

RECONNECTING: CREEK AND MARSH COMMUNITY AND NATURE

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Capstone Project Studio, Summer 2026
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PROJECT STATEMENT: This project realigns a creek through an empty, contaminated parcel within Point Pinole Regional Shoreline and connects the creek to a restored marsh by using Engineering with Nature® design concepts. Together with creek restoration, the project improves access, use, and enjoyment of the Shoreline by using Play for All and A Pattern Language design principles.

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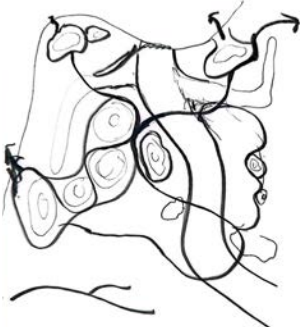
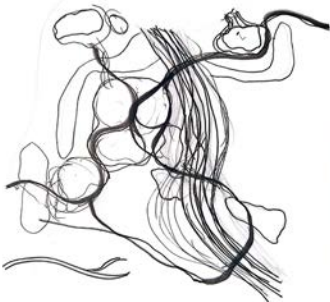
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PERSONAL STATEMENT

I am a landscape ecologist with a background in wetland science, plant ecology, and geospatial technologies. I received a Ph.D. in Environmental Science, Policy, and Management from U.C. Berkeley in 2005, and I have worked at the U.S. Geological Survey in the San Francisco Bay Area since 2009. At USGS, I have led research projects on wetland bird habitats, ecosystem services, climate impacts and carbon sequestration around California, Puget Sound, and the Gulf Coast. I believe that landscape architecture is central to building nature-based solutions on the coast, since it brings together people, nature, art and engineering, and creates the vision for what is possible. I am very excited to move into this new chapter where I hope to design beautiful, accessible spaces that provide solutions to our coastal challenges.

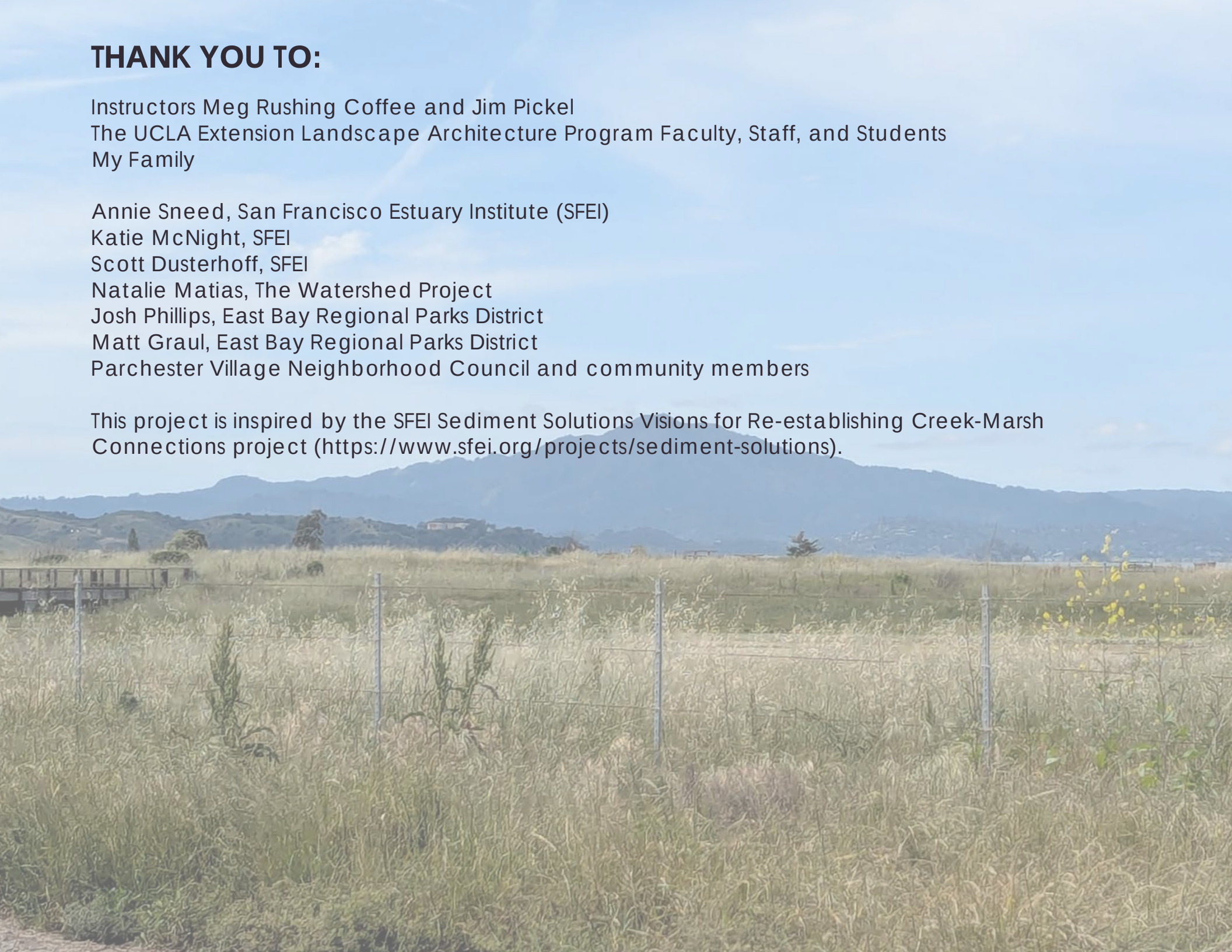


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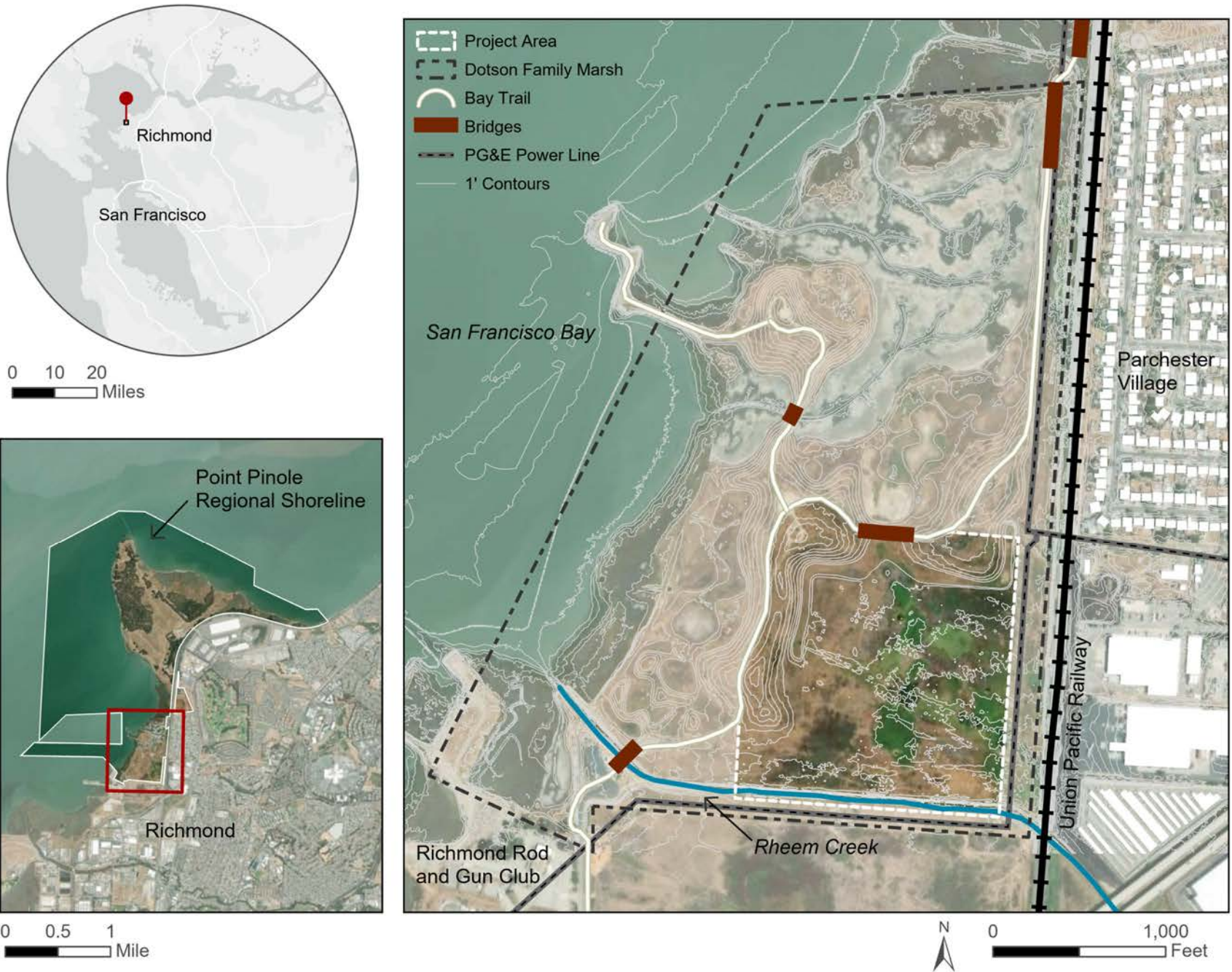
Instructors Meg Rushing Coffee and Jim Pickel
The UCLA Extension Landscape Architecture Program Faculty, Staff, and Students
My Family

Annie Sneed, San Francisco Estuary Institute (SFEI)
Katie McNight, SFEI
Scott Dusterhoff, SFEI
Natalie Matias, The Watershed Project
Josh Phillips, East Bay Regional Parks District
Matt Graul, East Bay Regional Parks District
Parchester Village Neighborhood Council and community members

This project is inspired by the SFEI Sediment Solutions Visions for Re-establishing Creek-Marsh Connections project (<https://www.sfei.org/projects/sediment-solutions>).



PROJECT AREA | DOTSON FAMILY MARSH | RICHMOND, CA



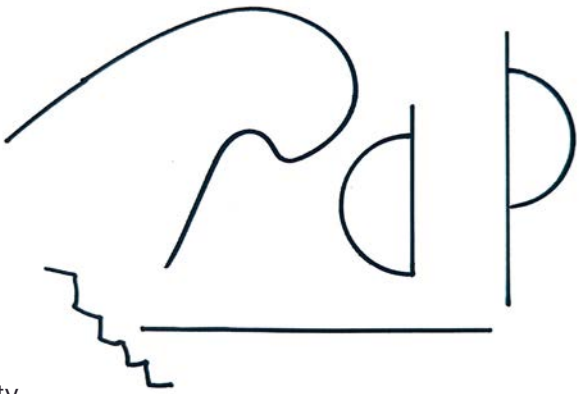
JUSTIFICATION

“We’d be gone the whole day exploring, looking for tadpoles or picking blackberries. Our parents knew it was safe, and coming from rural traditions in the South, they were comfortable with us experiencing the environment, the nature out here.” - Whitney Dotson, 2005 interview with the West County Times

A Legacy of Environmental Justice

The San Francisco Bay Shoreline of North Richmond, in Contra Costa County is known for the historic Parchester Village neighborhood and adjacent open space leading to the bay. Built as a planned community in the 1940s, Parchester Village is a predominantly Black neighborhood with a long history of environmental justice organizing. Although the adjacent open space and marshes were intended to be preserved for the community, for decades, the Parchester Village Neighborhood Council and the Dotson Family led the effort to protect the shoreline from development. In 2011, the East Bay Regional Parks District (EBRPD) acquired the shoreline open space via eminent domain and protected it in perpetuity as part of its parks system. A portion of the park land was restored to tidal and seasonal wetlands in 2017 and renamed Dotson Family Marsh. Today, Parchester Village cannot easily access this new park. The neighborhood is separated from the shoreline by a 15-foot-high levee and the Union Pacific railroad tracks.

Pre-design concept diagram



Future Threat of Sea Level Rise

Rheem Creek historically meandered through meadows and wetlands near the bay, transporting sediment from the watershed. A now channelized Lower Rheem Creek runs along the southern boundary of Dotson Family Marsh, cut off from the marsh due to levees, rail lines and development. This flood control channel, owned and maintained by Contra Costa County Flood Control and Water Conservation District (CCCFC&WCD), provides flood protection for less than a 15-year storm and sea level rise will further reduce flood capacity. Providing sediment to marshes is critical today, as it helps marshes maintain or even grow their elevations as sea level rises. The San Francisco Estuary Institute (SFEI), a science non-profit organization, has partnered with The Watershed Project, a community-based organization, to work with the local community to develop a vision for re-establishing creek-marsh connections at Lower Rheem Creek as part of their regional Sediment Solutions initiative.

A New Vision for Rheem Creek

The Watershed Project led a Parchester Village Visioning Workshop on August 23, 2025, where they collected community visions; residents built a “vision wall” with photos, drawing, and written ideas for trails, mini-parks, gathering spaces, educational features, and habitat areas. Participants identified aspirations including safe access to the shoreline, places for community gatherings, and nature-based learning. Participants also raised concerns, such as flooding, contamination and climate change impacts. This was followed by an SFEI Lower Rheem Creek Vision Workshop on November 5, 2025, that brought together project partners, advisors, regulators, and community representatives to brainstorm visions for restoring the creek. A third workshop on April 25, 2026, allowed SFEI to share its draft vision document and receive feedback from the community. The Dotson Family Marsh contains multiple parcels, one of which is the former Carr Property, an 18-acre square parcel situated between the neighborhood and restored marsh. This property is the likely location for the creek realignment and shoreline improvements described in the Parchester Village Visioning Workshop. The vision for the Carr Property provides the justification to select the site and its surrounding area for the planned design.

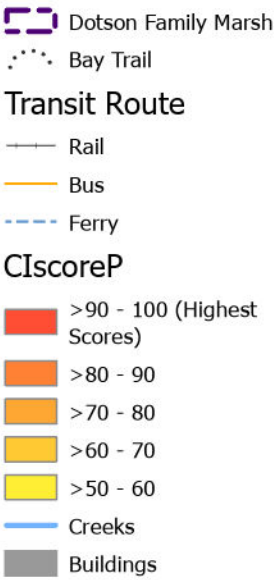
San Francisco Bay Living Shorelines at Giant Marsh
The first large-scale oyster reef and eelgrass restoration in San Francisco Bay. Reduces wave energy to combat sea level rise while enhancing habitat.



The North Richmond Shoreline Vision
A community-informed planning initiative designed to restore and protect the shoreline while addressing long-standing environmental justice issues and the future threat of sea-level rise.

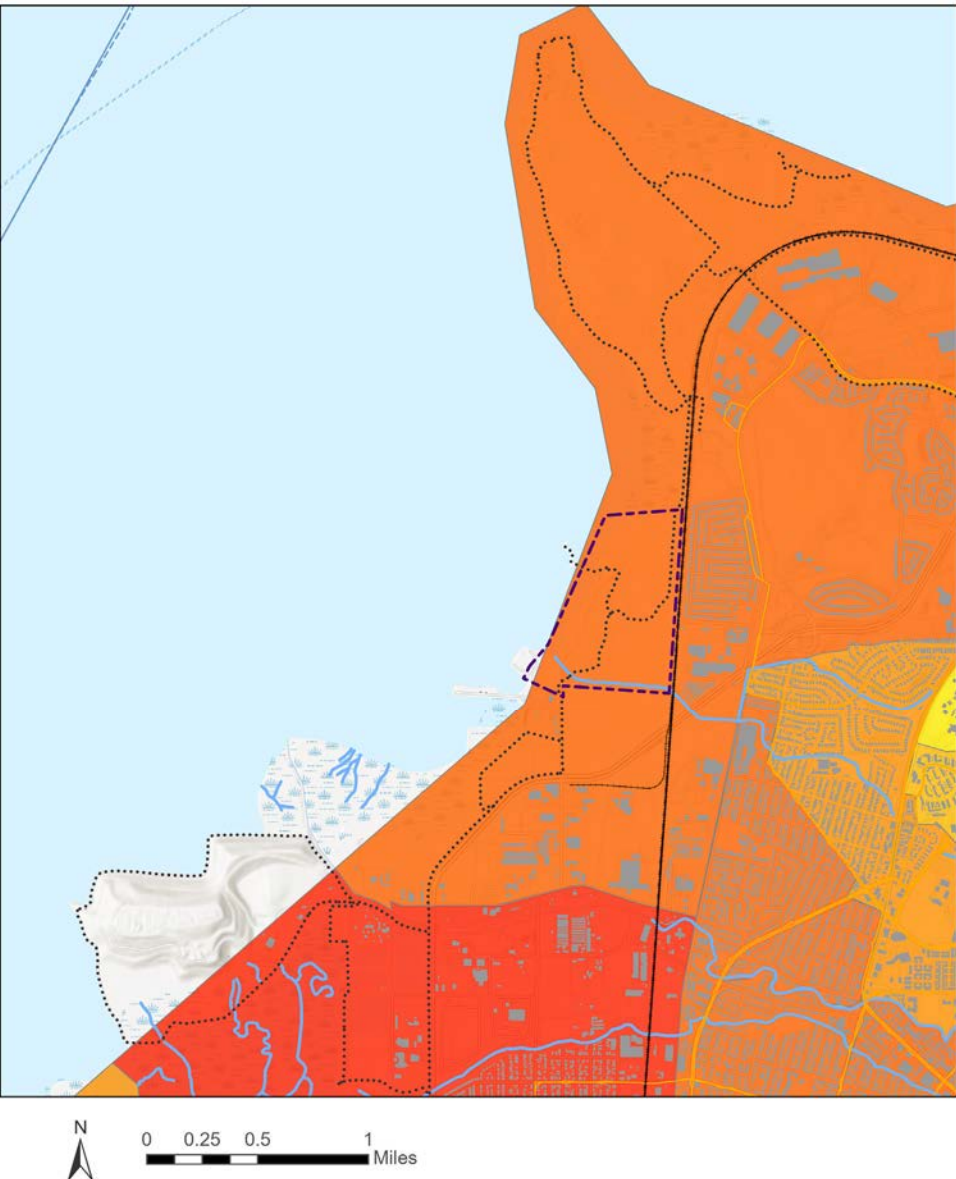


North Richmond Shoreline Living Levee Project
A living levee, a wide, gently sloped, vegetated berm that protects against SLR, will protect a wastewater treatment facility, neighborhoods, and habitats.



The Office of Environmental Health Hazard Assessment California Communities Environmental Health Screening Tool. Scores rank combined pollution burdens and vulnerabilities per census tract from high to low.

The census tract containing Dotson Family Marsh has a CIscore of 84.7 and includes economically disadvantaged communities, in which median household income is less than 80% of the county median income.



DOTSON FAMILY MARSH HISTORY

1949 Parchester Village built with the agreement that residents could use adjacent open space.

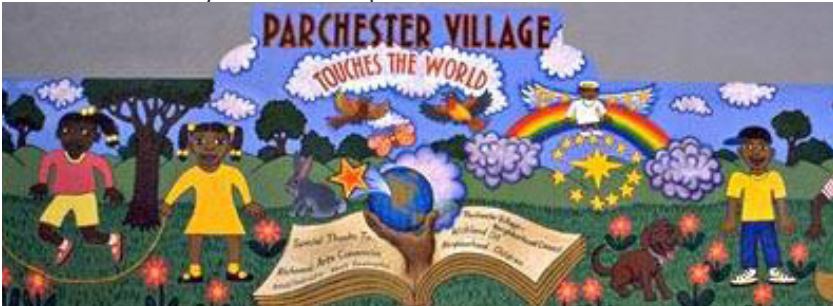


1960s Army Corps channelized Rheem Creek for flood control; Standard Oil Pipeline leak leads to lead contamination on Carr Property.

2017 Award-winning marsh restoration is completed and marsh renamed Dotson Family Marsh.



1970s - 2000s Parchester Village Neighborhood Council and Dotson Family lead effort to protect shoreline.



Parchester Village Touches the World, 1999, mural. Kemit Amenophis and the children of Parchester Village

DOTSON FAMILY MARSH TODAY

As part of the SFEI Sediment Solutions Vision Study for Creek-Marsh Connections, The Watershed Project held workshops with Parchester Village residents to gain input on preferences for site amenities that would be part of a Lower Rheem Creek restoration. I attended one workshop on Saturday, April 25, 2026, which was a Dotson Family Marsh Tour. During this workshop we:

- Received input on vision planning for Dotson Family Marsh from the local community and East Bay Regional Parks District planners
- Learned about how the local community has used the park in the past and now, and
- Learned about individual preferences and visions for the park.



Community members walking marsh trail with SFEI scientists during April 25, 2026 Dotson Family Marsh Tour hosted by the Watershed Project.



Based on feedback from this workshop and an August 25, 2025 workshop, community preferences for site amenities for the lower Rheem Creek restoration include:

- Shaded community gathering spaces
- Nature play
- Nature-based learning
- Biking and walking paths
- Native flower garden
- Space for cultural and music events
- Outdoor fitness equipment

(See Program Elements page 31).

Natalie Matais, The Watershed Project, leading introductions

USER GROUPS | SHORELINE ACCESS POINT DATA

1. Dotson Parking Lot
Demographics Within a 5-mile Drive
Total estimated population: 154,004 people
Low Income Households: 30%
People of Color: 85%
Households Without a Vehicle: 8%
Limited English Proficiency Households: 11%
Languages Spoken
Chinese: 6%
Spanish: 66%
Tagalog: 3%
Vietnamese: 3%

2. Bay Trail
Demographics Within a 0.5-mile Walk
Total estimated population: 27 people
Low Income Households: 27%
People of Color: 96%
Households Without a Vehicle: 11%
Limited English Proficiency Households: 0%
Languages Spoken
Chinese: 31%
Spanish: 54%
Tagalog: 1%
Vietnamese: 19%

Demographics Within a 2.5-mile Bike
Total estimated population: 9,440 people
Low Income Households: 34%
People of Color: 96%
Households Without a Vehicle: 8%
Limited English Proficiency Households: 16%
Languages Spoken
Chinese: 4%
Spanish: 60%
Tagalog: 2%
Vietnamese: 2%

WRMP shoreline access points v2.1. Points represent general locations where the public can access the shoreline, with associated data about numbers and demographics of people living within walking (0.5 mile), biking (2.5 miles), and driving (0.5 miles) distance of access points. Demographic information is from the American Community Survey (2017-2021 5-year estimates); Data Explorer: Shoreline Access and Restoration. <https://experience.arcgis.com/experience/564b949aed6b49dc82329a5b6635b9ad/>.

