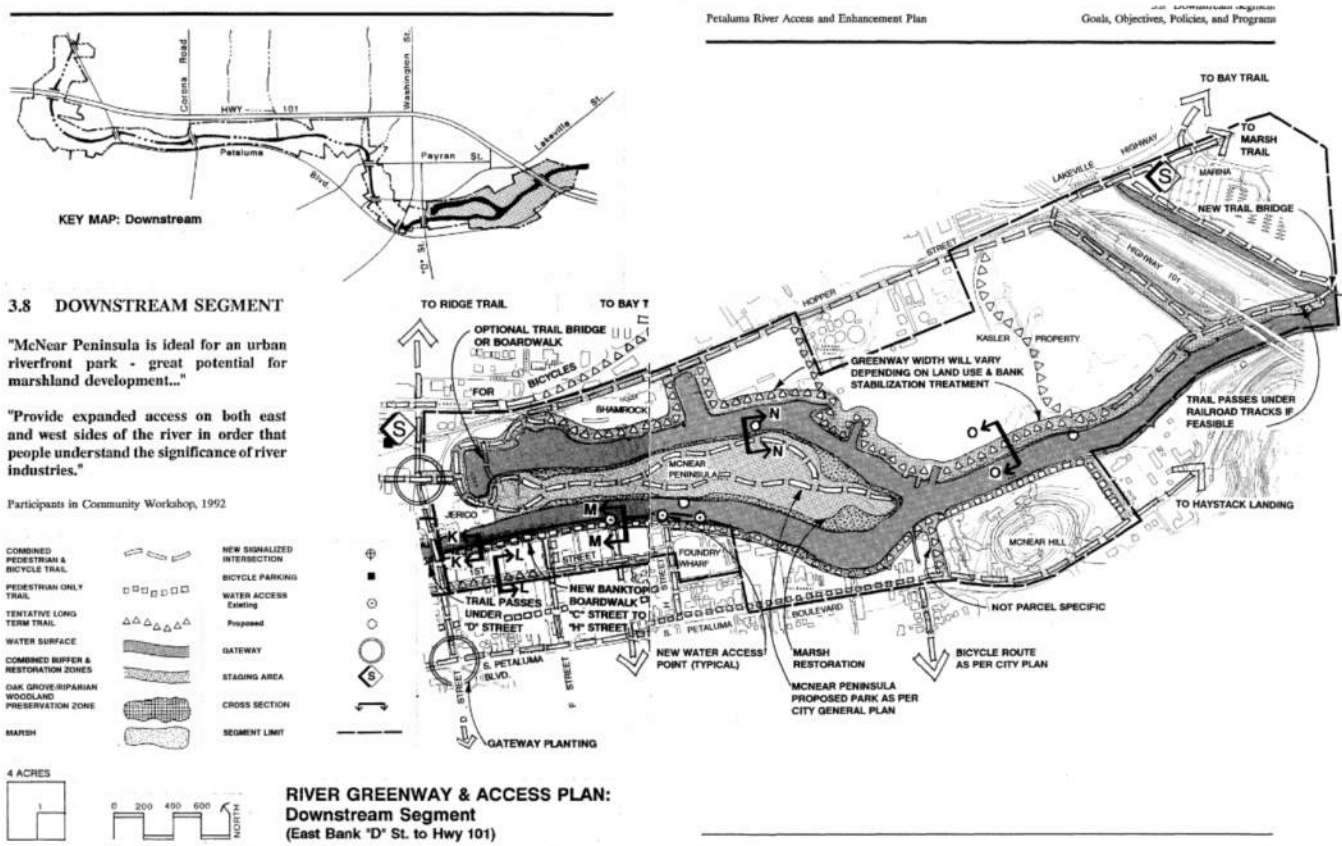


Figure 10+11 Petaluma River Access + Enhancement Plan

SECTION N-N WATER ACCESS AT MCNEAR PENINSULA

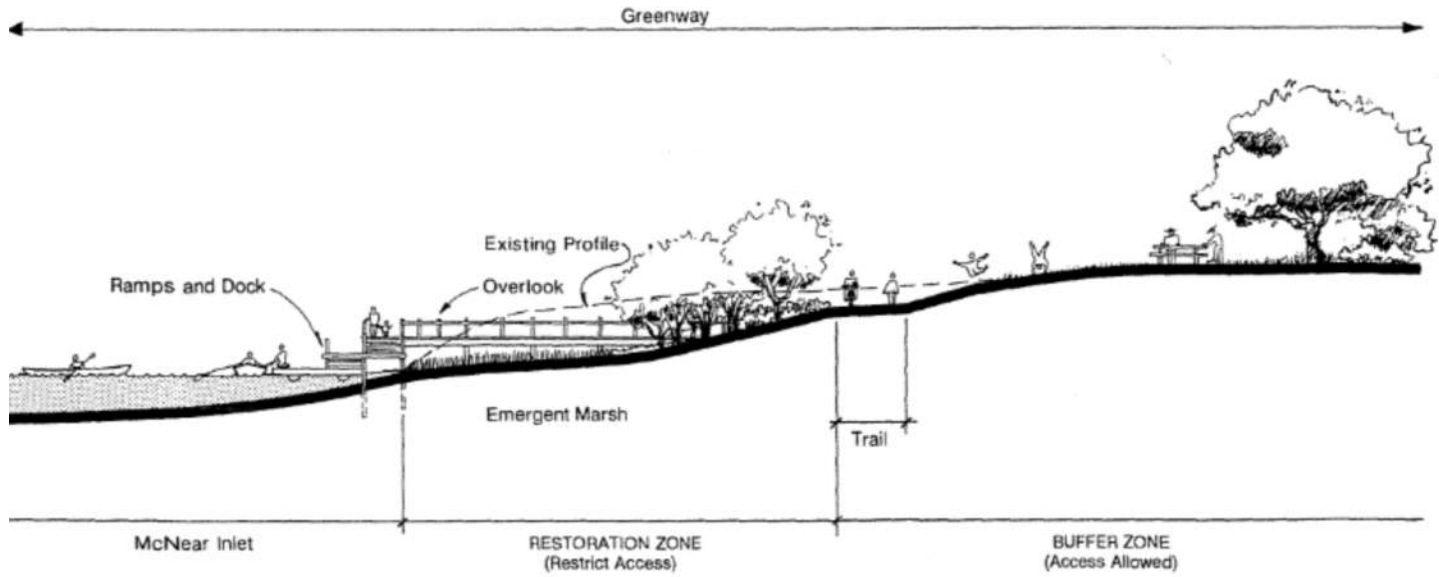
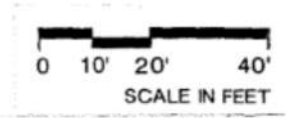


Figure 12 Petaluma River Access + Enhancement Plan Section



Figure 13 Petaluma Parks Map

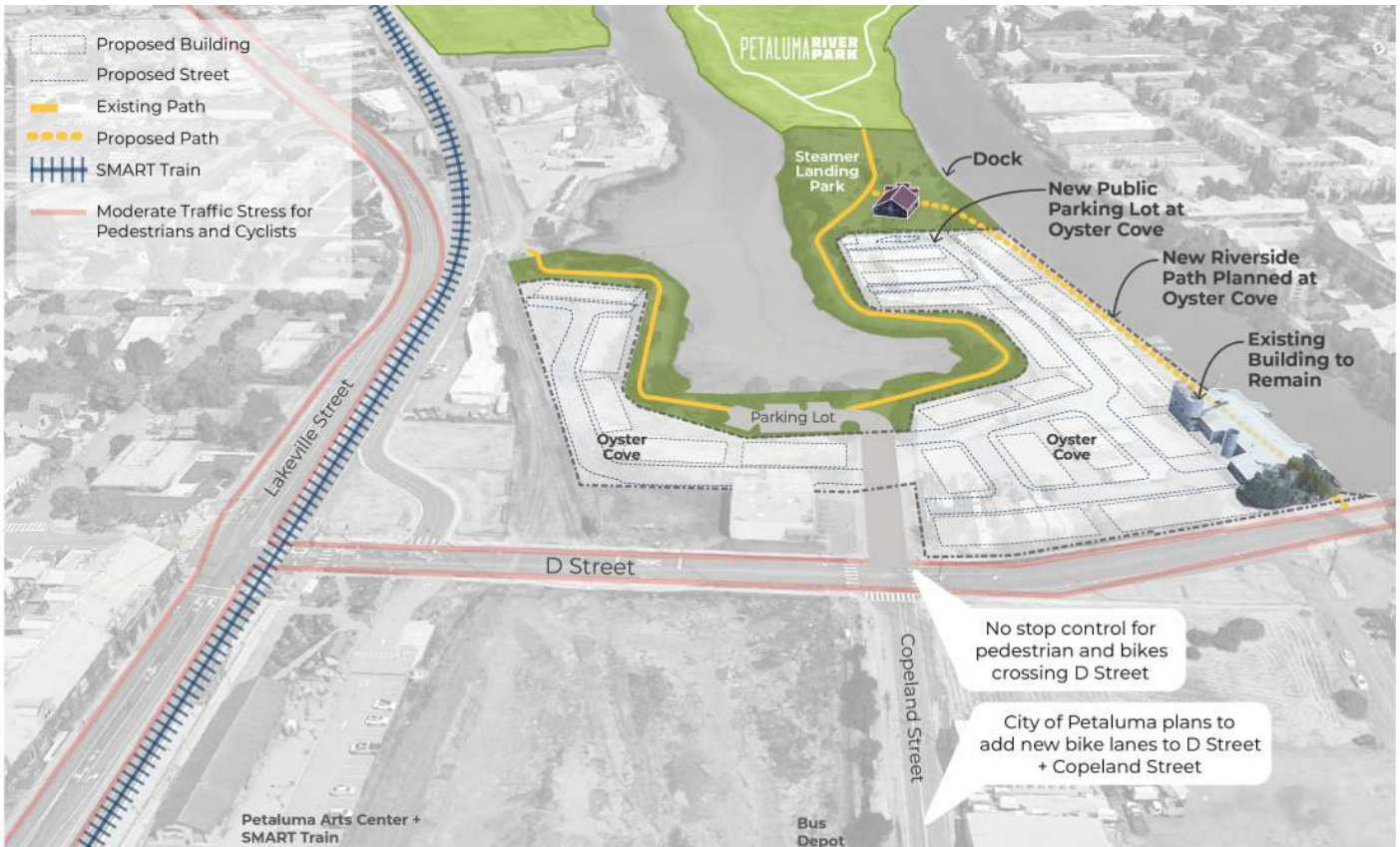