3. Giant Marsh Parking Lot and Bridge
Demographics Within a 0.5-mile Walk
Total estimated population: 55 people
Low Income Households: 25%
People of Color: 95%
Households Without a Vehicle: 12%
Limited English Proficiency Households: 4%
Languages Spoken
Chinese: 25%
Spanish: 43%
Tagalog: 1%
Vietnamese: 15%

Demographics Within a 5-mile Drive
Total estimated population: 154,983 people
Low Income Households: 30%
People of Color: 84%
Households Without a Vehicle: 8%
Limited English Proficiency Households: 11%
Languages Spoken
Chinese: 6%
Spanish: 64%
Tagalog: 4%
Vietnamese: 3%

Public Transit Within a 0.5-mile Walk
Public Transit Available: Yes

Population in Census Tract 3922.01:

Total population: 5,945
Total housing units: 1,775
Population by race/ethnicity:
Hispanic or Latino: 31.8%
White: 8.2%
Black or African American: 19.6%
Asian: 33.0%

Population by age:
Median Age: 36.3
Population under 18: 22.7%
Population 18-64: 67.1%
Population 65 and over: 10.1%

USER GROUPS | TYPICAL PARK VISITORS

Access Points (1) and (3):
Visitors Driving to the Site

Total estimated population: 154,000
Low Income Households: 30%
People of Color: 85%

Typical visitors may be multigenerational families who come to the park to walk, picnic, fish, or birdwatch.

Access Point (2):
Visitors Walking or Biking to the Site

Total estimated population: 9440
Low Income Households: 34%
People of Color: 96%

Typical visitors may be adults who bike through the park on the Bay Trail or walk their dog.



Shoreline access points





DOTSON FAMILY MARSH SURROUNDINGS



1. North of Parchester Village



2. Barrier to railroad tracks



3. The boardwalk



4. Sensitive marsh habitat



5. Possible future access point

DOTSON FAMILY MARSH SURROUNDINGS



1. Marsh with views



2. Mt. Tamalpais from the trail



6. Fence, marsh and levee



7. Transmission towers - Carr Property



3. Picnic tables



4. Mt. Tamalpais from the trail



5. Views of the North Bay



8. Train



9. Carr Property with highway, industrial edge, transmission lines



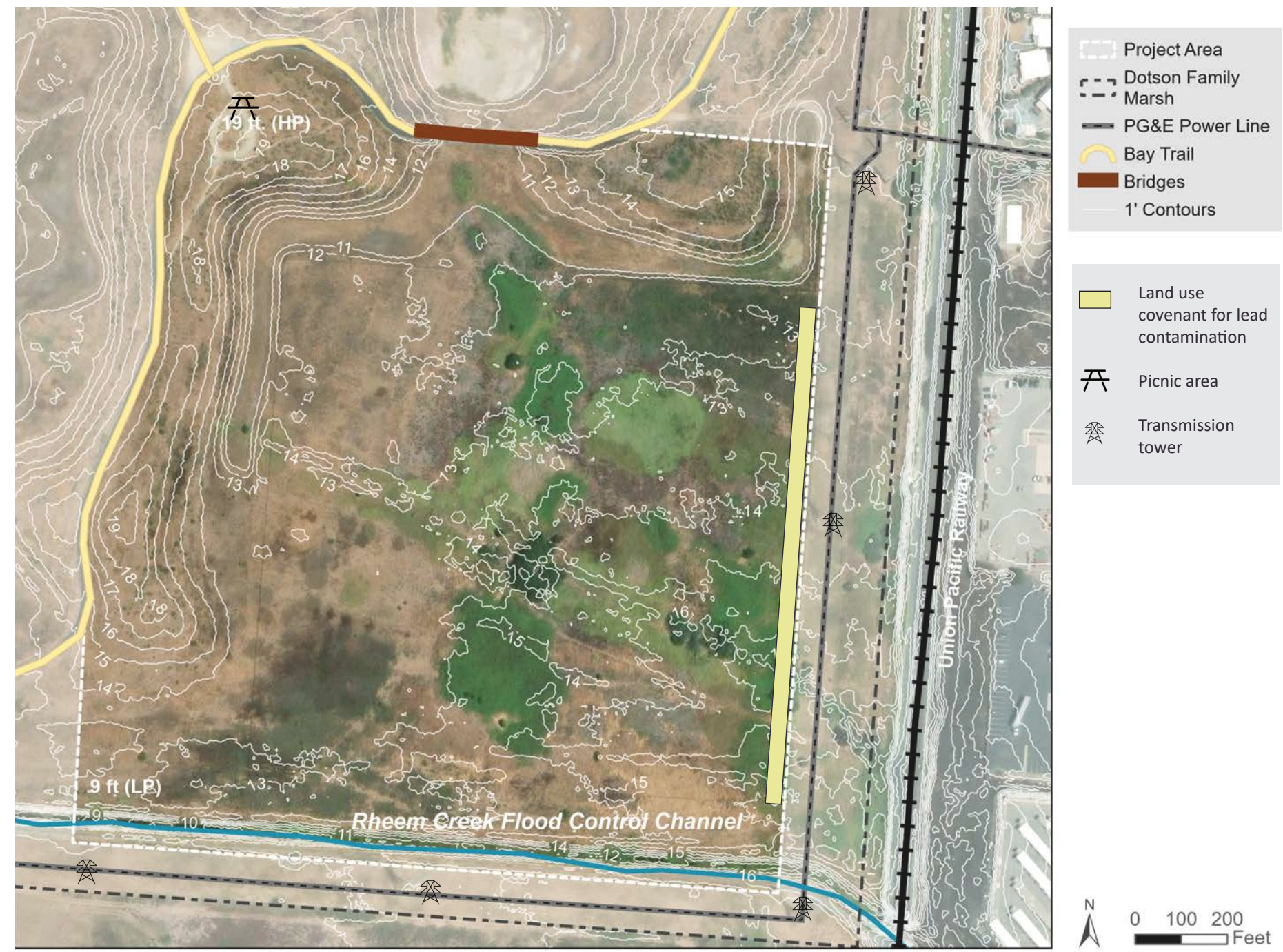
10. Carr Property with highway



The Project Area is in the southeast corner of Dotson Family Marsh, within Point Pinole Regional Shoreline, and contains the Carr Property. The project area is bordered on the east by the Union Pacific railway and the east and south by a Pacific Gas and Electric easement and transmission towers. The restored marsh is to the north and west. The channelized Rheem Creek is to the south and the Richmond Rod and Gun Club is to the southwest. The Project Area is adjacent to the Bay Trail, a multipurpose ADA accessible trail, which will ultimately extend 500 miles around San Francisco Bay.

INSIDE THE PROJECT AREA

PROJECT AREA CLOSE-UP





LOWER RHEEM CREEK

PROJECT AREA | FIELD NOTES



Cherry tree



Unable to see bay



Train



Field notes and photos from site visit Friday, May 29, 2026, noon. Wind 8 mph from SW, 60 degrees F, partly cloudy

1. Berm by old creek
2. Cherry trees
3. Large willow grove about 15 feet high
4. Saw an owl in the tree
5. Lots of deer scat
6. Seasonal wetlands
7. Other plants - large blackberry thickets, coyote brush, non-native grasses
8. Saw a mosquito, and lots of ticks
9. Sounds of highway and guns
10. Site is too low to see bay - about 5 feet lower than the Bay Trail



Arroyo willow

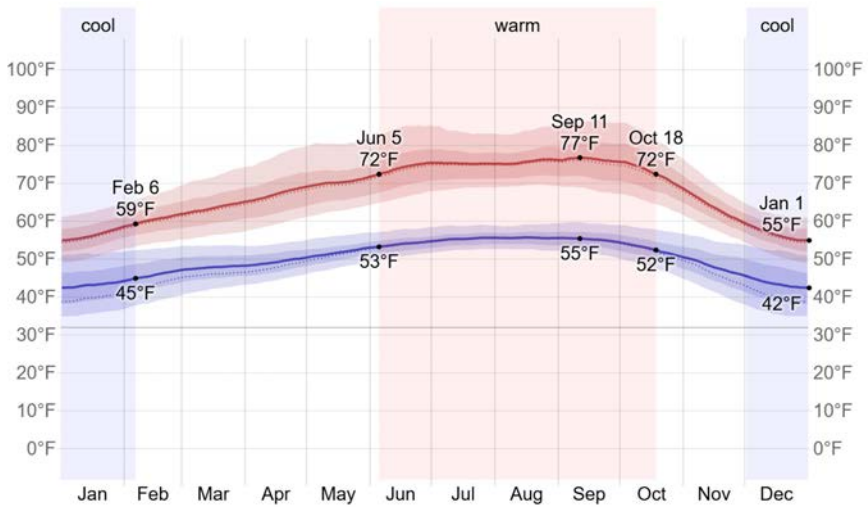


Highway view

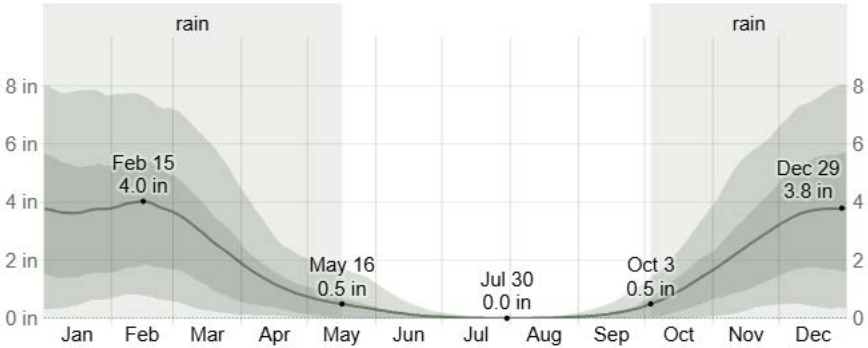


View of Mt. Tamalpais

RICHMOND, CA WEATHER



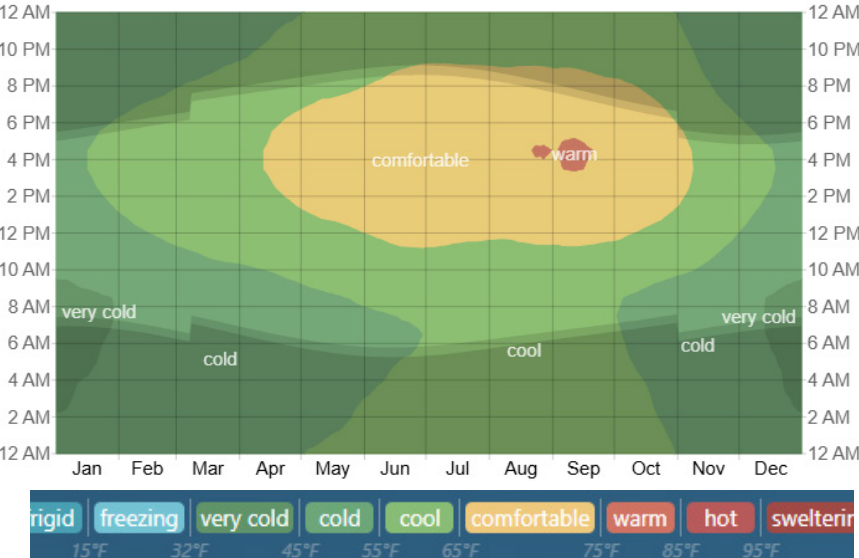
Average High and Low Temperature in Richmond, CA



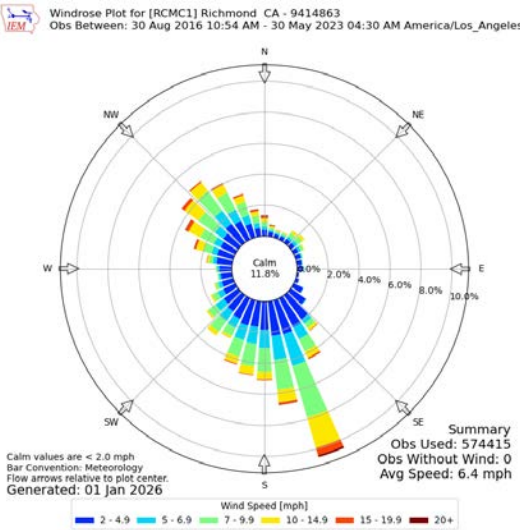
Average Monthly Rainfall in Richmond, CA

<https://weatherspark.com/>
https://mesonet.agron.iastate.edu/sites/site.php?station=RCMC1&network=CA_DCP

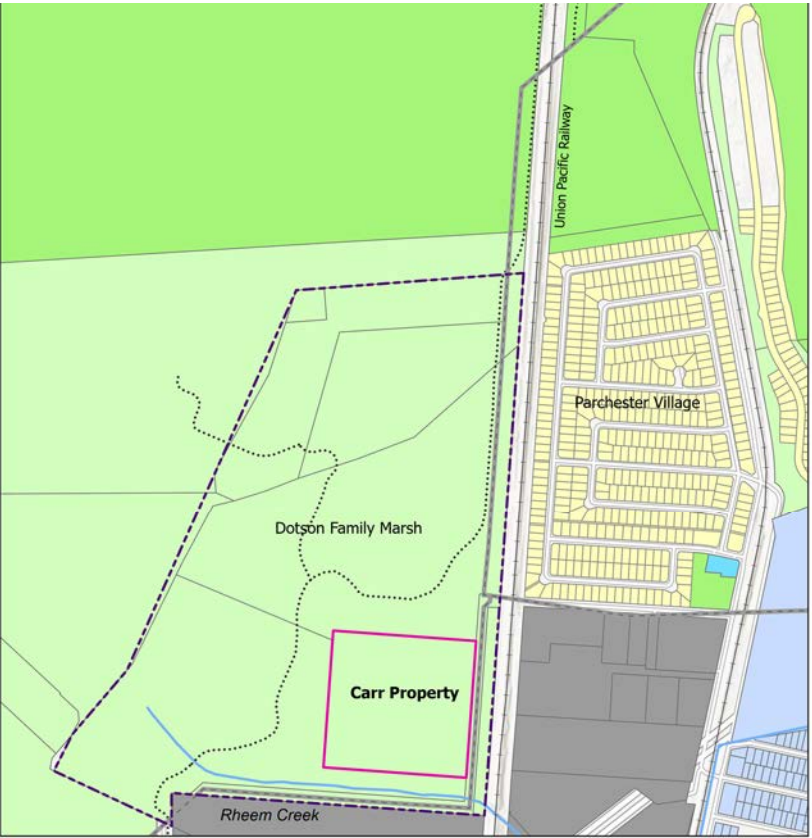
The weather in Richmond is cool to comfortable, with winds typically from the south blowing across the bay. The climate is Mediterranean, with cool, wet winters and dry, warm summers.



Average Hourly Temperature in Richmond, CA/Average Wind Speed and Direction

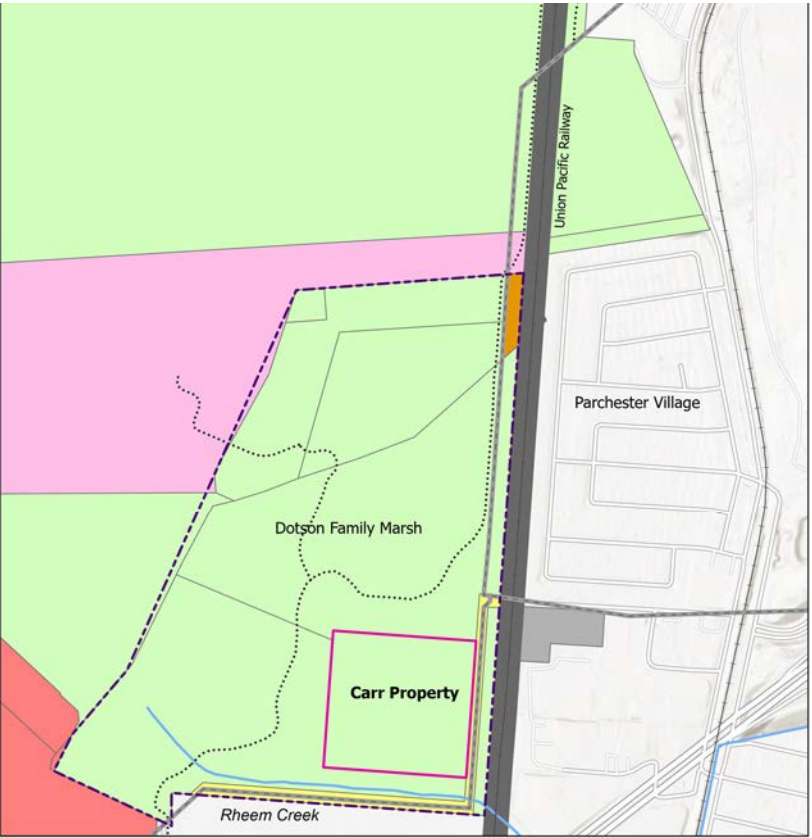


LAND OWNERSHIP AND ZONING



Zoning

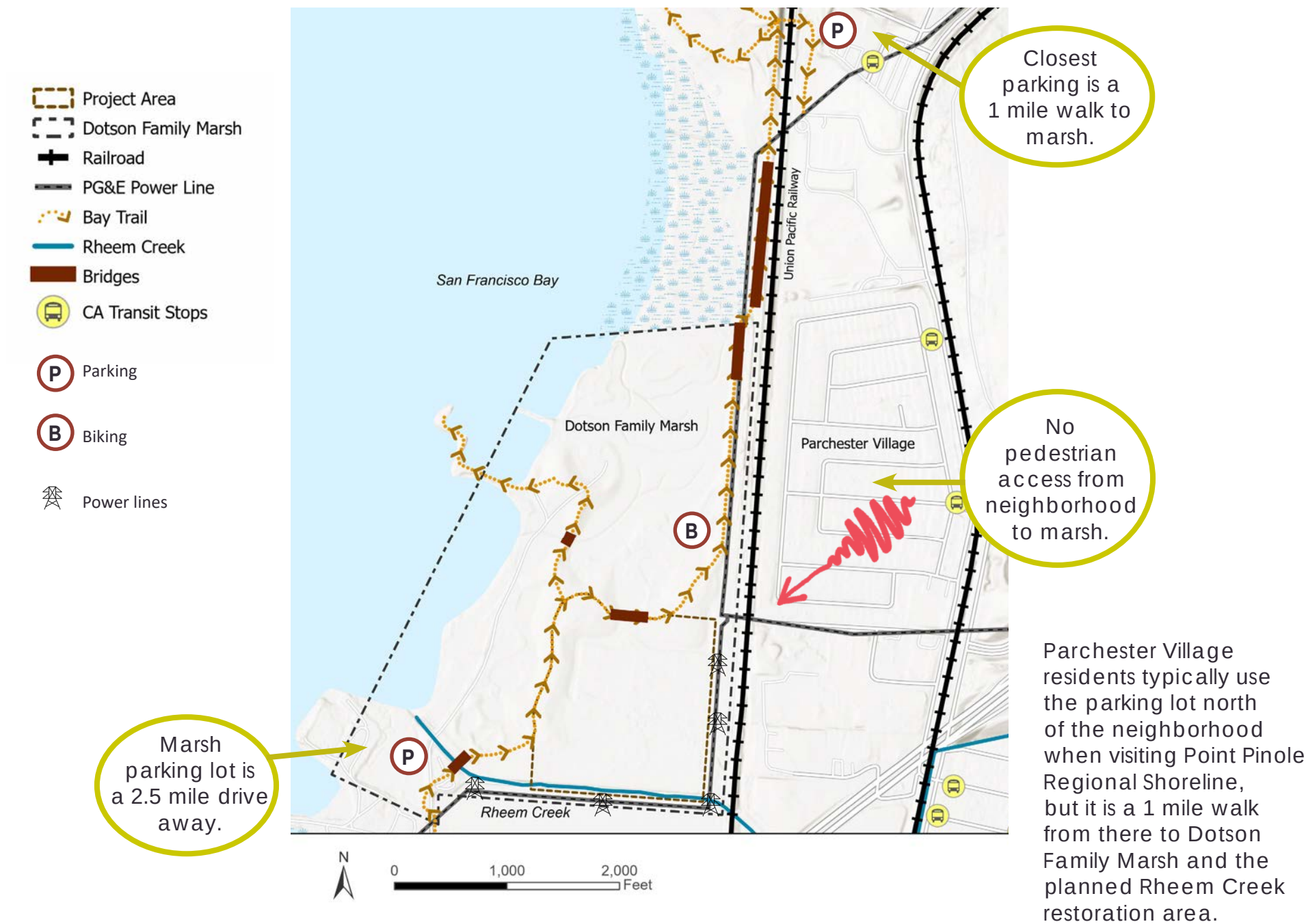
- Zoning**
- Industrial Light
 - Open Space
 - Parks and Recreation
 - Planned Area
 - Public, Cultural, Institutional
 - Single-Family Low Density