Figure 14 Peninsula Access



Figure 15 Hopper Access

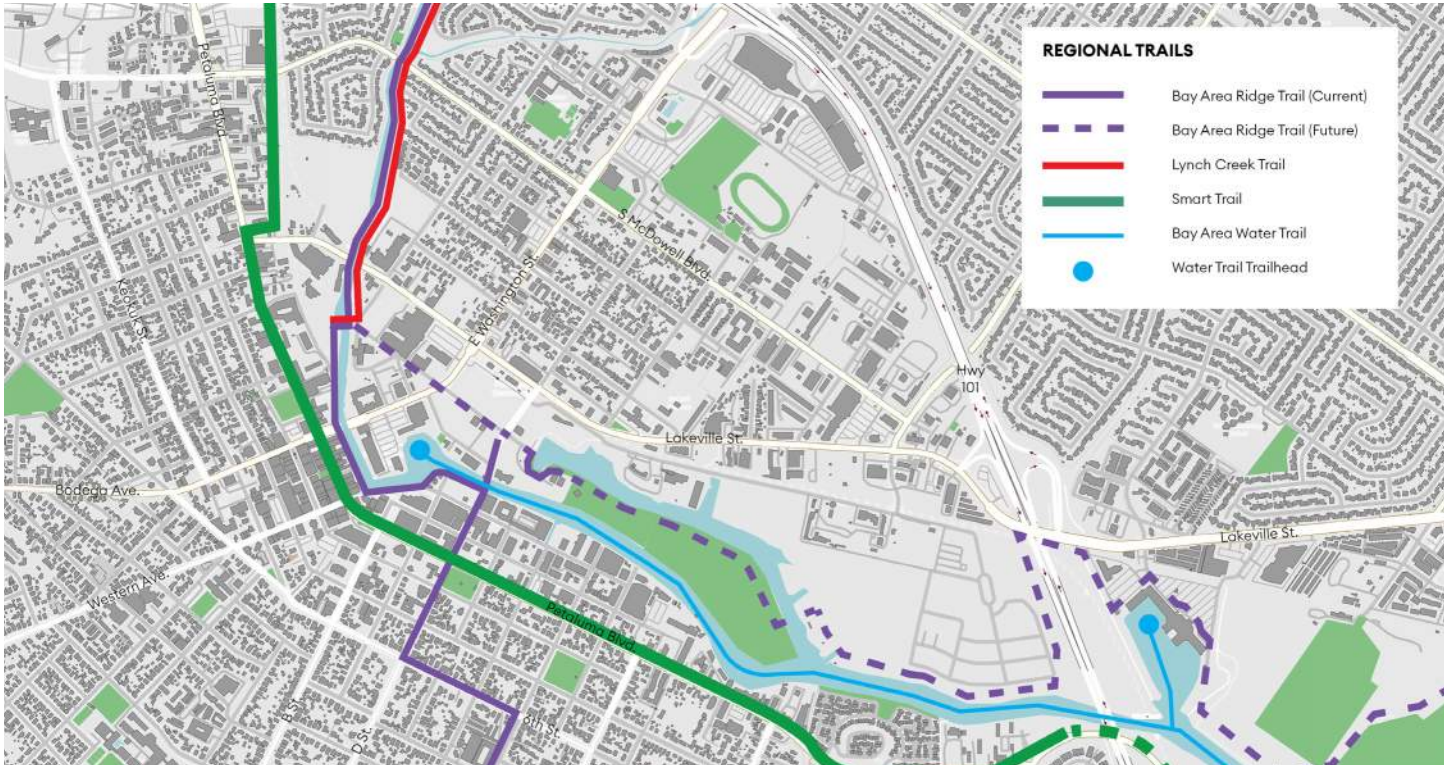


Figure 16 Regional Trails

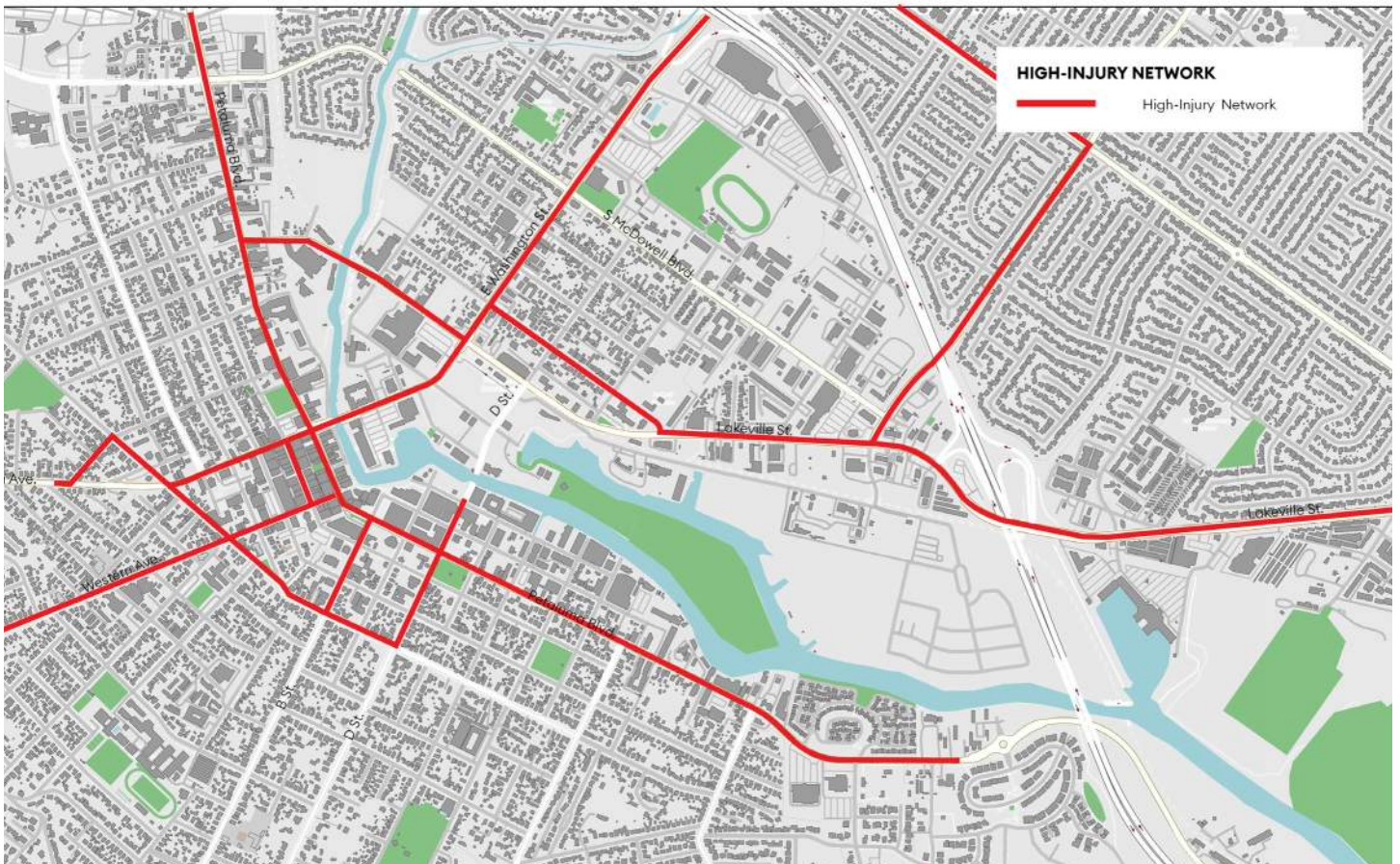


Figure 17 High Injury Network



Figure 9 Oyster Cove Development

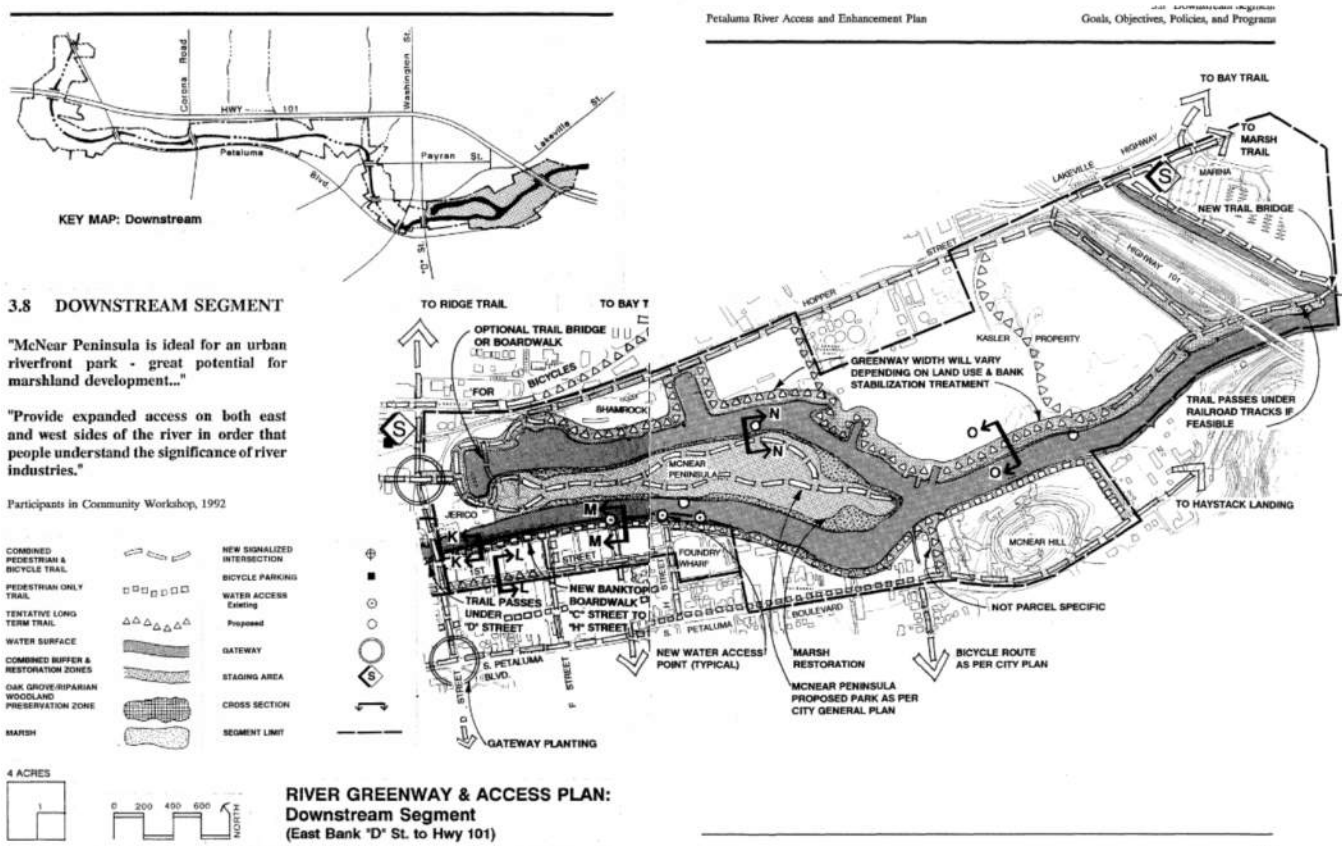