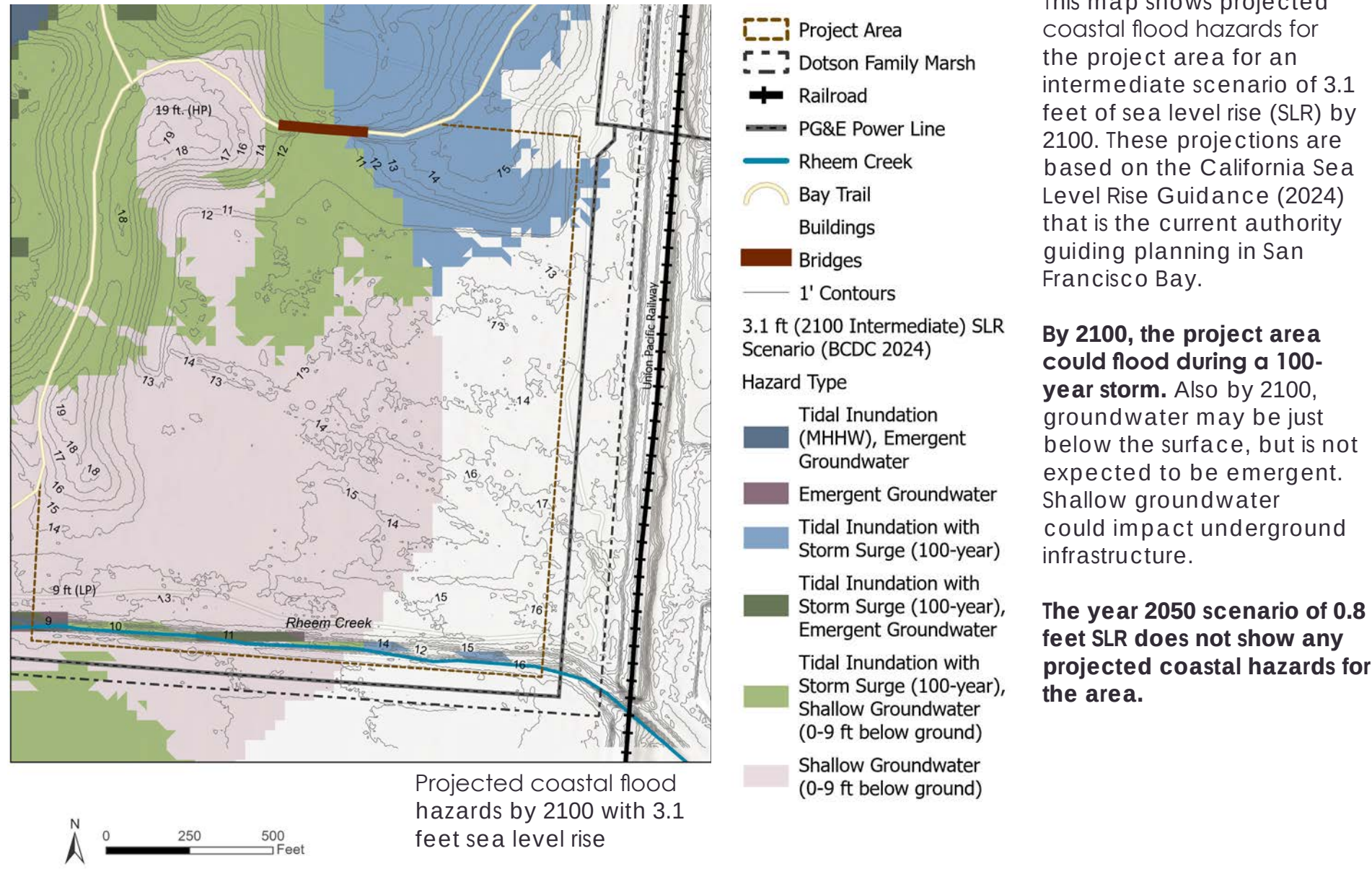
Parcel Ownership

- Parcels**
- Owner**
- East Bay Regional Parks District
 - Pacific Gas & Electric
 - Reaction Products Co
 - Richmond Rod and Gun Club
 - San Pablo Bay Pipeline Co LCC
 - State of CA
 - Union Pacific Railroad Corridor

CIRCULATION AND ACCESS



ELEVATION AND SEA LEVEL RISE

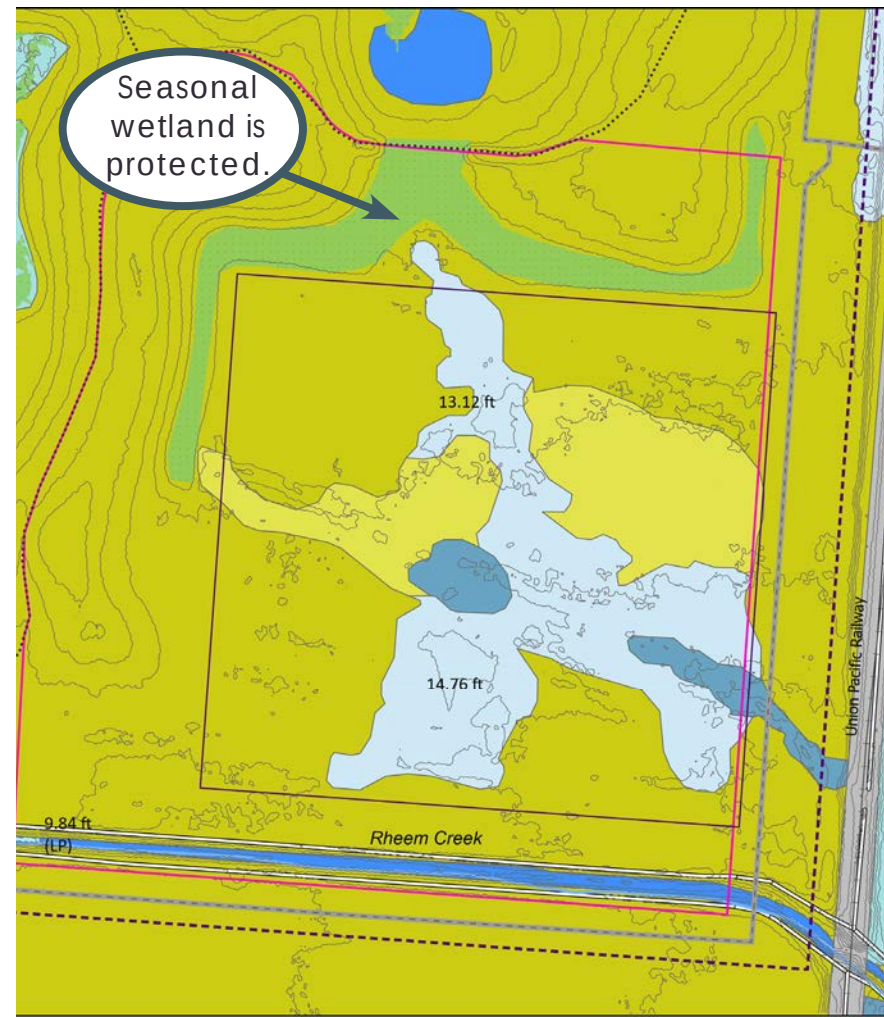


This map shows projected coastal flood hazards for the project area for an intermediate scenario of 3.1 feet of sea level rise (SLR) by 2100. These projections are based on the California Sea Level Rise Guidance (2024) that is the current authority guiding planning in San Francisco Bay.

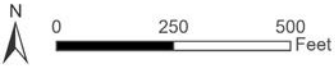
By 2100, the project area could flood during a 100-year storm. Also by 2100, groundwater may be just below the surface, but is not expected to be emergent. Shallow groundwater could impact underground infrastructure.

The year 2050 scenario of 0.8 feet SLR does not show any projected coastal hazards for the area.

PLANTS AND ANIMALS



- 2020 Bayland Habitats
- Undetermined Other Marsh
 - Undetermined Open Water
- Vegetation MapClass
- Californian Annual and Perennial Grassland Mapping Unit
 - Poison hemlock-Fennel Semi-Natural Alliance
 - Arroyo willow Alliance
 - Himalayan blackberry Semi-Natural Association
 - Lowland Marsh, Wet Meadow and Shrubland Macrogroup



<https://gis.data.ca.gov/datasets/CDFW::vegetation-alameda-and-contra-costa-county-ds3206/about>

ENDANGERED SPECIES IN PARK

Salt marsh harvest mouse (*Reithrodontomys raviventris*), federally endangered



California Ridgway's rail (*Rallus obsoletus obsoletus*), federally endangered



California black rail (*Laterallus jamaicensis*), CA State threatened species

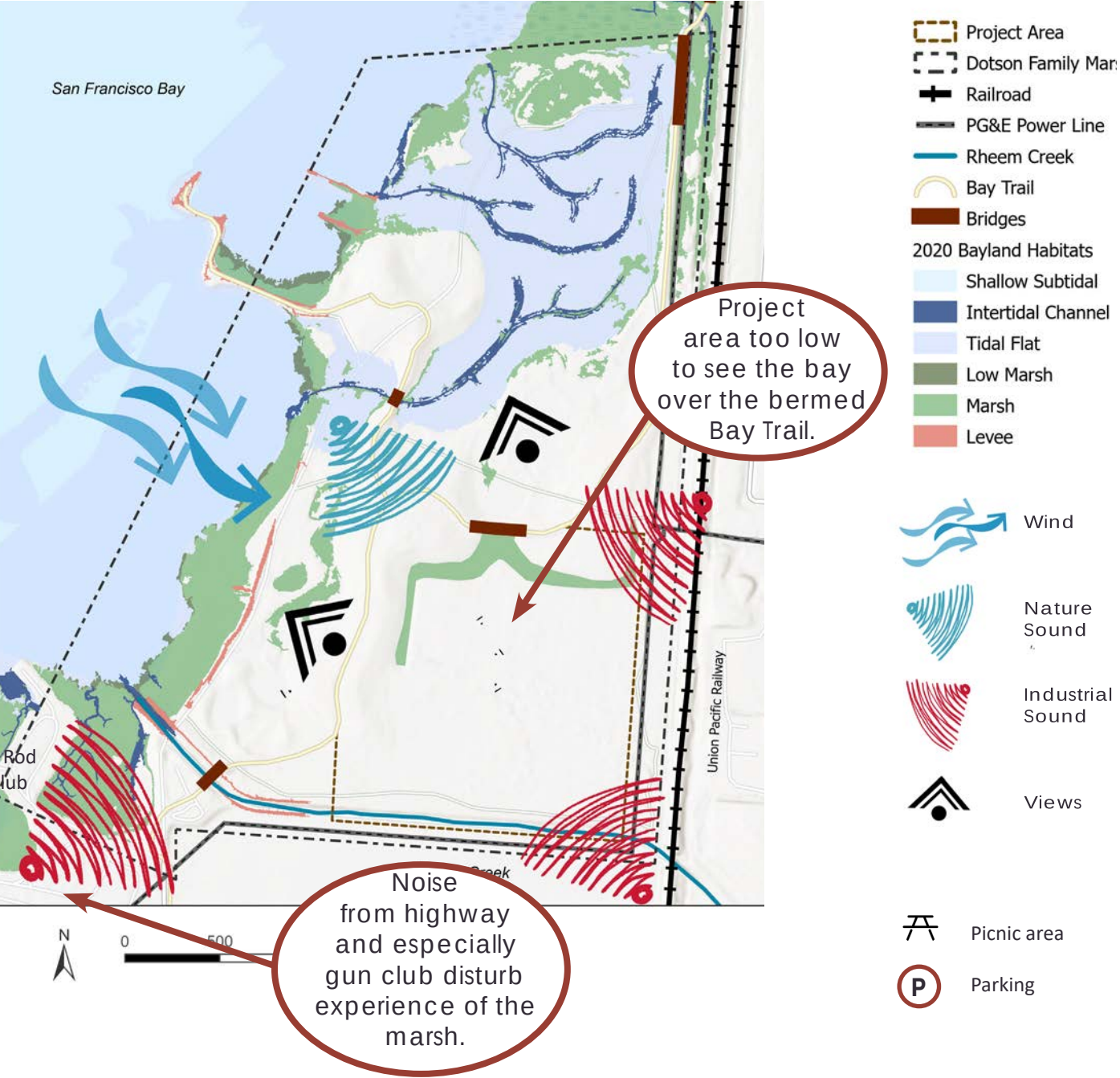


COMFORT, VIEWS, NOISE

Cool and windy temperatures affect when people want to be at the park. Sunsets are too cold.

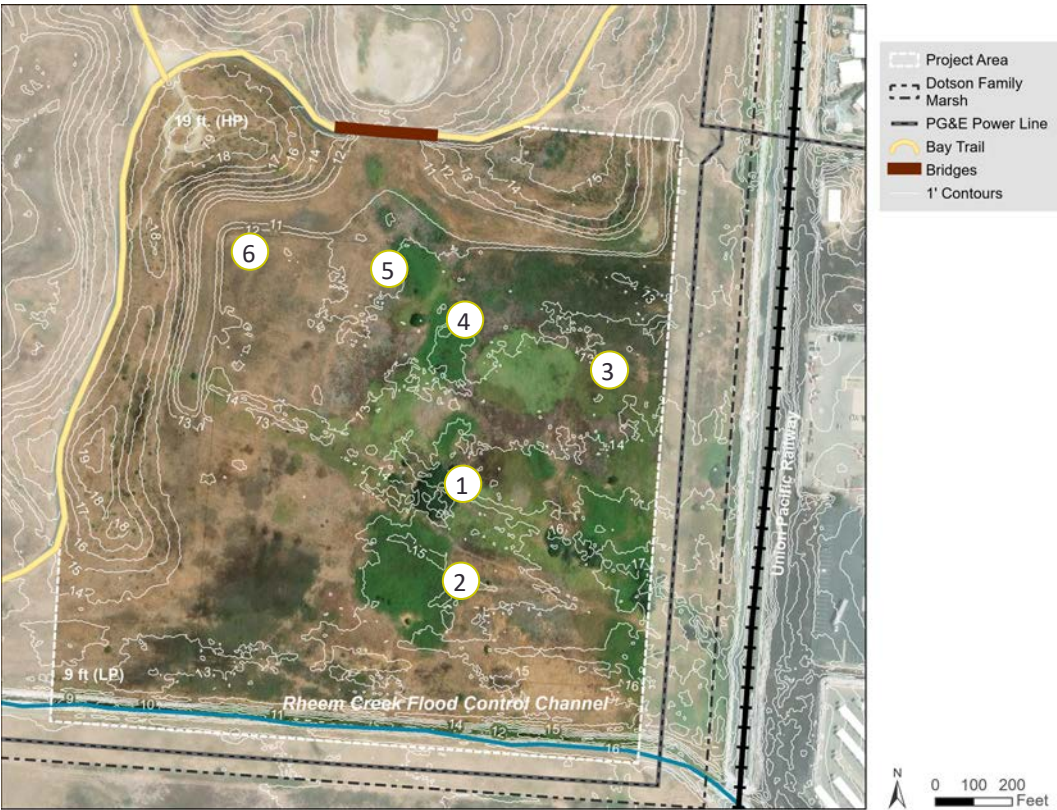


View of Mt. Tamalpais from the Bay Trail



A NOISE STUDY

- ↳ I received a research permit from EBRPD to access the Carr Property, which is inaccessible to the public.
- ↳ I visited the site on 5/29/26 and selected six stations within the property.
- ↳ I stayed at each station 10-15 minutes and used three phone apps. One to record my location and two to record sounds.



Station locations for noise study



The Sound Decibel Meter App records sound with dB-A frequency weighting.

The QField App records locations.



The Merlin App identifies birds based on their song.



STATION AND TIME, MAY 29, 2026

Station 1: 12:37

Gun pops, highway noise, train whistle, birds
Bay view obscured from low elevation, lots of deer scat and trails. See transmission towers, a train, warehouses
dB: min: 18.3, avg: 41.9, max: 85.1
7 Birds: northern mockingbird, western meadowlark, American kestrel, California scrub-jay, California towhee, Hudsonian whimbrel, western bluebird

Station 2: 1:12

Gunshots and northern mockingbird
Bay views obscured. Next to giant blackberry patch. On an old berm. Saw a train
dB: min: 6.3, avg: 49.9, max: 85.2
11 Birds: northern mockingbird, California towhee, spotted sandpiper, semipalmated plover, American crow, house finch, tree swallow, Bewick's wren, American kestrel, oak titmouse, hairy woodpecker

Station 3: 1:45

Direct view of Mt Tam but still too low to see. Hear highway and guns. Plants: rumex, thistle
dB: min: 20.4, avg: 51.6, max: 63.8
3 Birds: northern mockingbird, house finch, semipalmated plover

Station 4: 2:05

Hear gun shots, highway, and train horn. Saw a mosquito. Rye grass, mustard and blackberry
dB: min: 11.9, avg: 46.6, max: 73.1
3 Birds: Red-shouldered hawk, house finch, common raven

Station 5: 2:29

Gun shots seem louder. Highway more in background. Hear and see Amtrak train. Wild ryegrass
dB: min: 7.7, avg: 56.3, max: 73.8
1 Bird: house finch

Station 6: 3:04

Corner of lot. Next to seasonal wetland. Lower than Bay Trail - can't see the bay. Highway is quieter. Gun shots more loud.
dB: min: 17.4, avg: 59.3, max: 73.8
0 birds

SUMMARY -
BIRD SPECIES AND SOUND

Station 1: 7 birds, avg dB 41.9
Station 2: 11 birds, avg dB 49.9
Station 3: 3 birds, avg dB 51.6
Station 4: 3 birds, avg dB 46.6
Station 5: 1 bird, avg dB 56.3
Station 6: 0 birds, avg dB 59.3

The number of bird species was highest near the arroyo willows at the center of the property, while the lowest number of species were found in the northwest corner dominated by non-native grasses. Sounds from the gun club and highway were somewhat consistent across the property, but slightly reduced around the willows.

BIRDS OBSERVED via MERLIN (photos from eBird.org)



American crow



American kestrel



Bewick's wren



California scrub-jay



California towhee



Hudsonian whimbrel



Spotted sandpiper



Western bluebird



hairy woodpecker



house finch



Northern mockingbird



oak titmouse



red winged blackbird



semipalmated plover

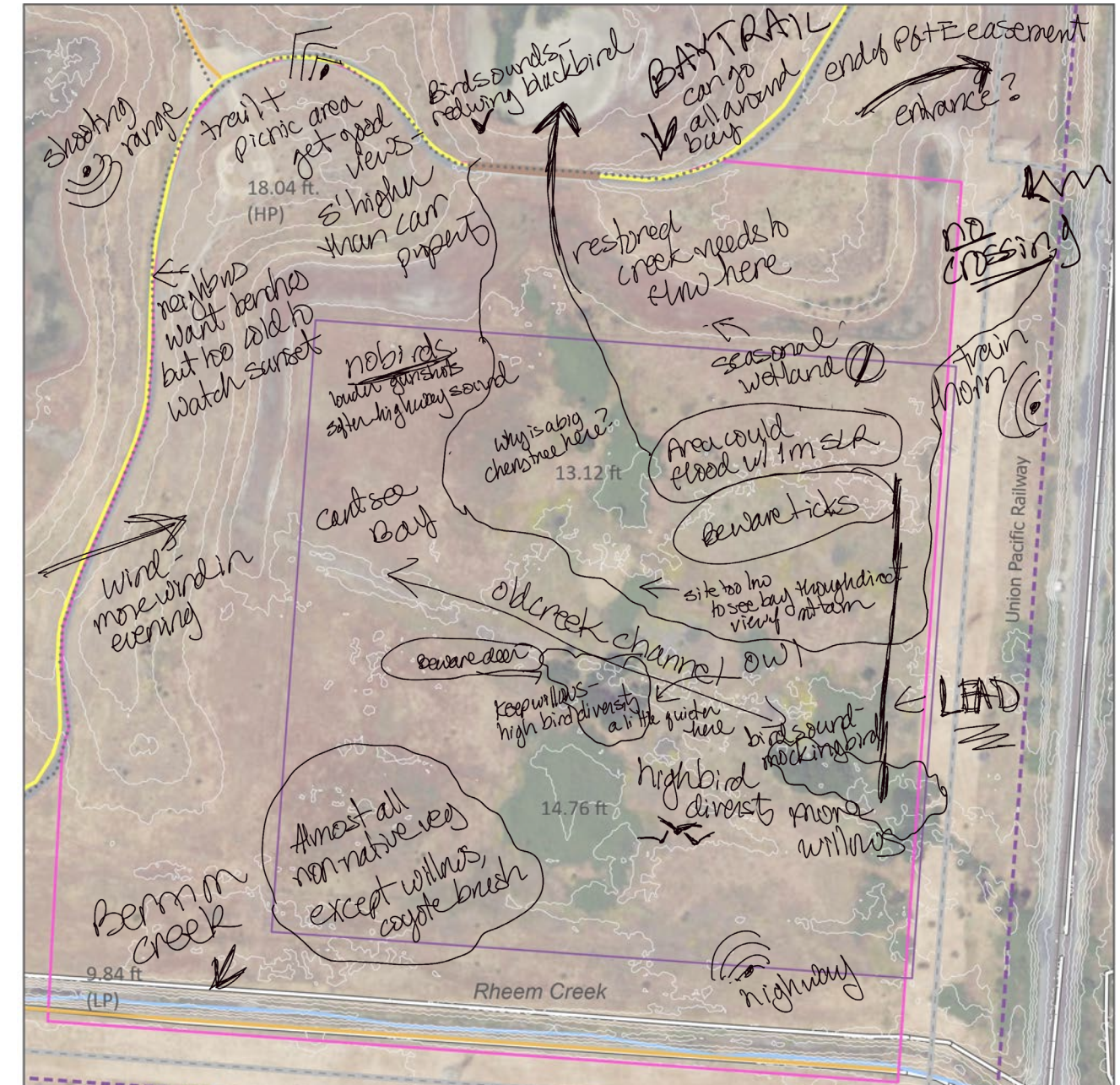


tree swallow



western meadowlark

GIS DATA AND SITE VISIT NOTES



GOALS AND OBJECTIVES

To Reconnect Creek and Marsh, Community and Nature



GOAL 1. RESTORED CREEK AND HABITAT

Restore Lower Rheem Creek and wildlife habitat that connects to and blends with Dotson Family Marsh.

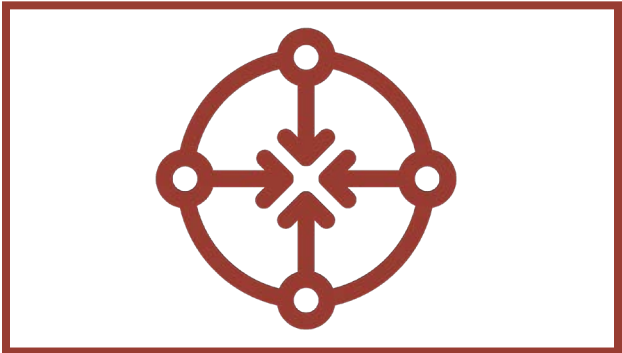
- Objective 1.1. Re-align Rheem Creek to flow across the marsh and deliver sediment from the watershed.
- Objective 1.2. Establish wildlife habitat.



GOAL 2. INCLUSIVE ACCESS

The local community has inclusive access to natural surroundings and views of Dotson Family Marsh, the bay and beyond.

- Objective 2.1. Establish an entry that will connect to future pedestrian and bike access across the railroad tracks.
- Objective 2.2. Design environmentally sensitive interaction with marsh and creek.
- Objective 2.3 Create a universal design nature play space.



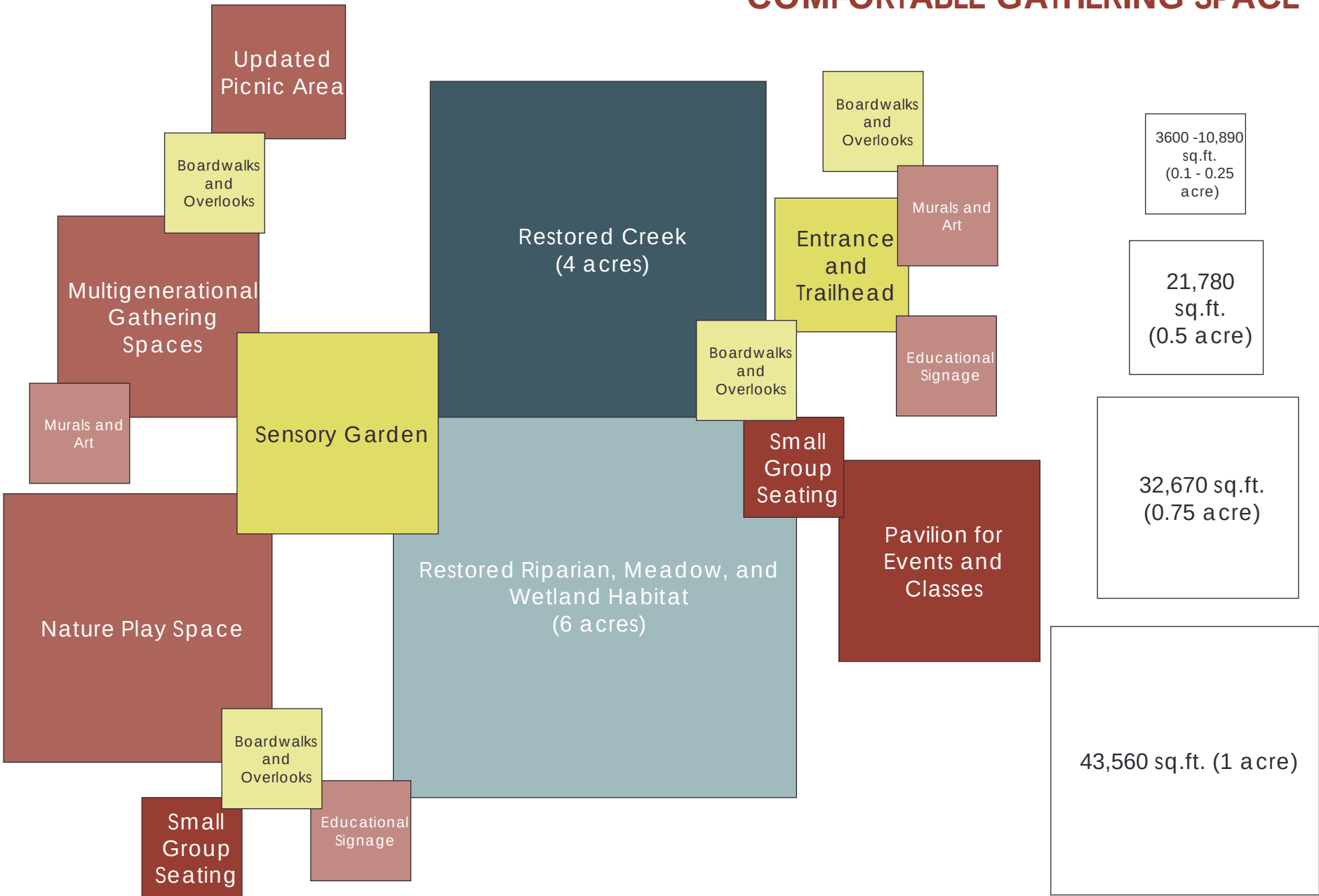
GOAL 3. COMFORTABLE GATHERING

The Project Area becomes a comfortable place for the local community to gather, spend time, and celebrate events.

- Objective 3.1. Create a sensory native plant garden.
- Objective 3.2. Create spaces for events and small gatherings.
- Objective 3.3. Improve educational opportunities.

PROGRAM ELEMENTS BY GOAL

RESTORED CREEK AND HABITAT
INCLUSIVE ACCESS
COMFORTABLE GATHERING SPACE



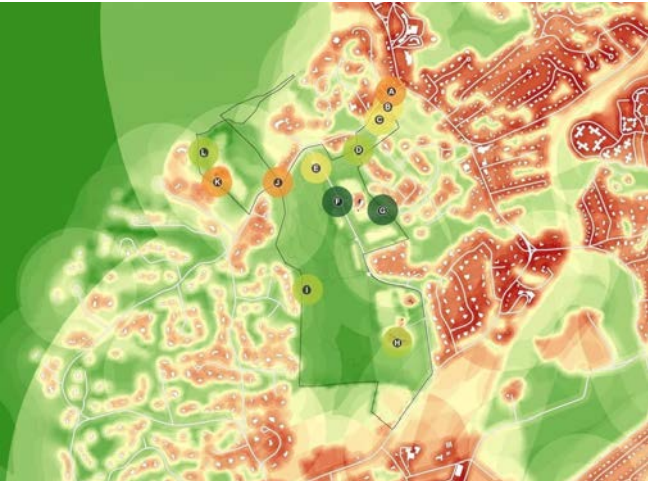
CASE STUDY | Avalon Park and Preserve, Stony Brook, NY

Landscape Architect: Andropogon Size: 73 acres; Completed: 2001

Project Overview: This is a 7-acre memorial and surrounding preserve designed as a sequential journey through a series of natural gardens that represent the native northern Long Island landscape. More than 6,900 native trees and shrubs, and 54,500 native ferns, grasses, and wildflowers were planted in six unique communities. Paths, bridges, and overlooks encourage many uses from contemplation to jogging. Avalon was embraced as a sacred space following the attacks of September 11.

Unique Features: The team mapped Avalon’s soundscape and siting program based on sound. Placing design elements like sculptures in spaces to preserve sound quality helped increase the biodiversity in Avalon by 35%. Eighteen acres of agricultural land was converted to tall grass and wildflower meadows to encourage populations of birds and small mammals. A wooden footpath wraps around the Mill Pond protecting wetlands from visitors and providing a safe pedestrian zone along the road and through the preserve.

Key Lessons Learned: The final design has a strong master plan with sensual experiences from form, texture, color, and contrast. The design patterns based on appropriate plant-to-plant and plant-to-place relationships create a healthy and dramatic visitor experience that provides wide-ranging mental health benefits. The consideration of the soundscape in design planning can be applied to Dotson Family Marsh given sources of noise pollution. The process of designing plant-to-place relationships is an important design tool for place making.



Soundscape mapping - Lauren Mandel



Site Plan of Avalon Memorial Gardens - Andropogon



Constructed stream with pond - Michael Geffel, CSI 2011

<https://www.landscapeperformance.org/case-study-briefs/avalon-park-and-preserve>
<https://www.laurenmandel.design/work#/soundscape-mapping/>; <https://www.asla.org/news-insights/dirt/designing-with-sound>

CASE STUDY | Fish Tail Park, Nanchang, China

Landscape Architect: Turenscape, Size: 126 acres; Completed: 2021

Project Overview: Located in Nanchang, China, is a 126-acre “floating forest” that transformed a polluted former fish farm and coal ash dump into a resilient urban oasis. The park serves as a “sponge” to manage monsoon floods and restore local biodiversity.

Unique Features: The park is planted with thousands of native trees, such as bald cypress and dawn redwood, specifically chosen to survive temporary submersion. The park provides nesting and foraging grounds for at least 12 observed bird species. The park includes Zoned Recreation: the periphery features playgrounds, beaches, and sports courts that remain accessible during 20-year flood events; Contemporary bridges and towers made of perforated aluminum provide high vantage points for birdwatching and views of the city skyline; Terraced wetlands along the edges filter urban runoff before it enters the larger lake system. Coal ash on site was recycled to create over 80 islets that now form the park’s “island-jeweled” lake. The central lake was engineered to hold up to 1 million cubic meters of water, allowing the level to rise by 2 meters (6.5 feet) during peak storm surges without damaging the infrastructure.

Key Lessons Learned: The park proved that “messy nature”—dense, semi-wild wetland plantings—could be successfully framed by modern, clean-lined structures to make ecological restoration attractive to the public. Survey data showed the park serves visitors across multiple income levels. The project serves as an example of how to create a park that combines restoration with public recreation, how to design on a budget, and how to recycle existing waste material to benefit a park.

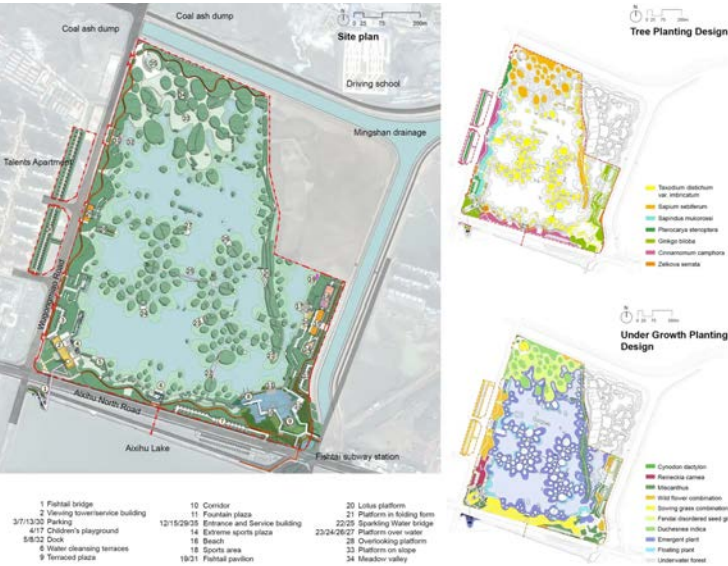


Bridges and platforms for birding - Kongjian Yu, Turenscape

<https://www.landscapeperformance.org/case-study-briefs/avalon-park-and-preserve>
<https://www.laurenmandel.design/work#/soundscape-mapping/>; <https://www.asla.org/news-insights/dirt/designing-with-sound>



Floating forest

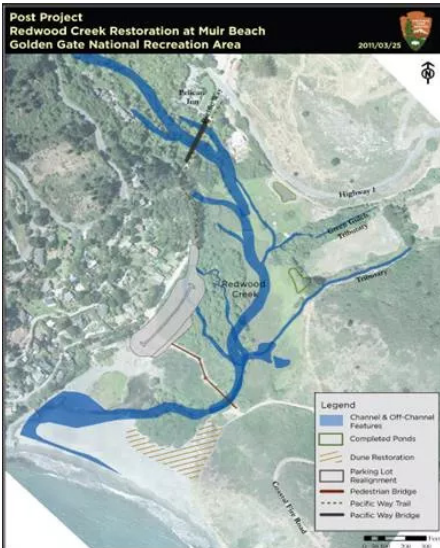


Fish Tail Park Site Plan

CASE STUDY | Redwood Creek Restoration at Muir Beach, Marin Co., CA

Landscape Architect: Restoration Design Group, Size: 46 acres; Completed: 2014

- ↳ Improved habitat for endangered coho salmon and threatened steelhead trout, CA red-legged frog.
- ↳ Decreased flooding on nearby roads.
- ↳ Improved visitor access and interpretive experiences.
- ↳ California red-legged frog numbers have soared thanks to restored breeding ponds and the relocation of egg masses and adult frogs.
- ↳ Improved floodplain connectivity and side-channel areas now provide essential winter habitat for endangered coho salmon and threatened steelhead trout.
- ↳ **The project used a process-based restoration, where the design facilitates natural processes so the ecosystem can eventually maintain itself.**
- ↳ The design added side channels, backwater ponds, and engineered log jams to create varied water speeds and depths, mimicking a wild stream.



Map of Redwood Creek/NPS



Muir Beach creek restoration - Ann Joyce, GGNP Conservancy



Muir Beach volunteers/NPS

<https://www.parksconservancy.org/projects/redwood-creek-muir-beach#:~:text=Redwood%20Creek%20begins%20high%20on,Key%20Project%20Accomplishments>
<https://www.nps.gov/muwo/learn/nature/restoration-mb.htm#:~:text=The%20restoration%20project%20is%20designed,rise%20in%20the%20near%20future>

CASE STUDY | Tom Lee Park, Memphis, Tennessee

Landscape Architect: SCAPE, Size: 31 acres; Completed: 2023

- ↳ The park is named for Tom Lee, a Black river worker who became a hero after risking his own life to save 32 people from a capsized steamboat in 1925.
- ↳ The park features over 1000 new trees, including 300 oaks, and restored soil systems to support biodiversity.
- ↳ Riverfront was historically separated from poorer neighborhoods. The park added 5 new ADA compliant entrances and the Carlisle Cutbank Bluff to connect the bluff to the riverfront.
- ↳ The park demonstrated that **adaptive topography**, creating zones that can safely flood and drain, is more sustainable than rigid flood walls.
- ↳ **Tom Lee Park provides inspiration that it is feasible to successfully meet ecological and social goals in one project.**
- ↳ **It shows how park design can accommodate both flood hazard risk and create spaces for people.**
- ↳ It shows how honoring local history can create a space celebrated and adopted by the community.

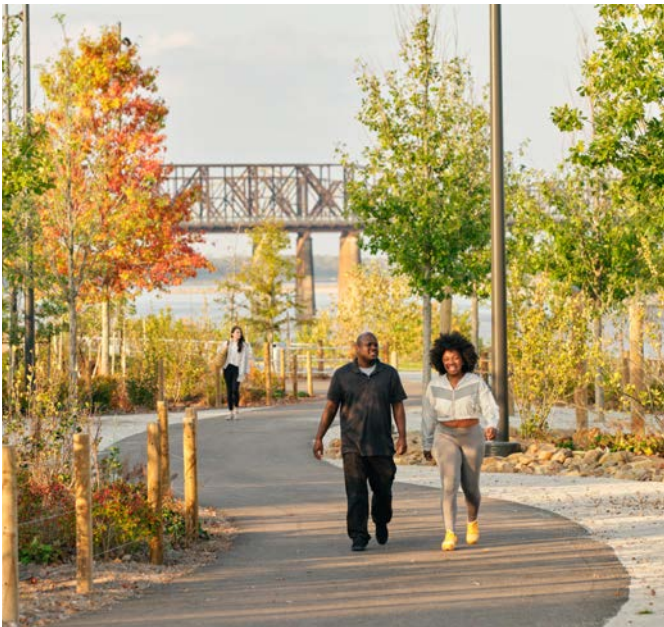


Tom Lee Park aerial - SCAPE-Ty Cole



Tom Lee Park Plan - Studio Gang and SCAPE

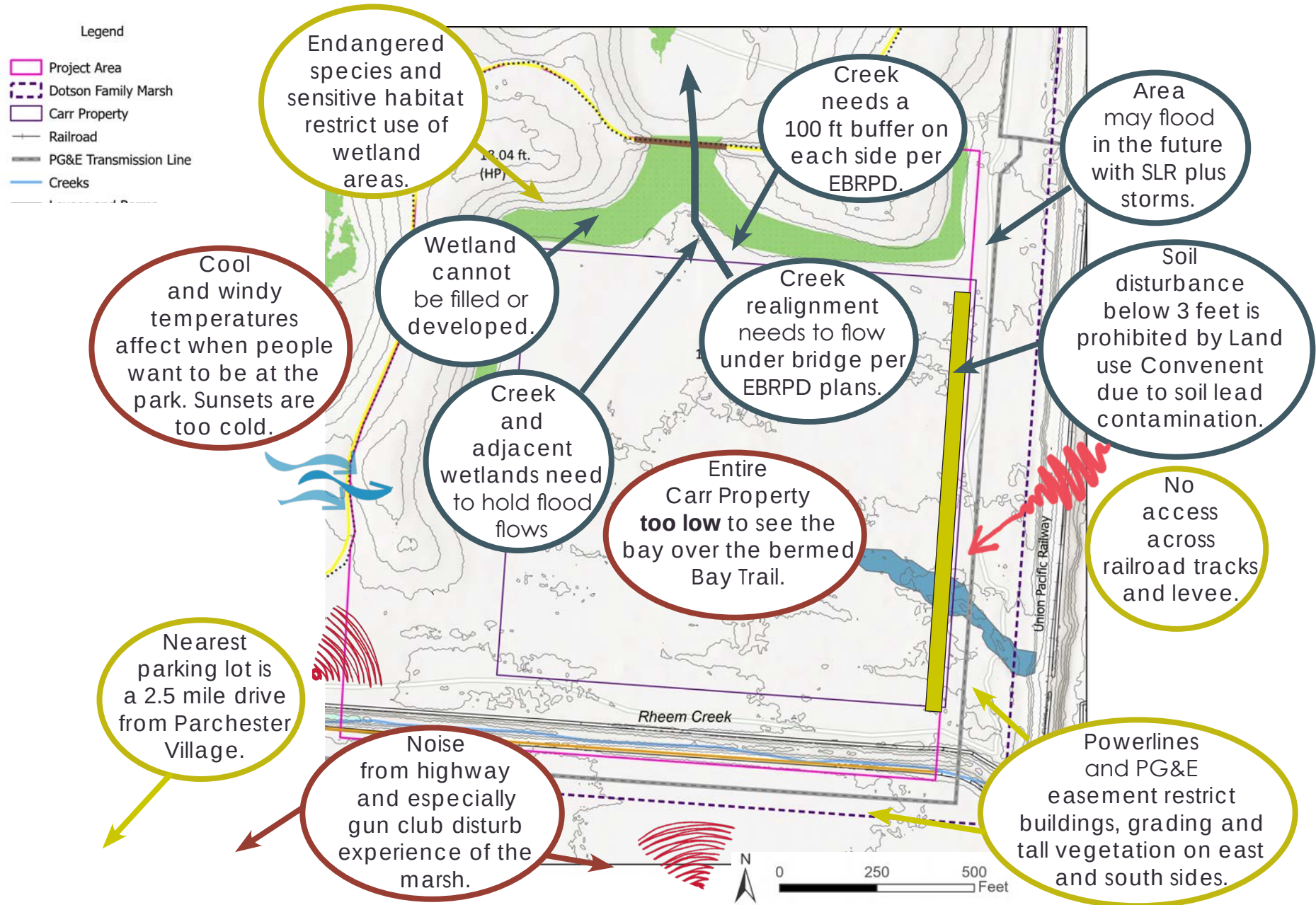
<https://www.scapestudio.com/projects/tom-lee-park/>
<https://www.usgbc.org/articles/tom-lee-park-sites-certified-model-equity-ecology-and-connection>