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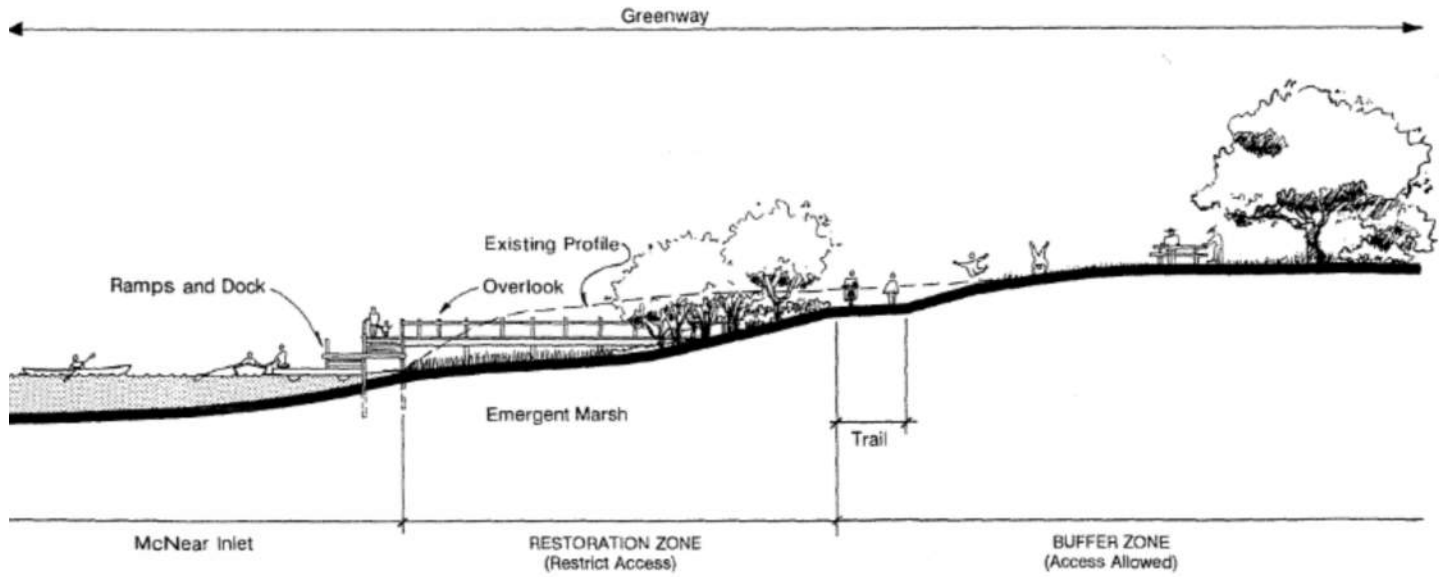
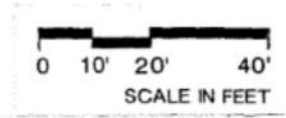