SCAPE

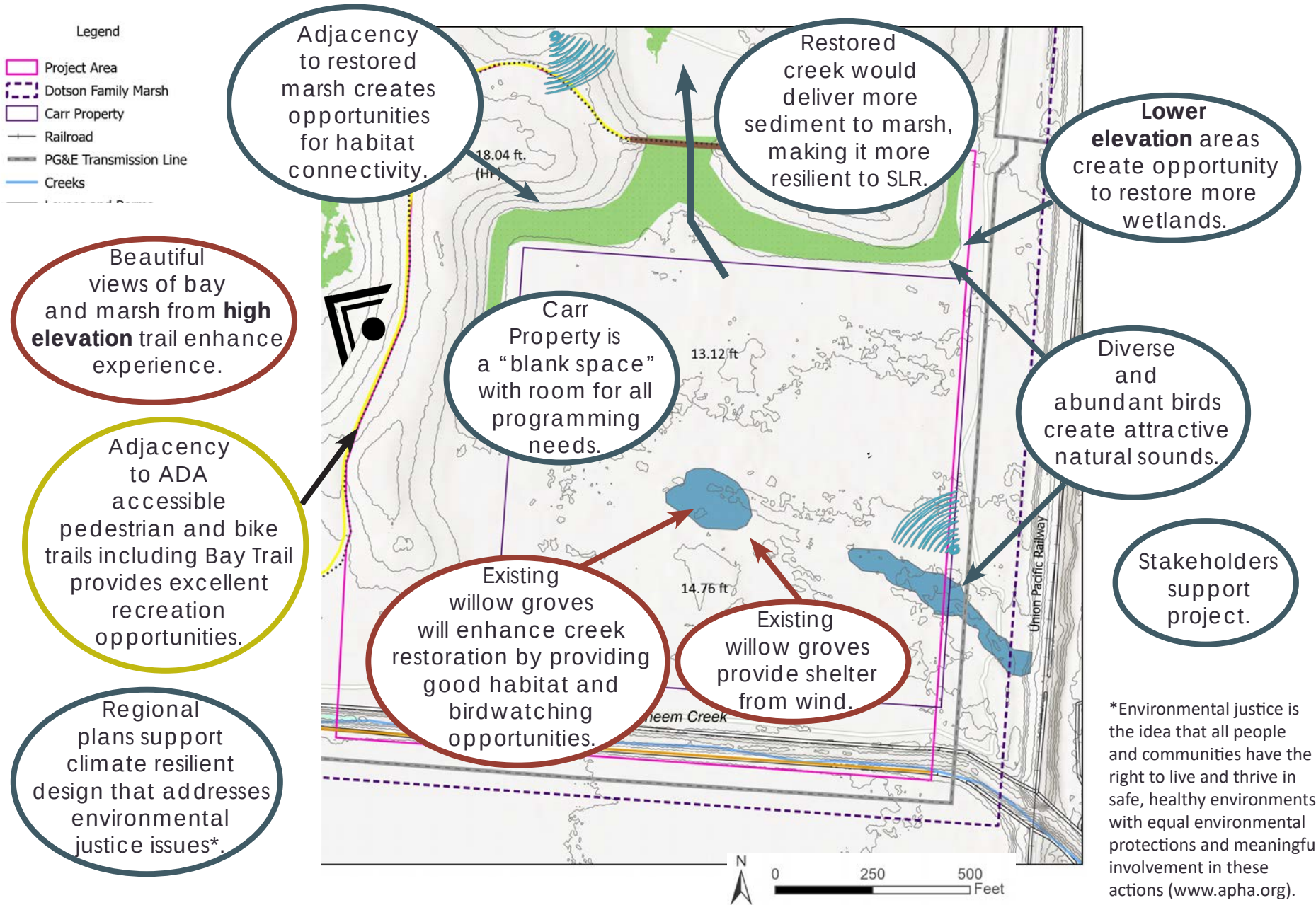
Design Constraints by Project Goal

RESTORED CREEK AND HABITAT
INCLUSIVE ACCESS
COMFORTABLE GATHERING SPACE



Design Opportunities by Project Goal

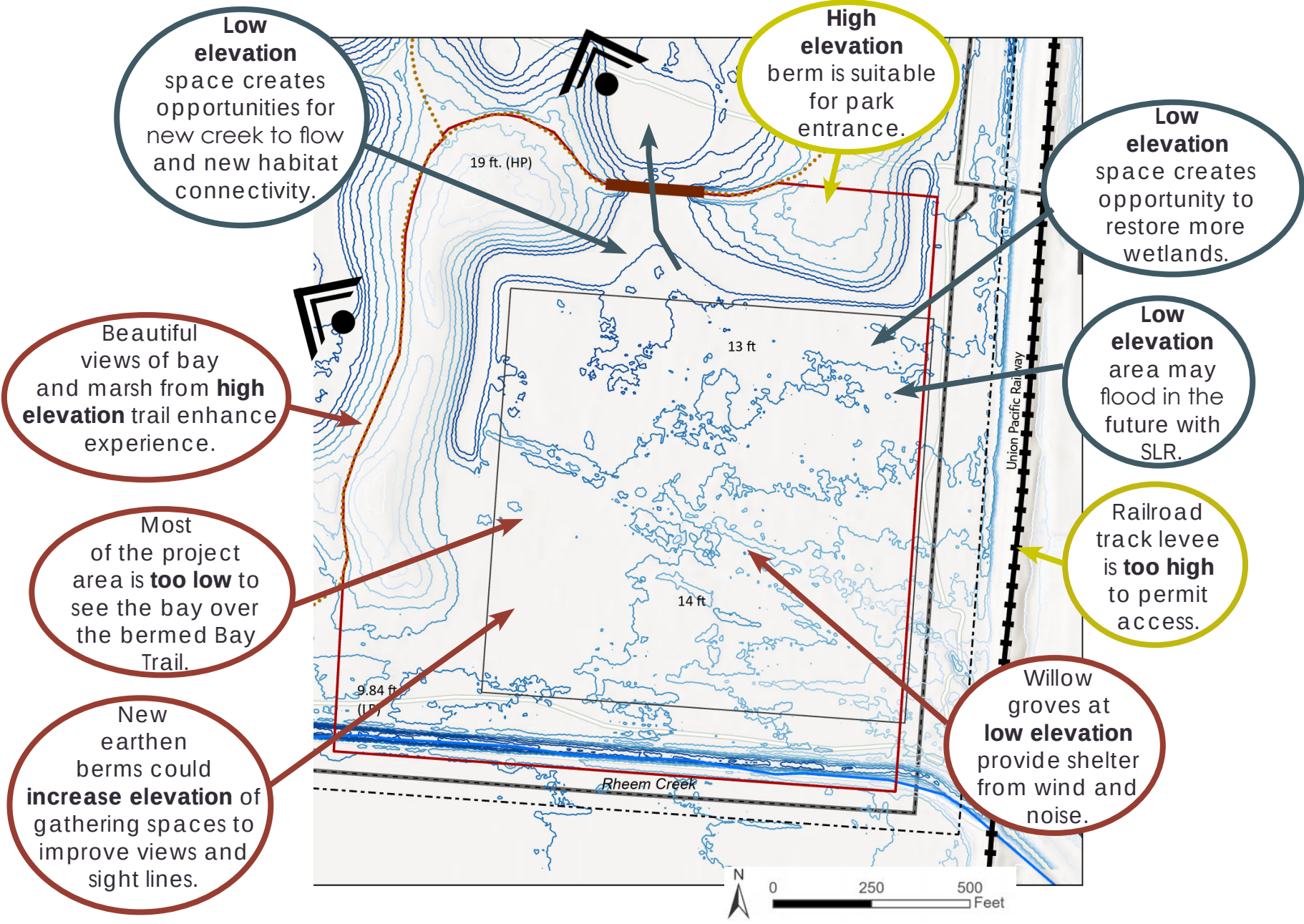
RESTORED CREEK AND HABITAT
INCLUSIVE ACCESS
COMFORTABLE GATHERING SPACE



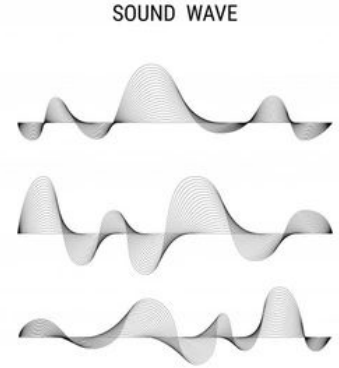
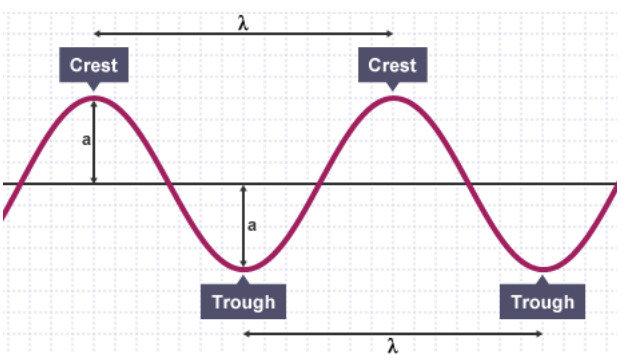
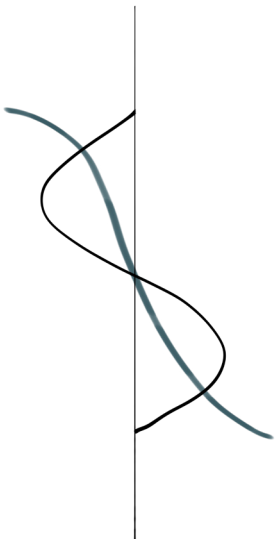
*Environmental justice is the idea that all people and communities have the right to live and thrive in safe, healthy environments with equal environmental protections and meaningful involvement in these actions (www.apha.org).

LAND ELEVATION INFLUENCES OPPORTUNITIES AND CONSTRAINTS

RESTORED CREEK AND HABITAT
INCLUSIVE ACCESS
COMFORTABLE GATHERING SPACE



DESIGN CONCEPT | AMPLITUDE



<https://www.bbc.co.uk/bitesize/guides/zc62tv4/revision/2> Dmitrii Evtushenko, dreamstime.com



<https://de.pinterest.com/pin/874965033869134177/>



<https://www.pinterest.com/pin/785878203742182236/>

AMPLITUDE: The height of a wave from the crest to the depth of a trough. Amplitude describes the volume of sound and brightness of light. Amplitude can be found in many landforms, such as the height of hills or sinuosity of creeks.

Site analysis revealed the influence of land elevation in meeting project objectives, including space for riparian and wetland habitat, noise mitigation, universal design and optimizing views.



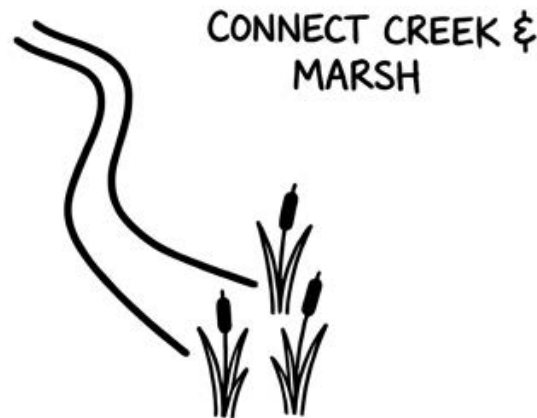
Water, <https://pt.pinterest.com/pin/48061921671880344/>



Robert W. Wilson Overlook, Weiss/Manfredi, mooool.com

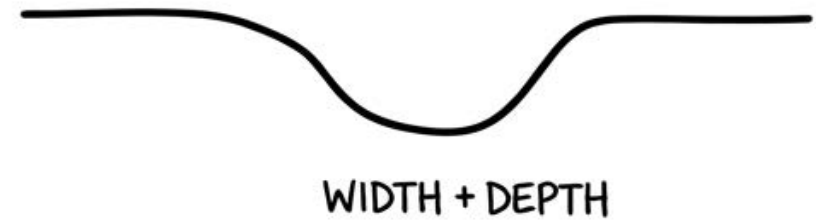
AMPLITUDE: DESIGN CONCEPT TO CLIMATE SMART DESIGN PRINCIPLES

Sediment Delivery: Engineering with Nature®



The U.S. Army Corps of Engineers Engineering With Nature® (EwN) program is the alignment of natural and engineering processes to efficiently and effectively deliver economic, ecological, and social benefits through collaboration (<https://ewn.erd.c.dren.mil/>). EwN has partnered with the Landscape Architecture Research Collaborative to develop a handbook of nature-based solutions. The program's design principles guide the overall design of the Lower Rheem Creek restoration. These include treating sediment as a resource, reconnecting habitats, and providing community benefits. EwN concepts are used to connect Rheem Creek with the existing restored marsh and to restore additional wetland and riparian habitat to infiltrate floodwaters.

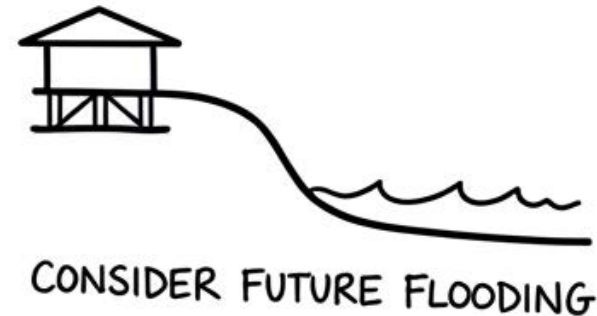
Creek Design: Water in Environmental Planning by Dunne and Leopold, 1978



According to the SFEI Vision Study, the goal of creek restoration is to deliver sediment from the watershed to the restored marsh to support marsh sustainability with sea level rise. The creek would be designed to hold Q2 floods, meaning floods that occur approximately every 2 years. Floods greater than that would spread into the seasonal and tidal wetlands and deliver sediment. Based on these goals, width and depth of the creek channel was calculated by Scott Dusterhoff, SFEI geomorphologist, to be approximately 2-3 feet deep and 25-30 feet wide.

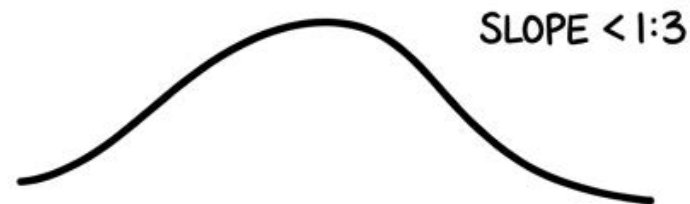
Diagrams hand-drawn then refined with AI

Program Element Siting: EBRPD Climate Smart Initiative



The East Bay Regional Park District Climate Smart Initiative provides a mandate to embed climate resilience, sustainability, and ecological uplift into every stage of design. New projects must be designed to perform under future climate conditions while advancing ecological and community benefits. Design principles include 1) Climate Integration: Mitigation + adaptation from concept to completion; 2) Sustainable Design: Low-carbon materials, water conservation, and waste reduction, and 3) Climate Readiness: Plan for sea-level rise, wildfire, heat, flooding, and drought. The Climate Smart Initiative drives program element siting by considering future flooding. The design incorporates nature-based solutions, and material selection minimizes embedded carbon and water use.

Earthen Berms: Time-Saver Standards for Landscape Architecture



Earthen berms can be used to increase the elevation of program elements, providing views of the surroundings and protecting infrastructure from flooding. Berms can also help mitigate noise in some cases. Maintaining low slopes stabilizes berms and helps vegetation to establish.

AMPLITUDE: DESIGN CONCEPT TO HUMAN FACTOR DESIGN PRINCIPLES

A Pattern Language,
Alexander, Ishikawa and
Silverstein, 1977

Play for All: Universal design,
accessibility and inclusion in
playground.



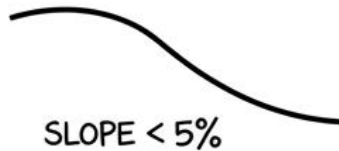
114 HIERARCHY OF OPEN SPACE



125 STAIR SEATING



73 ADVENTURE PLAYGROUND

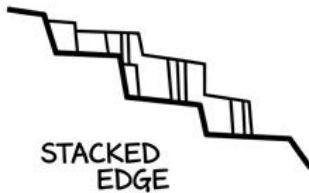
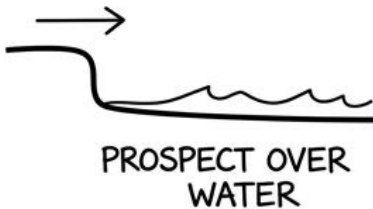


A Pattern Language is a collection of patterns; each pattern describes a problem and provides a design solution, many of which are archetypal. Patterns are selected that help address the project goal of creating comfortable gathering spaces, and incorporated into the design where they best fit and where they provide a solution.

“Universal design” means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design. (Kompan Play Institute 2010). Some major principles of Play for All Universal Design are 1) Products are accessible, multifunctional (when possible), 360 degree design (Play from all sides), 2) Equipped with diverse play opportunities, 3) Clear in color and design signals, and 4) Provided with special solutions for special needs when relevant. Universal design is used in playground design and all circulation.

Diagrams hand-drawn then refined with AI

Form and Fabric in Landscape Architecture, Dee, 2007



Similar to A Pattern Language, Form and Fabric provides a structure through which landscapes can be understood. It describes Fabric, the integrated structure of whole landscapes, and Form, the components of the fabric. Forms are selected and incorporated into the design where they best fit and where they provide a solution.

Overall Design Process

Using the information from the Site Inventory and Analysis, including site visits, and Climate Smart and Human Factor Design Principles, the design process included the following steps:

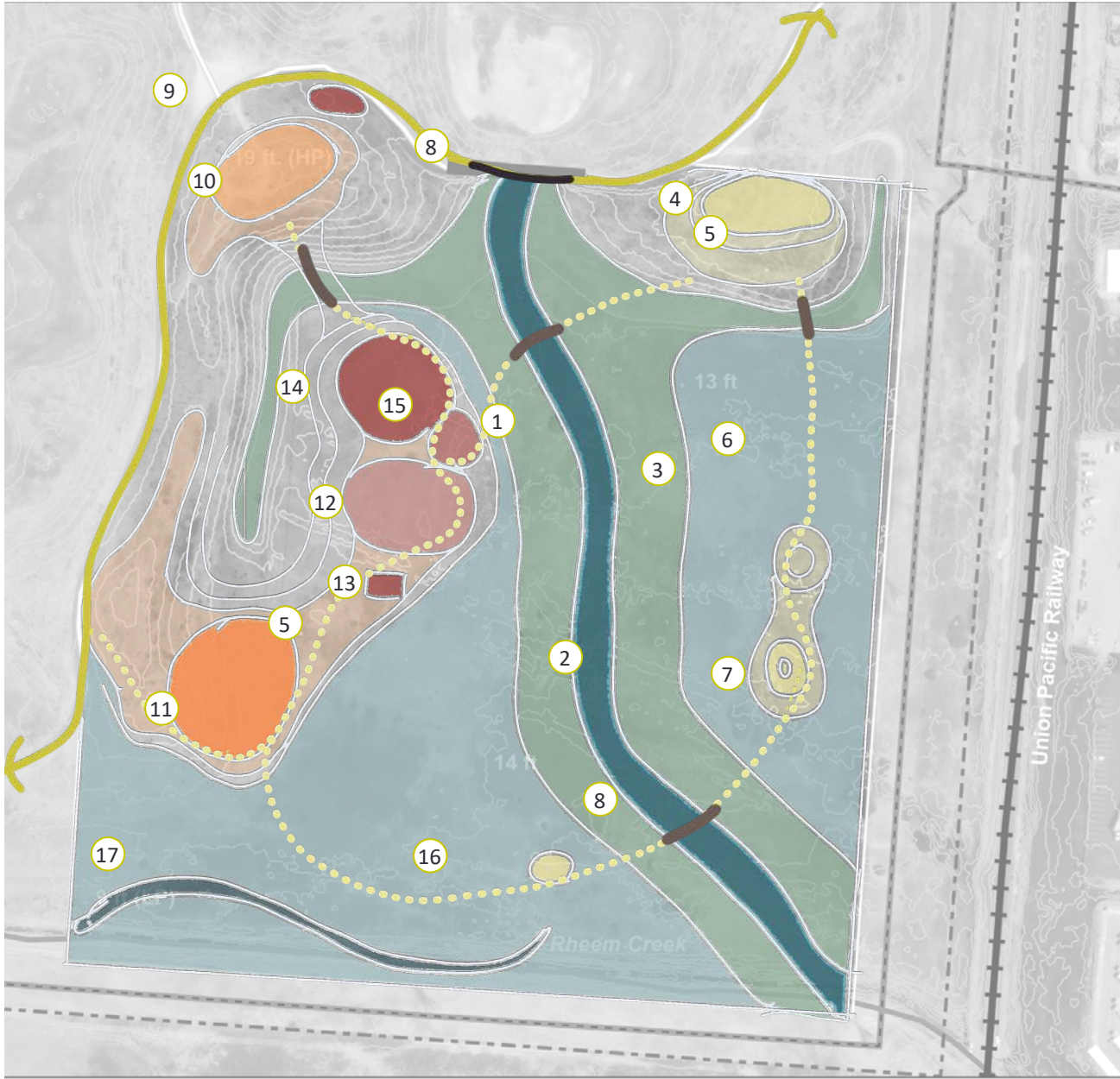
- ↳ Development of three design alternatives through sketches and bubble diagrams
- ↳ Selection of a design alternative and development of a final bubble diagram
- ↳ Additional visits to the project area to test and adjust the best siting for each program element based on noise and views
- ↳ Iterative sketching of a conceptual plan for the whole project area and for enlargements

DESIGN ALTERNATIVE 1: ELEVATE

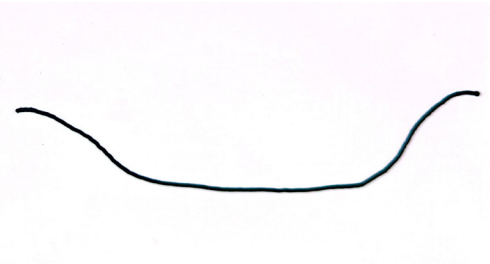


For ELEVATE, an earthen berm is constructed at the same elevation as the Bay Trail. The major program elements, the large gathering space, the sensory garden, the nature playground, restroom and pavilion are at this elevation. Boardwalks and bridges enable visitors to explore the natural areas.

- 1. Creek
- 2. Riparian habitat
- 3. Wetland habitat
- 4. Entrance and trailhead
- 5. Mural and art
- 6. Boardwalk
- 7. Overlook
- 8. Bridge
- 9. Bay trail
- 10. Updated picnic area
- 11. Pavilion
- 12. Nature Play
- 13. Restroom
- 14. Large gathering space
- 15. Sensory garden
- 16. Small seating area
- 17. Slough



DESIGN ALTERNATIVE 2: SUNKEN

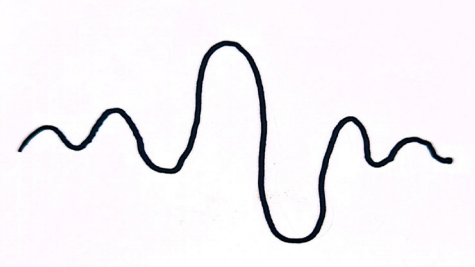


For SUNKEN, there is no grading or change in elevation at the site. The major program elements, the large gathering space, the sensory garden, the nature playground, restroom and pavilion are at the original elevation 4 to 5 feet below the Bay Trail. There are no creek crossings. A boardwalk takes visitors through a portion of the natural areas.

- 1. Creek
- 2. Riparian habitat
- 3. Wetland habitat
- 4. Entrance and trailhead
- 5. Mural and art
- 6. Boardwalk
- 7. Bridge
- 8. Bay trail
- 9. Updated picnic area
- 10. Pavilion
- 11. Nature Play
- 12. Restroom
- 13. Large gathering space
- 14. Sensory garden
- 15. Small seating area
- 16. Slough



FINAL DESIGN CONCEPT: OSCILLATE



OSCILLATE:

- ↳ An earthen berm with variable elevations.
- ↳ The major program elements sit at different elevations related to program-specific requirements.
- ↳ Boardwalks and bridges enable visitors to explore the natural areas.

- 1. Creek
- 2. Riparian habitat
- 3. Wetland habitat
- 4. Entrance and trailhead
- 5. Mural and art
- 6. Boardwalk
- 7. Overlook
- 8. Bridge
- 9. Bay trail
- 10. Updated picnic area
- 11. Pavilion
- 12. Nature Play
- 13. Restroom
- 14. Large gathering space
- 15. Sensory garden
- 16. Small seating area
- 17. Slough



DESIGN COMPARATIVE ANALYSIS



ELEVATE



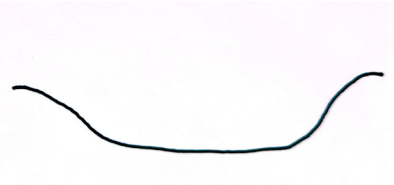
Yerba Buena Island, CMG

PROS:

- ↳ High elevation creates good views everywhere (*Form and Fabric*).
- ↳ Bridges, boardwalks and overlooks provide chance to interact with natural area.
- ↳ More simple topography makes universal design easier (*Play for All*).
- ↳ Areas protected from flooding (*EBRPD Climate Smart Initiative*).

CONS:

- ↳ All elevated areas are subject to same noise and wind.
- ↳ Maximizes fill, which could be hard to find.



SUNKEN



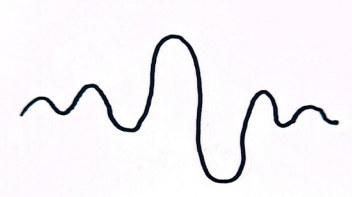
Centenary Lakes Nature Play

PROS:

- ↳ No fill required. More simple design is more feasible; universal design is easier (*Play for All*).
- ↳ Programming partially protected from noise and wind.
- ↳ No bridges and fewer boardwalks create less impact to natural areas.

CONS:

- ↳ Limited views on site. Limited sightlines. Could affect safety (*Project for Public Spaces*).
- ↳ Less opportunity to interact with natural areas.
- ↳ More park areas are subject to flooding (*EBRPD Climate Smart Initiative*).



OSCILLATE



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PROS:

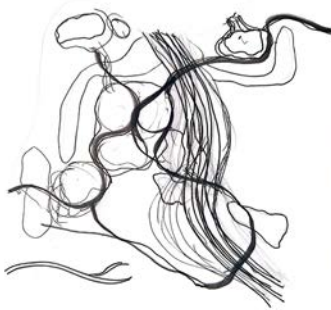
- ↳ More interest in changing elevation and use of slopes.
- ↳ Views created in higher seating areas while noise and wind reduced in lower pavilion area (*Form and Fabric*).
- ↳ Areas protected from flooding (*EBRPD Climate Smart Initiative*).
- ↳ Bridges, boardwalks and overlooks provide chance to interact with natural area.

CONS:

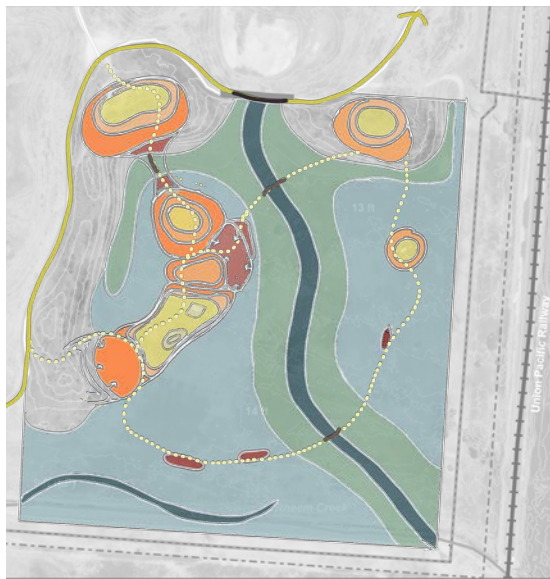
- ↳ Requires fill, which could be hard to find.
- ↳ Reduced sightlines could affect safety.

DESIGN PROCESS

DIAGRAMS →



BUBBLES →



ANOTHER SITE VISIT: VIEWS, NOISE, SLOPES



Good spot for stair seating



Good spot for a garden seat



Future trail across tracks



Good spot for a berm

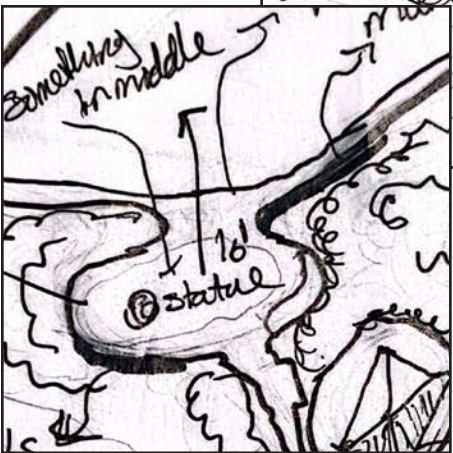
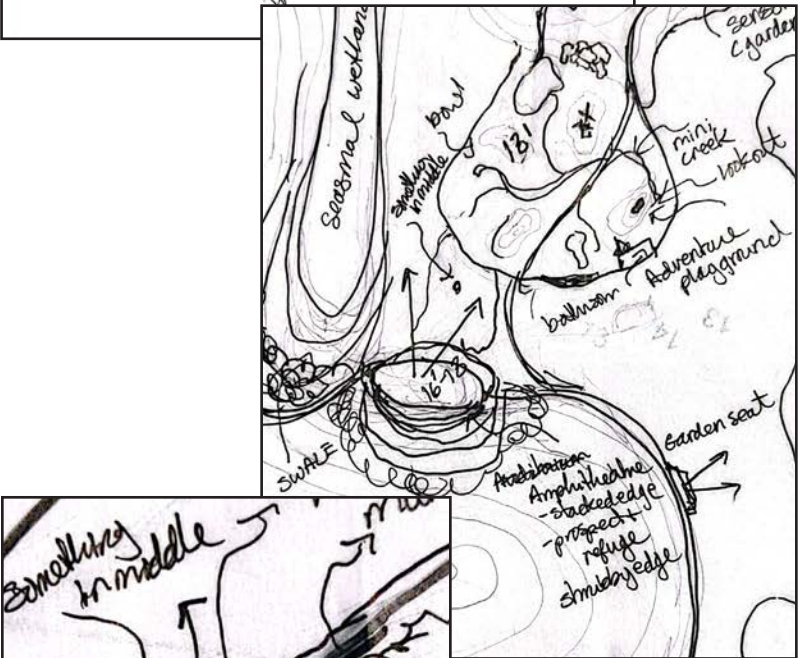
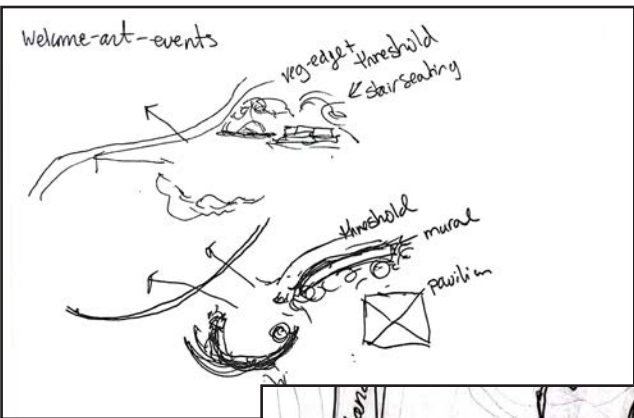


Bridge over future creek



Future pavilion views

ENLARGEMENTS



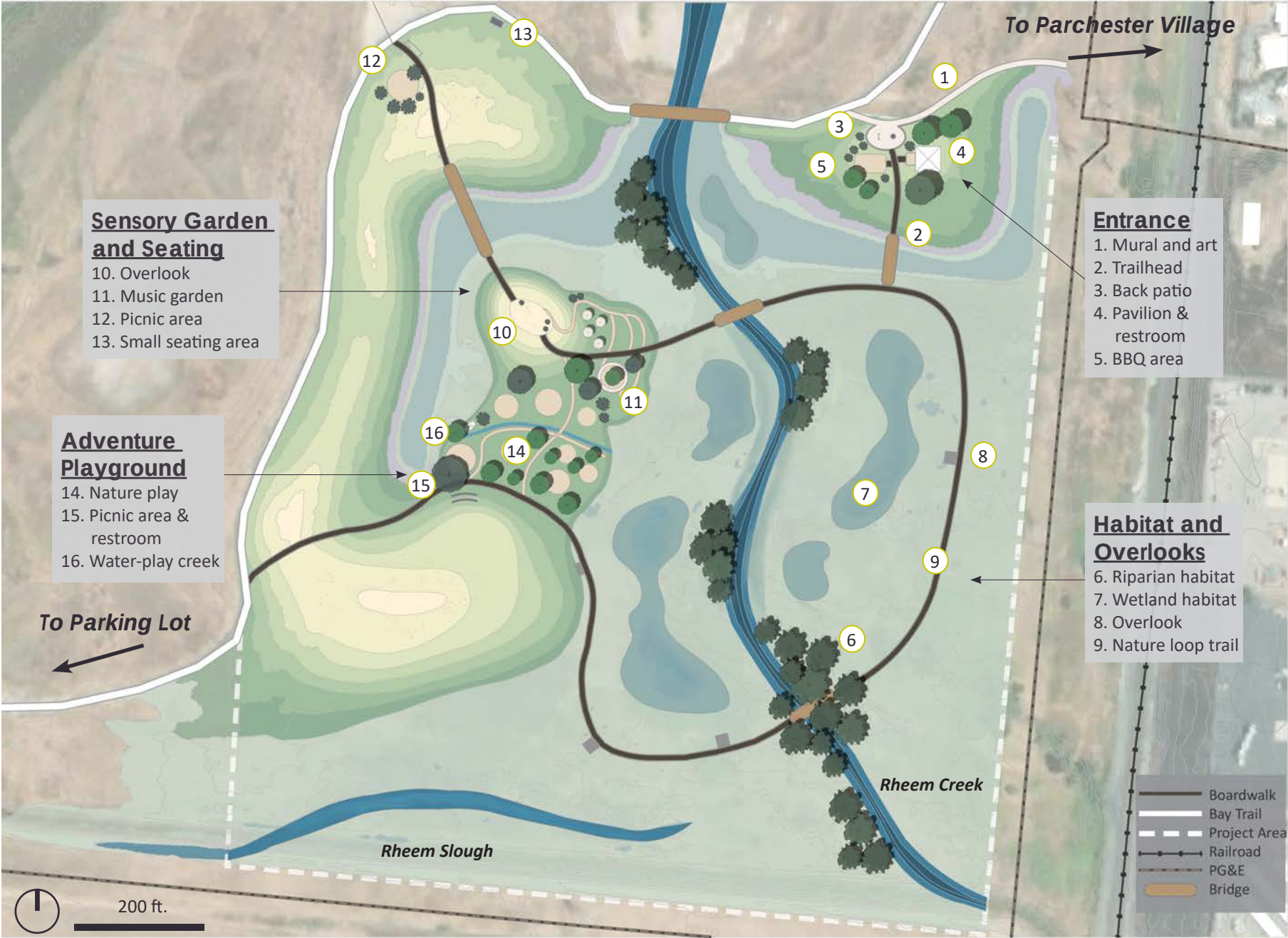
Mapping out A Pattern Language and Form and Fabric Design Principles, and Views



SITE PLAN



RHEEM CREEK PARK | RECONNECTED CREEK & MARSH, COMMUNITY & NATURE



RHEEM CREEK PARK | A VISITOR EXPERIENCE

The final conceptual master plan shows the creek re-aligned to the north. The creek has riparian vegetation and is surrounded by seasonal wetlands like those found in Dotson Family Marsh. These seasonal wetlands are meant to hold floodwater during high flow events. A large berm was added to the southwest corner to help block noise from the gun club and highway, and to create highpoints with views of the bay. There is a trail in the northeast corner that connects to a future planned railroad crossing to Parchester Village.

The park has four main areas: the entrance, the adventure playground, and the sensory garden, which all surround the new habitat, and a nature loop boardwalk trail and wetland overlooks. The following pages will provide details of a visitor experience who moves from the entrance, south along the nature loop trail to an overlook, to the playground, then sensory garden, then finally to a creek crossing.

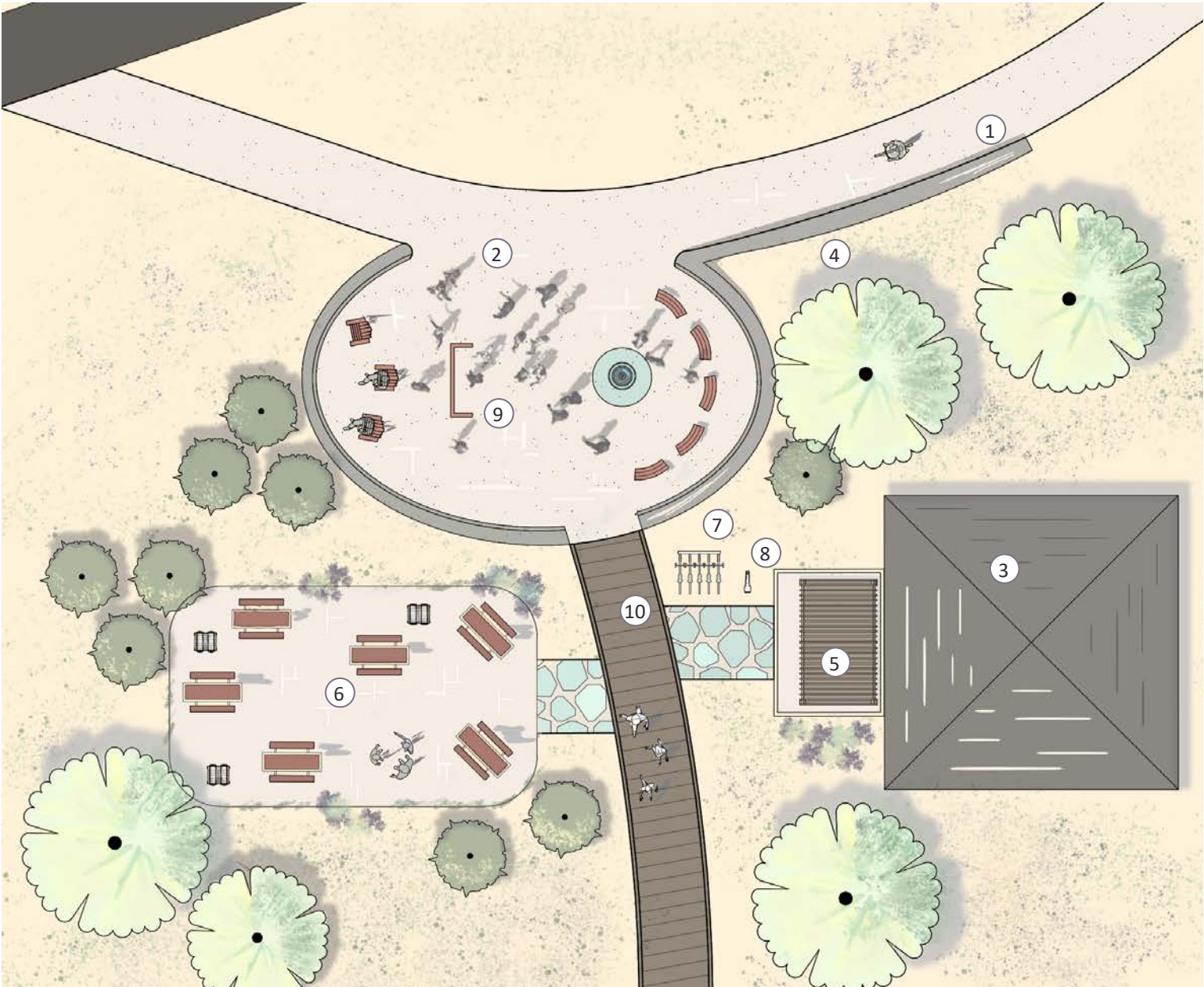


ENTRANCE | ENLARGEMENT

- 1. Trail to Parchester Village
- 2. "Back Patio" with Bay views
- 3. Pavilion
- 4. Murals
- 5. Patio with pergola
- 6. Picnic area with BBQs
- 7. Bike rack
- 8. Water bottle filling station
- 9. Educational signage
- 10. Trailhead to boardwalk nature trail



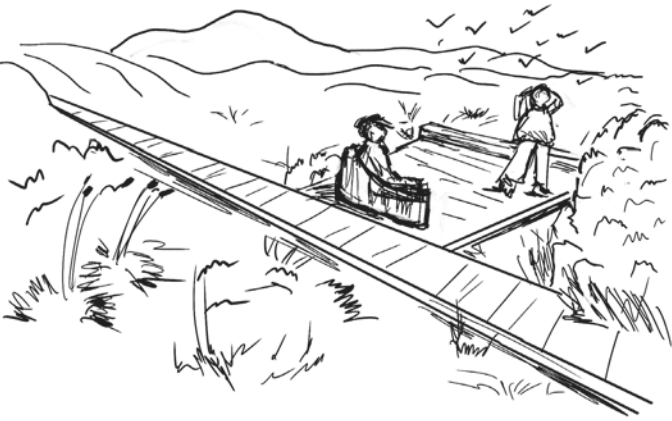
topophyla.com



20 ft.



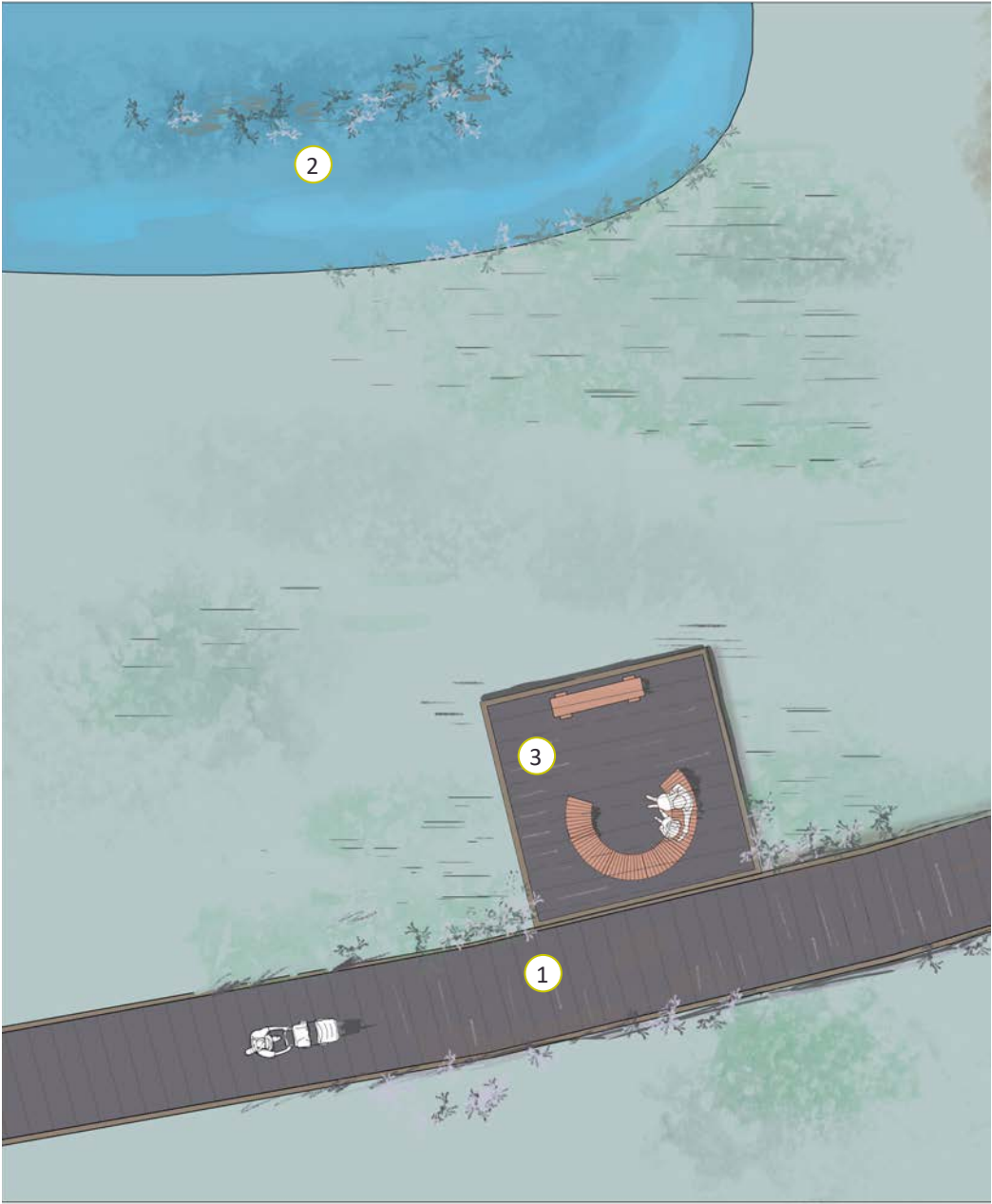
OVERLOOK AND BOARDWALK | ENLARGEMENT



- 1. Boardwalk nature loop trail
- 2. Seasonal wetland
- 3. Overlook



Minghu Wetland Park, Turenscape



20 ft.