Figure 12 Petaluma River Access + Enhancement Plan Section



Figure 13 Petaluma Parks Map

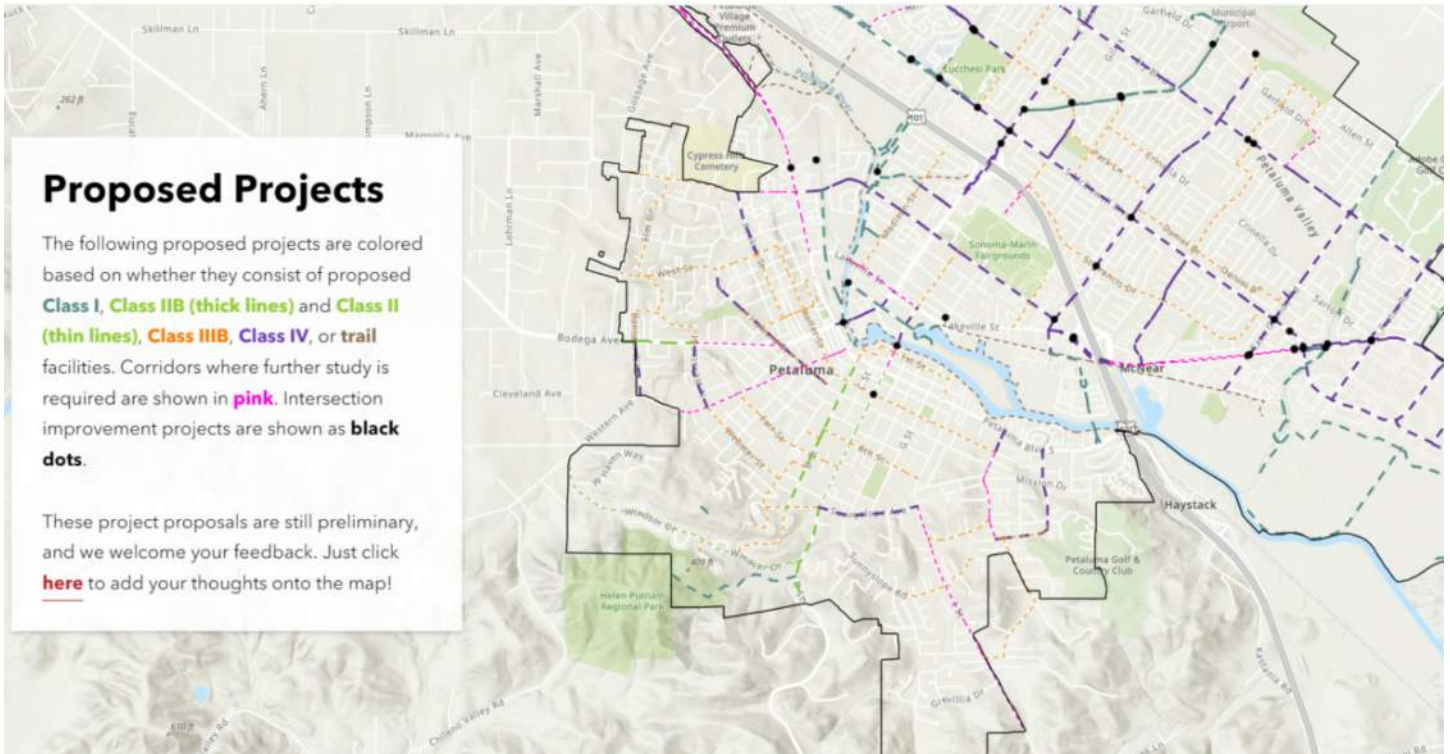


Figure 18 Proposed Transportation Improvements

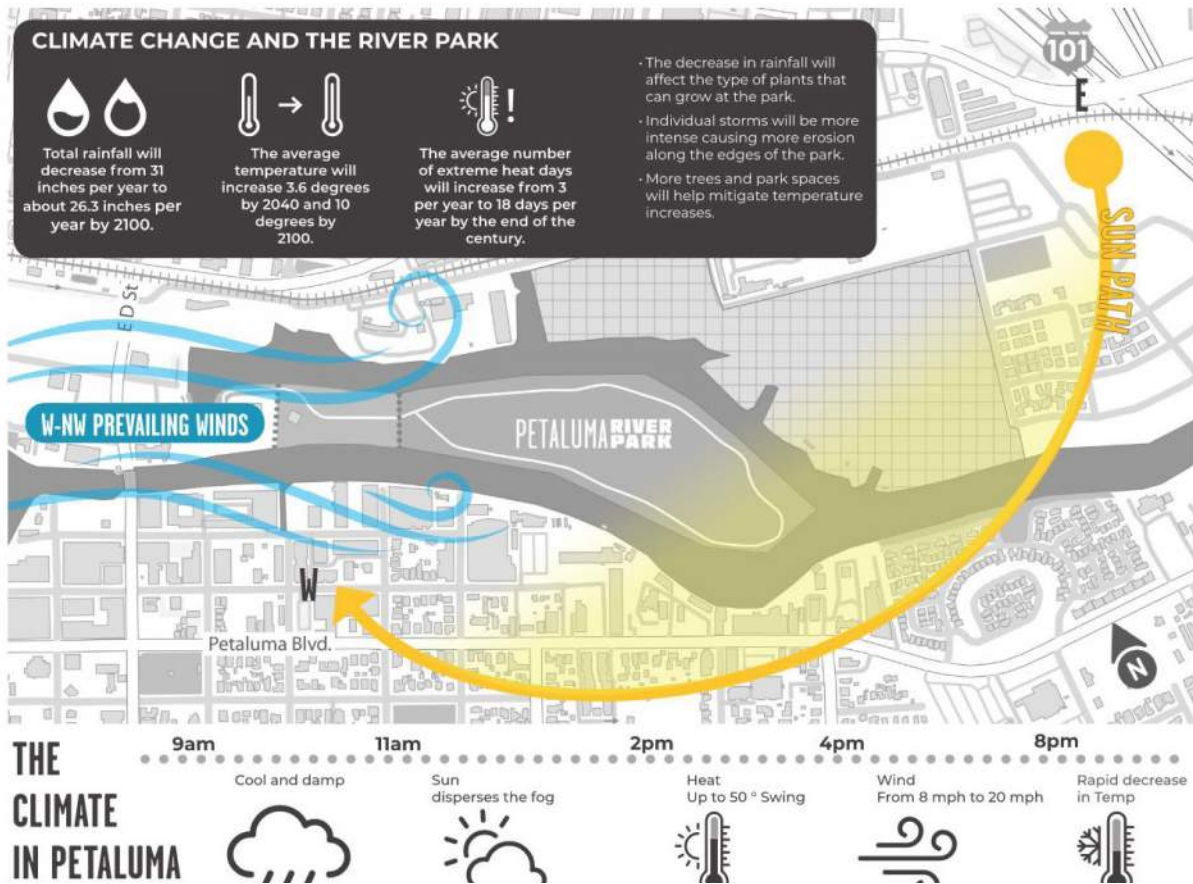
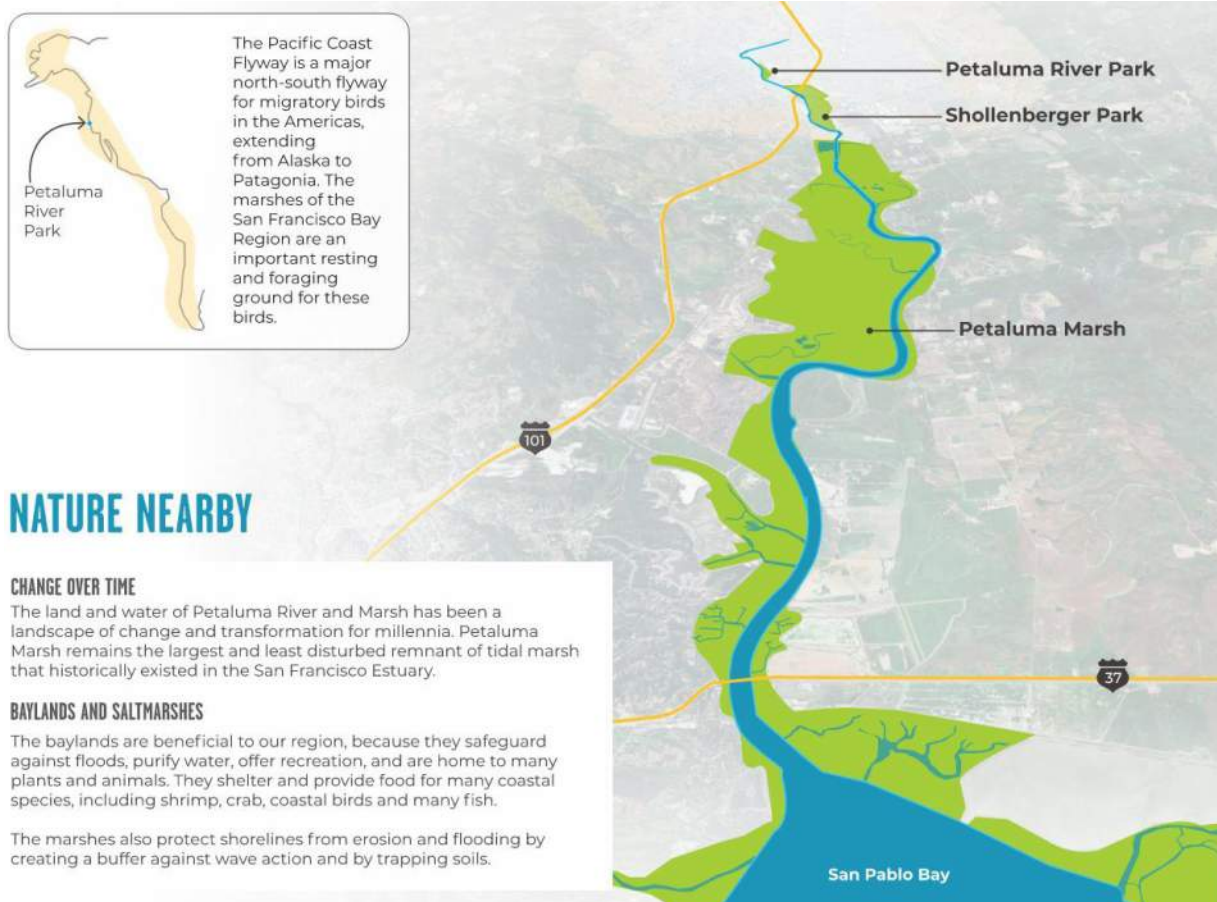


Figure 19 Climate



NATURE AT THE PARK

Figure 20 Nature at the Park



NATURE NEARBY

CHANGE OVER TIME

The land and water of Petaluma River and Marsh has been a landscape of change and transformation for millennia. Petaluma Marsh remains the largest and least disturbed remnant of tidal marsh that historically existed in the San Francisco Estuary.

BAYLANDS AND SALTMARSHES

The baylands are beneficial to our region, because they safeguard against floods, purify water, offer recreation, and are home to many plants and animals. They shelter and provide food for many coastal species, including shrimp, crab, coastal birds and many fish.

The marshes also protect shorelines from erosion and flooding by creating a buffer against wave action and by trapping soils.

Figure 21 Nature Nearby

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