ENTRANCE | TRAIL FROM PARCHESTER VILLAGE



Before

ENTRANCE | THE BACK PATIO



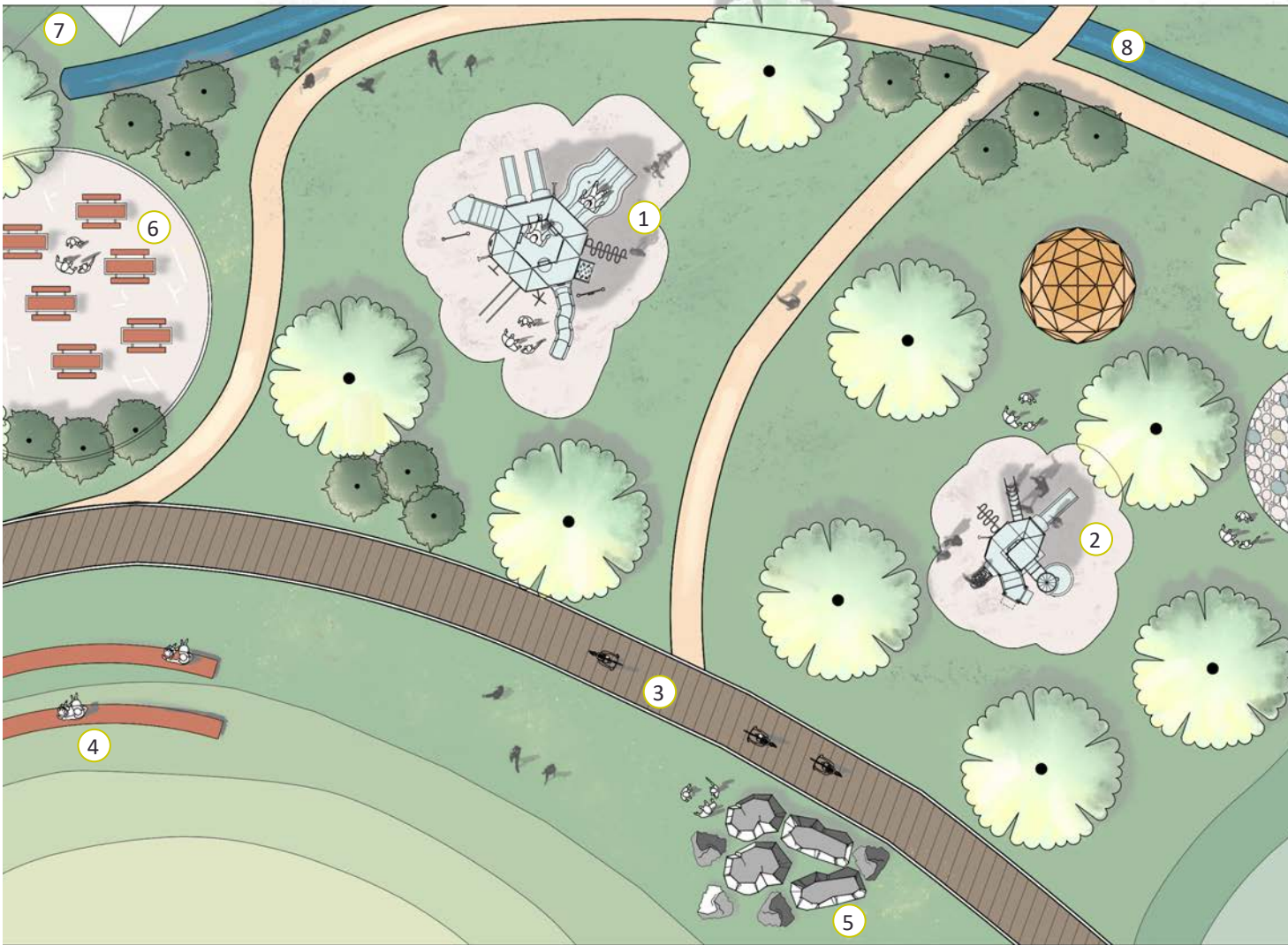
Before

ADVENTURE PLAY | ENLARGEMENT

- 1. Tower play structure (5-12 yrs)
- 2. Small play structure (1-5 yrs)
- 3. Boardwalk nature loop trail
- 4. Seating
- 5. Rock scramble area
- 6. Picnic area
- 7. Bathroom
- 8. Water-play creek



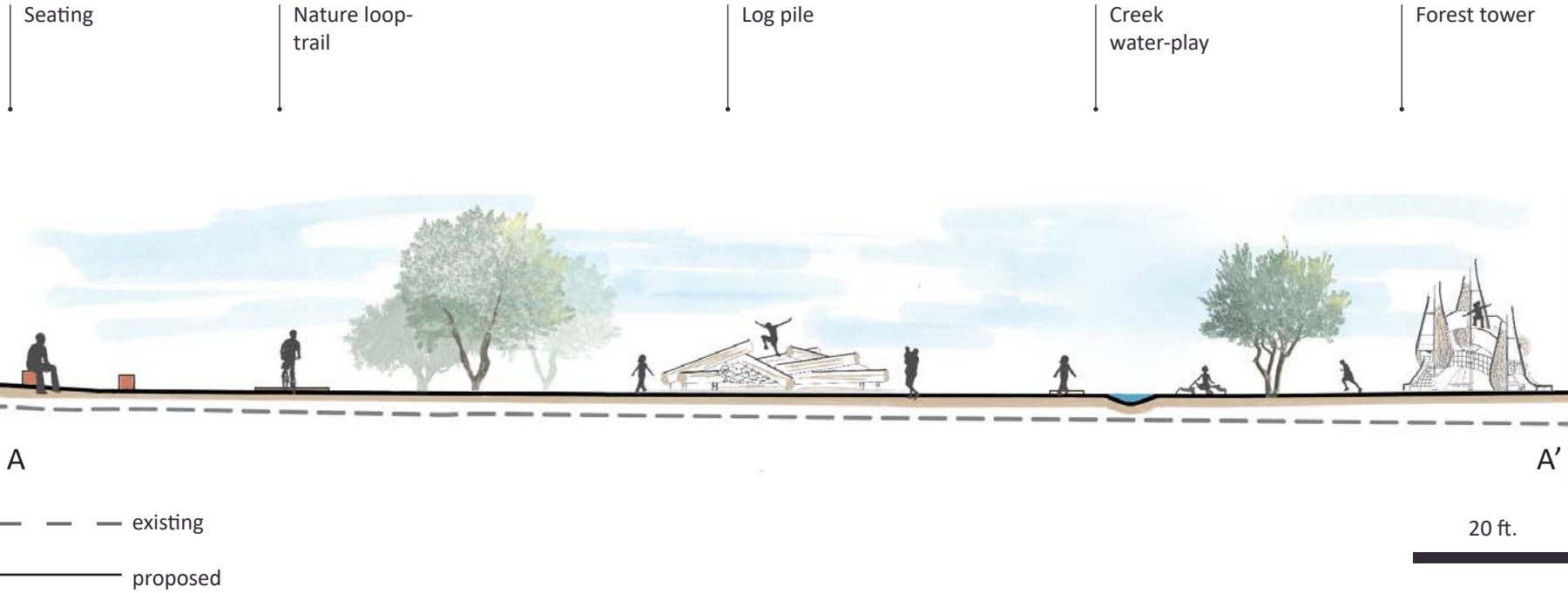
Tunnel Tops,
Presidio, San Francisco, CA



20 ft.



ADVENTURE PLAY | SECTION



play equipment from earthscapeplay.com

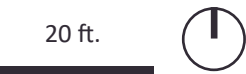


SENSORY GARDEN | *ENLARGEMENT*

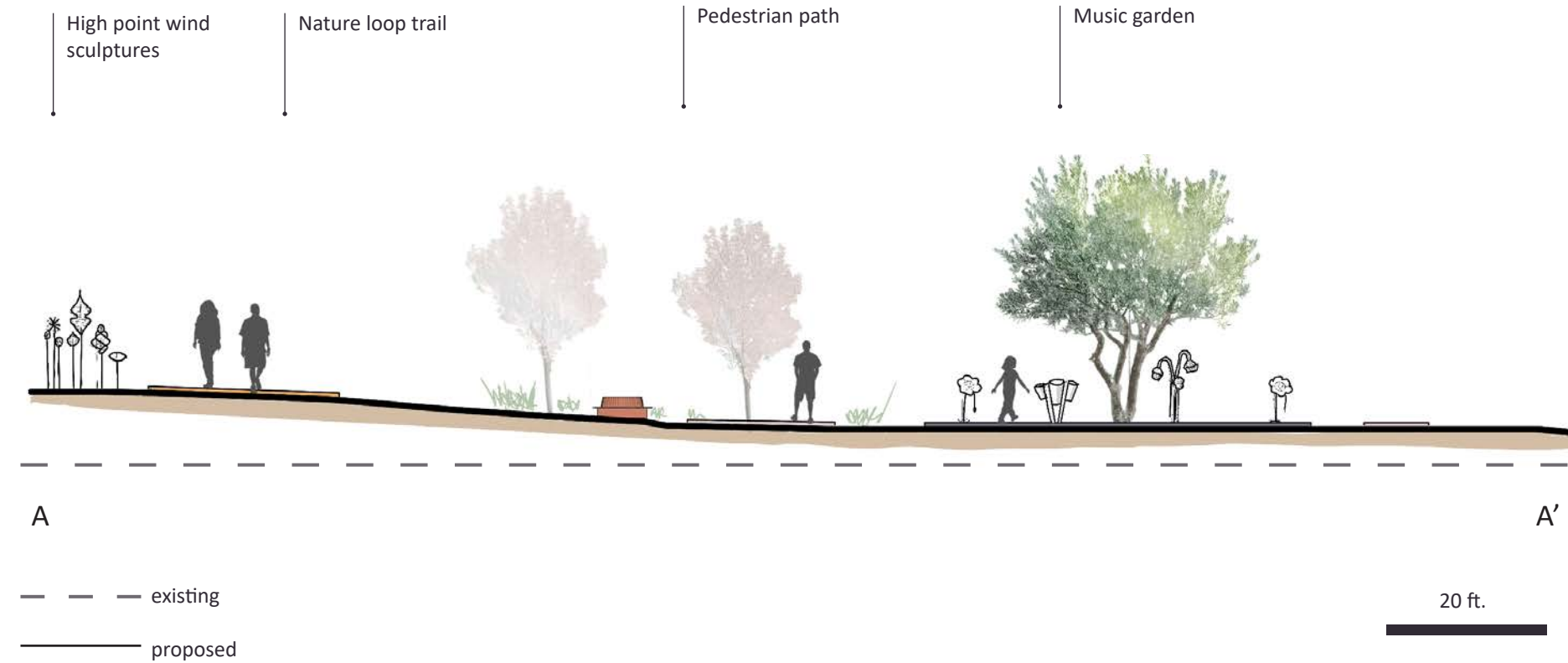
- 1. Boardwalk nature trail
- 2. High point gathering space
- 3. Wind sculptures
- 4. Pedestrian pathways
- 5. Benches
- 6. Music garden
- 7. Orchard
- 8. Wetland
- 9. Playground



Studio Toop



SENSORY GARDEN | *SECTIONS - MUSIC GARDEN*



ADVENTURE PLAYGROUND | *PICNIC AND NATURE PLAY*



Before

play equipment from earthscapeplay.com

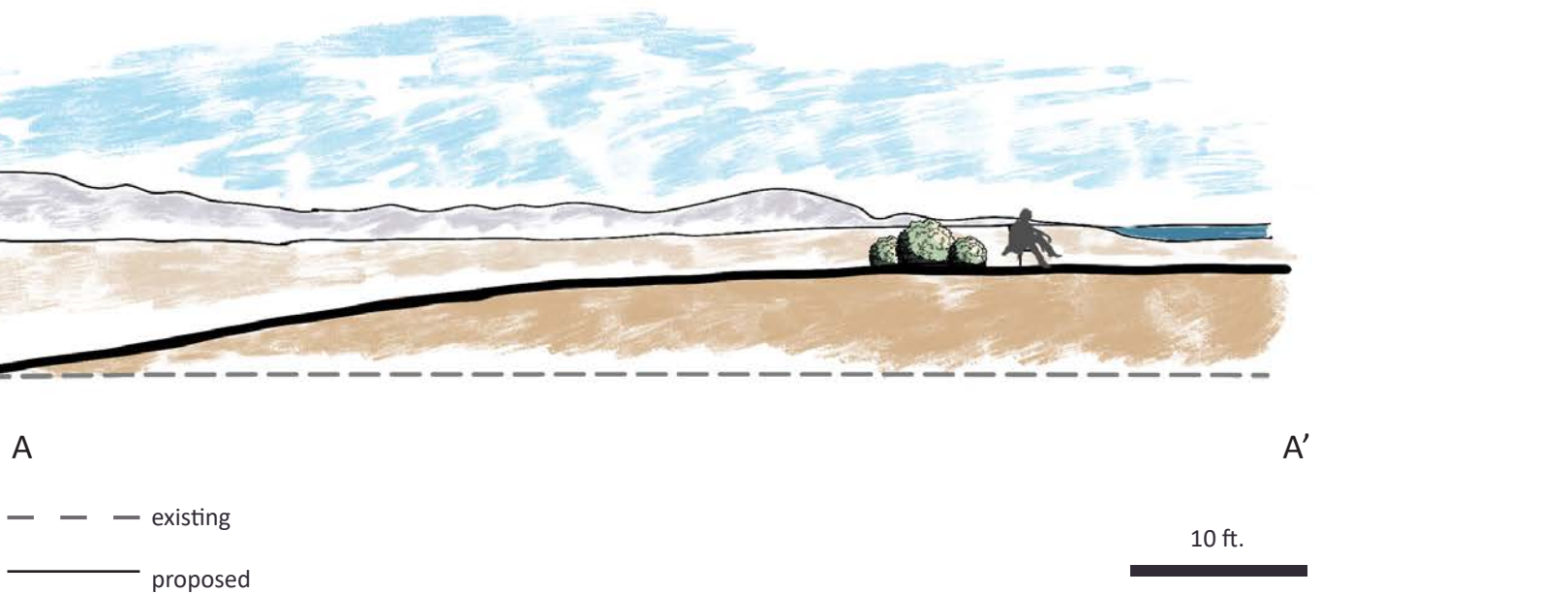
SENSORY GARDEN | *MUSIC GARDEN*



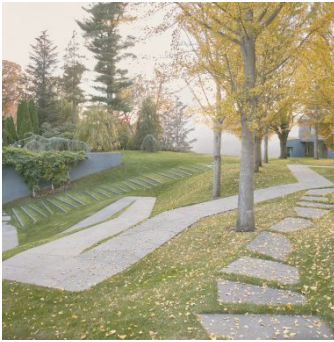
Before

instruments from percussionplay.com

SENSORY GARDEN | SECTIONS - HIGHPOINT

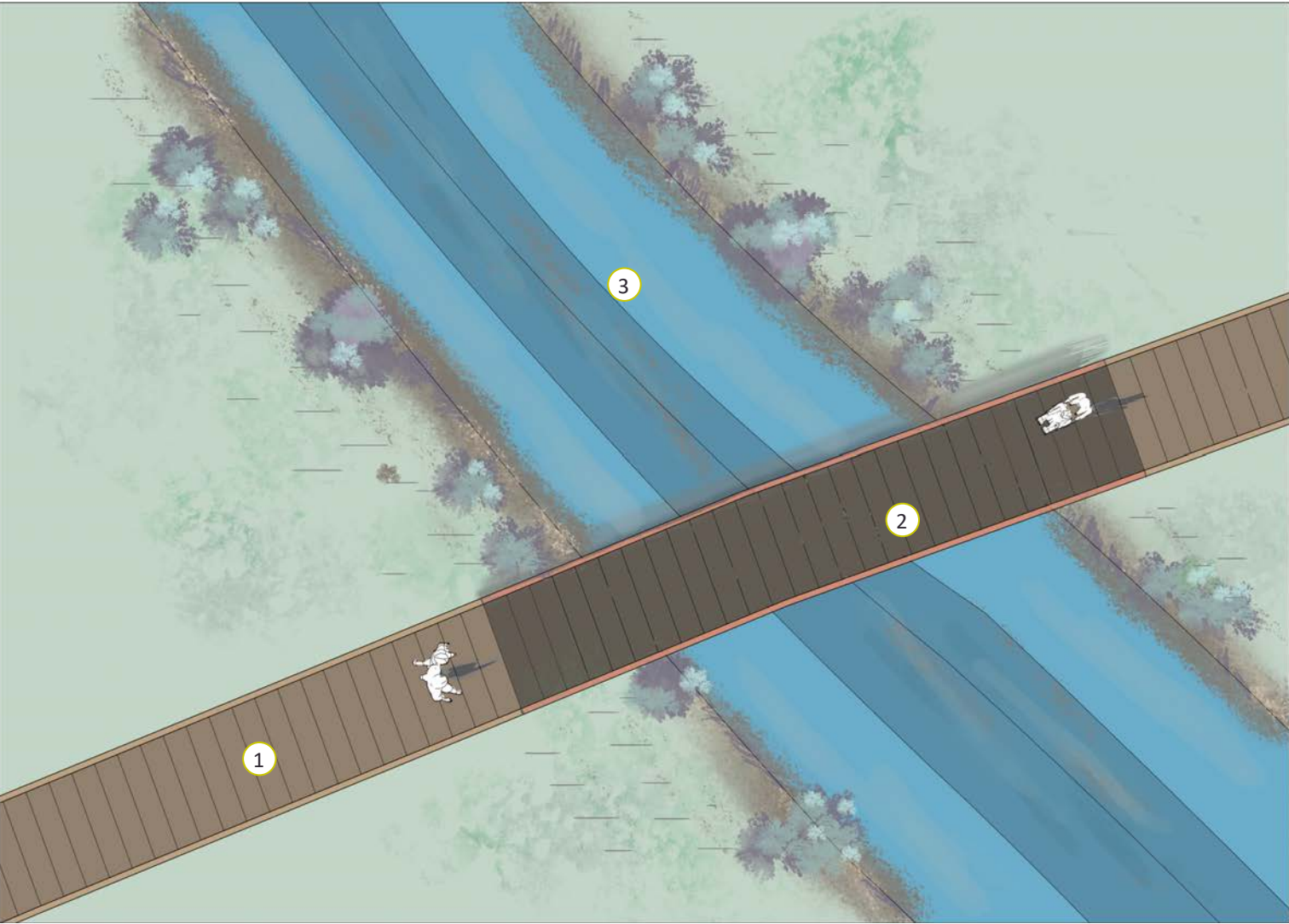


Hollander Design Landscape Architects



CREEK CROSSING | ENLARGEMENT

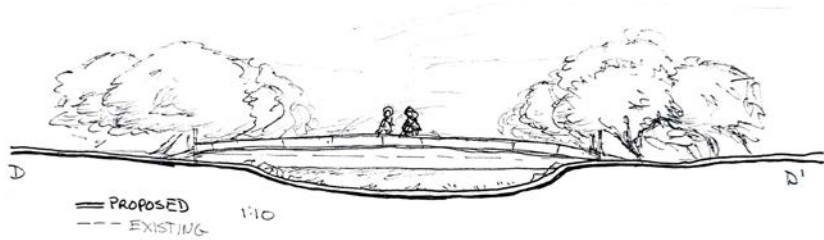
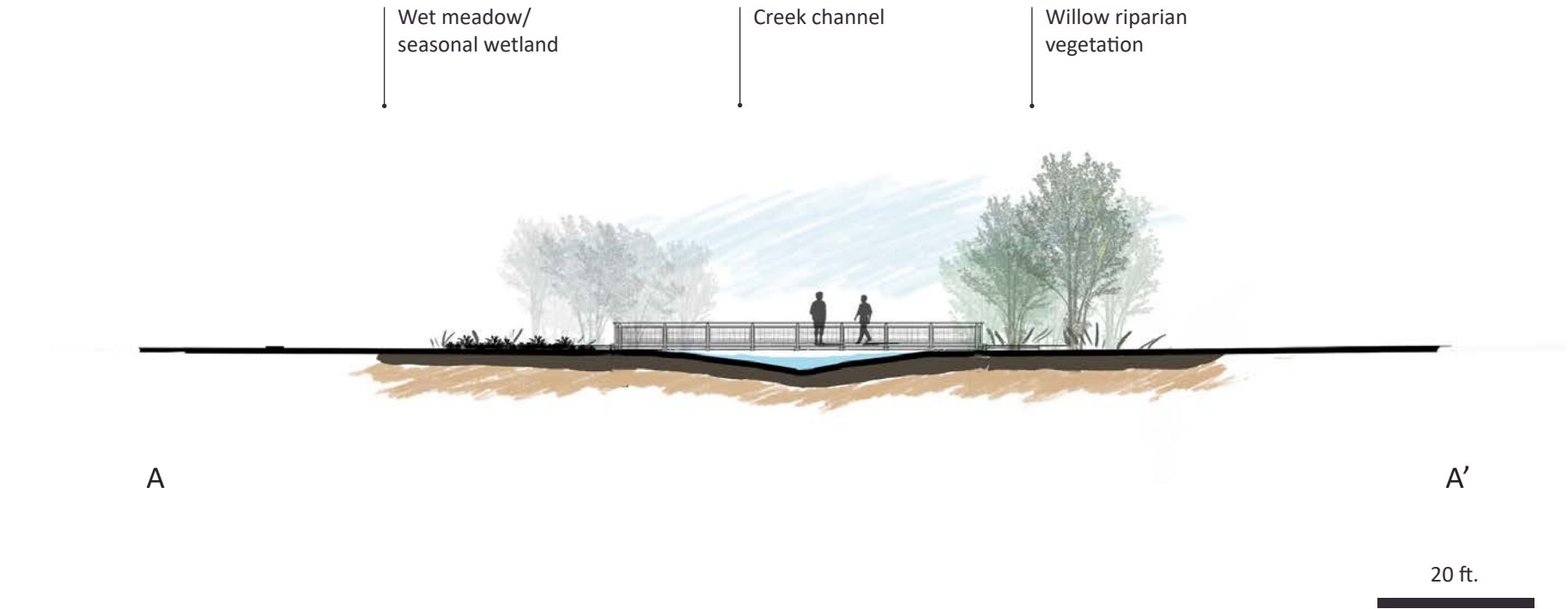
- 1. Boardwalk nature loop trail
- 2. Creek crossing
- 3. Creek



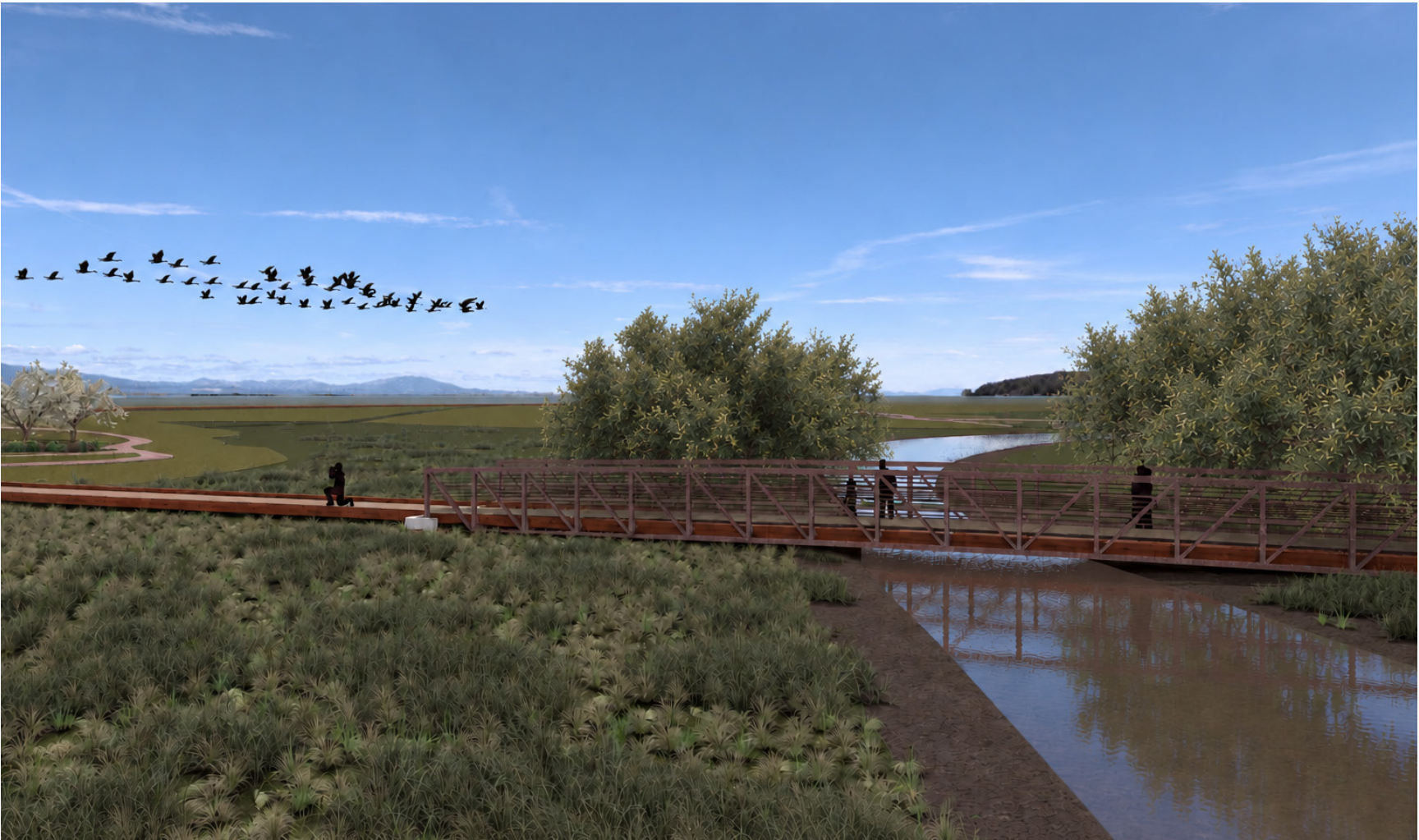
Half Moon Bay
Coastal Trail creek crossings



CREEK CROSSING | SECTION



CREEK CROSSING | NATURE LOOP TRAIL



Before

ChatGPT used to replace Lumion willows with California arroyo willows.

PLANT PALETTES

Upland



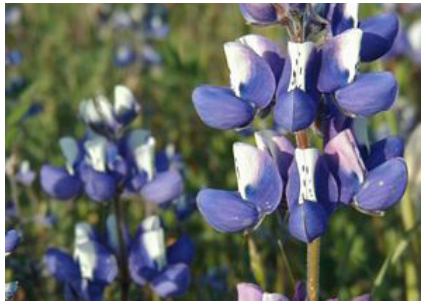
Achillea millefolium



Baccharis pilularis



Eschscholzia californica

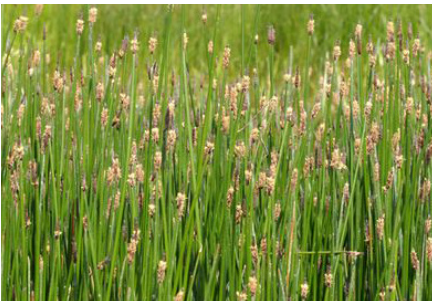


Lupinus nanus

Meadow



Deschampsia danthonioides



Eleocharis macrostachya



Cyperus eragrostis



Sisyrinchium bellus

Riparian



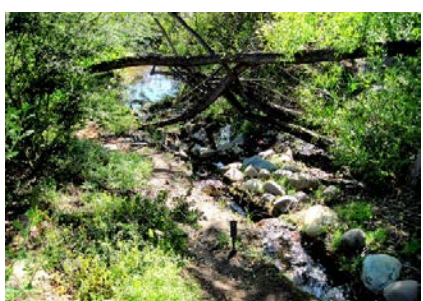
Juncus patens



Schoenoplectus californicus



Salix lasiolepis



Salix laevigata

Sensory Garden



Monardella villosa



Salvia apiana



Fragaria chiloensis



Artemisia douglasiana

HARDSCAPE

Paving



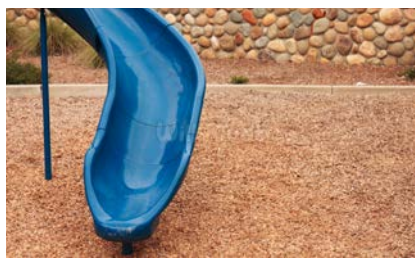
Permeable pavers



Recycled plastic lumber



Flagstone



Engineering wood fiber surface

Amenities/Details



Bollard lighting



Corten steel railings



Water bottle filling station



QCP concrete planter

Music / Art / Play



Street congas Percussion Play



Eandscape towers



Duo Percussion Play



Wind sculpture

Furnishings



Sitecraft circular bench



Landscape forms picnic table



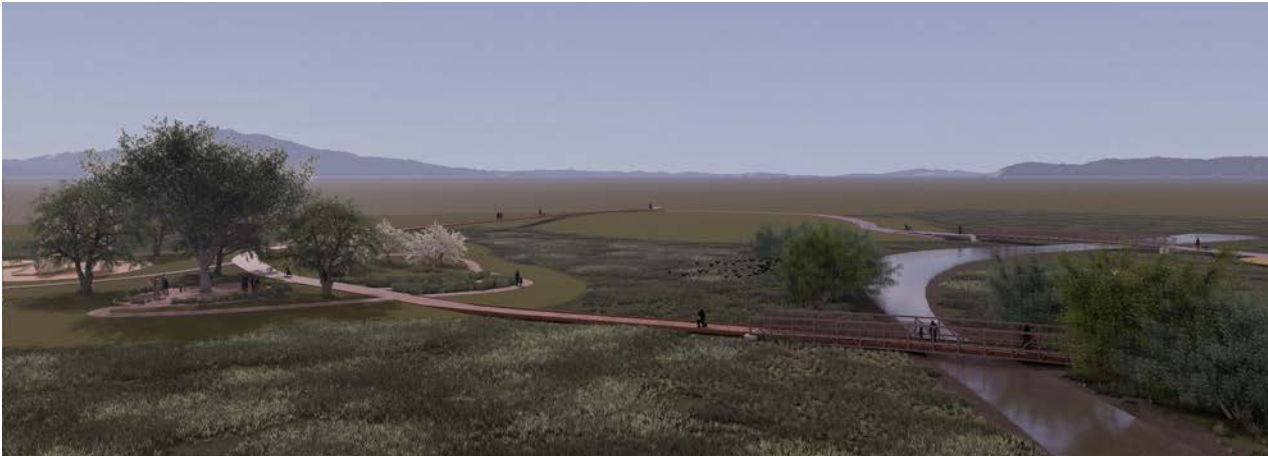
Precast concrete



Sitecraft bench

SUMMARY

Overall, the design meets the original goals. Zooming out, the project blends into the surrounding Dotson Family Marsh. All the trails and boardwalks are accessible, and a nature loop trail and creek crossings allow visitors to connect with nature. The design approach emphasizes the visitor experience, with high points for views and quiet seating areas along edges. The design is reponsive to noise levels to create spaces for the community to gather.



DESIGN SOLUTIONS | GOAL: RESTORED CREEK AND HABITAT

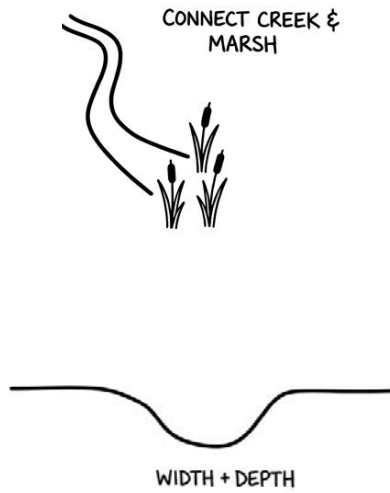
Design **blends** into surrounding Dotson Family Marsh

Over **4 acres** new wetland habitat

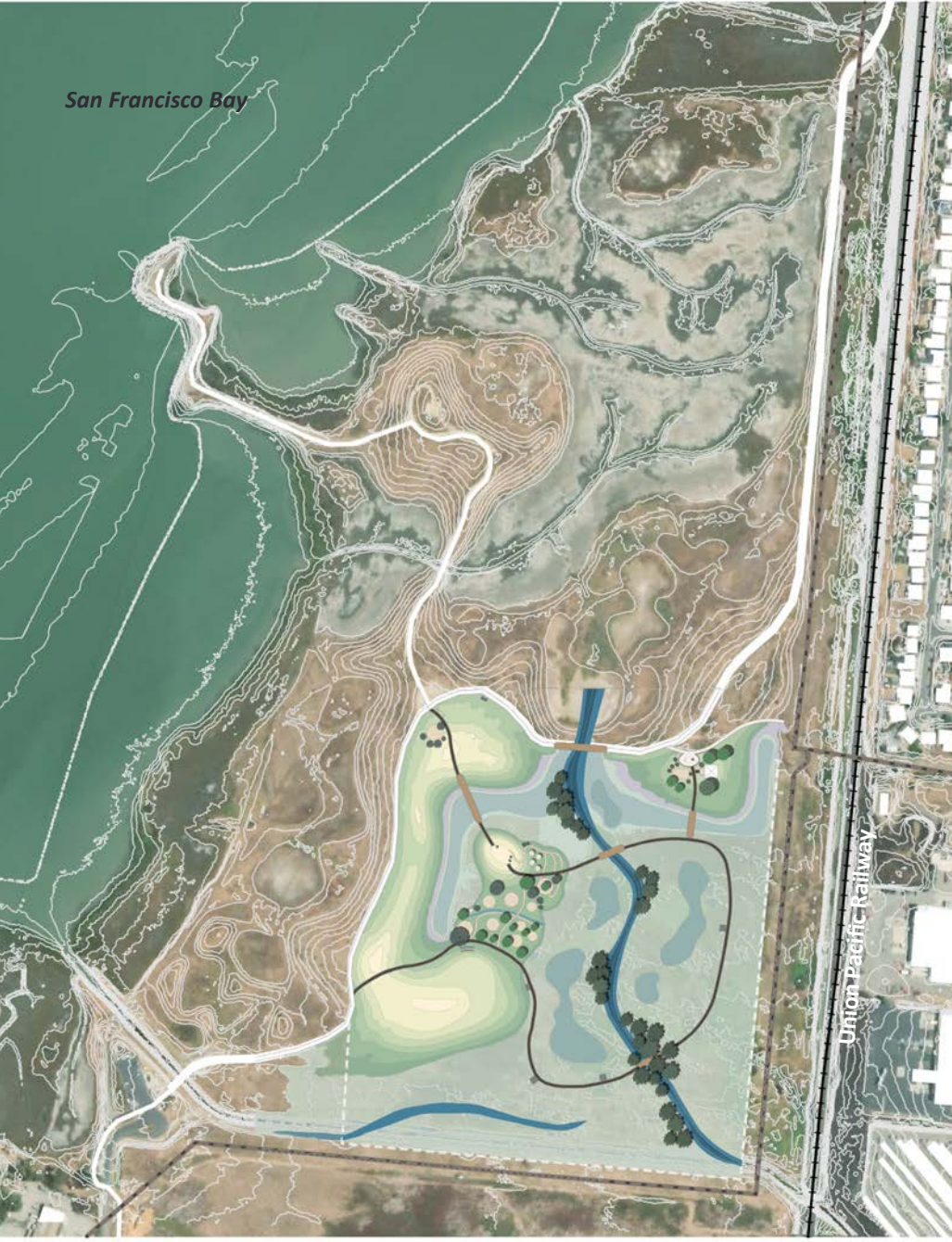
1700 linear feet of restored creek

Connection of creek to surrounding wetlands

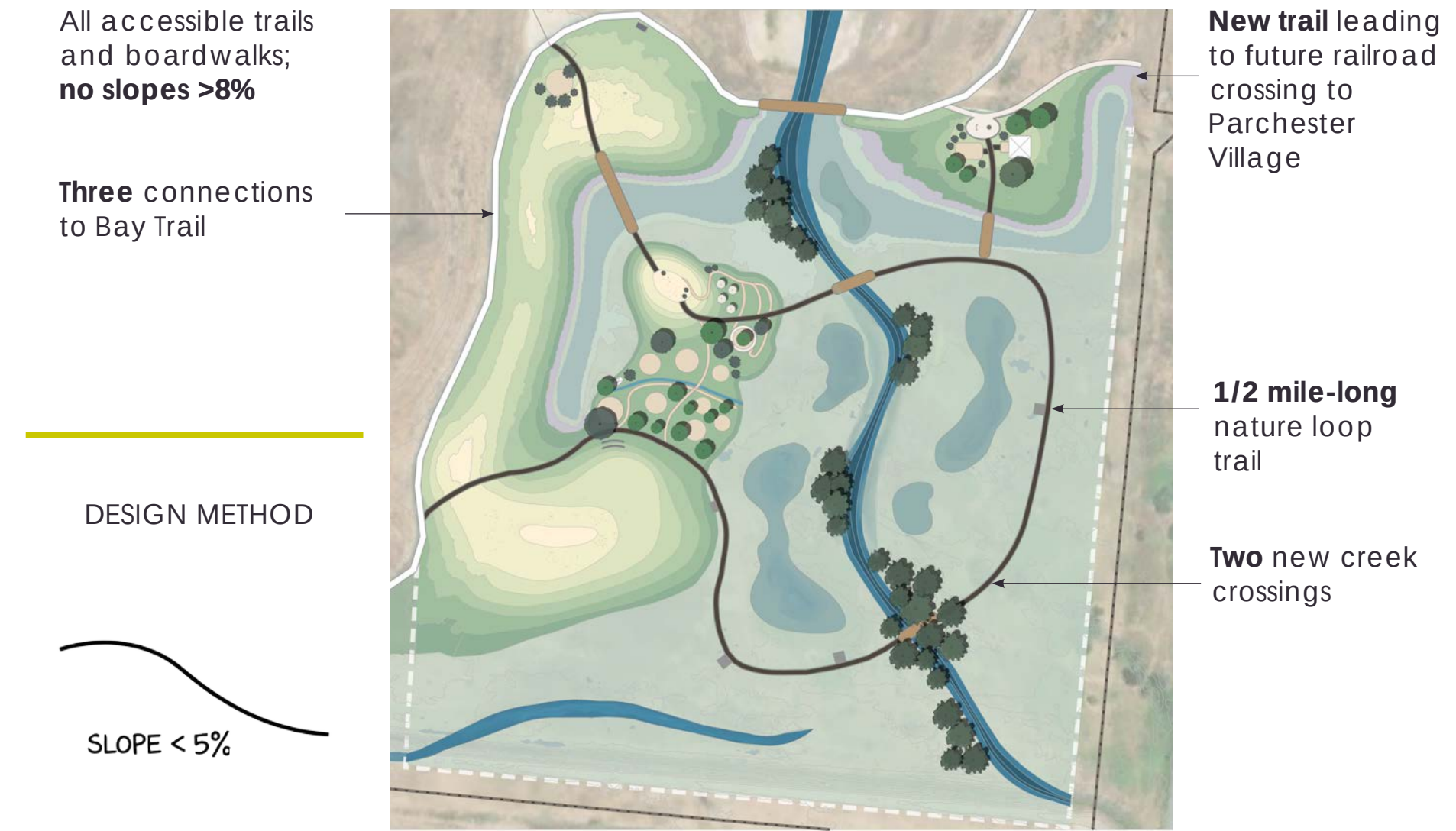
DESIGN METHOD



Engineering with Nature,
Water in Environmental Planning



DESIGN SOLUTIONS | **GOAL: INCLUSIVE ACCESS**



DESIGN SOLUTIONS | **GOAL: COMFORTABLE GATHERING SPACE**

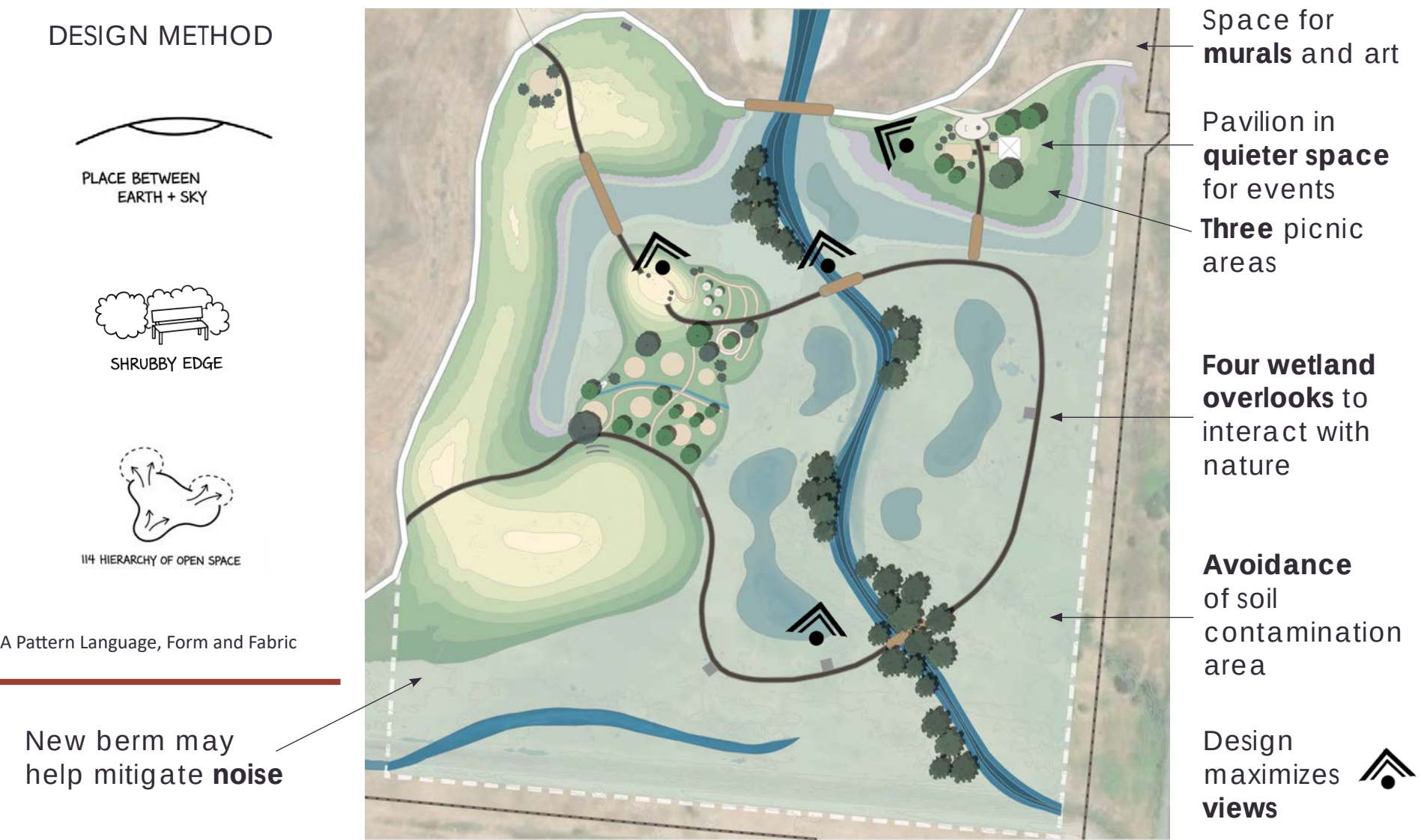


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