BALLONA CREEK GREENWAY PLAN

GREENWAY PLAN

Introduction

The Ballona Creek Greenway Plan describes opportunities to reconnect residents with their creek, create a green corridor of trails and points of access, enhance habitat, mitigate stormwater runoff, redevelop land to improve watershed functions, re-establish riparian areas, and increase the health and sustainability of the region.

The Reach Plans summarize design opportunities in general terms, focusing on trail connections, gathering and entry points, stormwater mitigation, and street design.

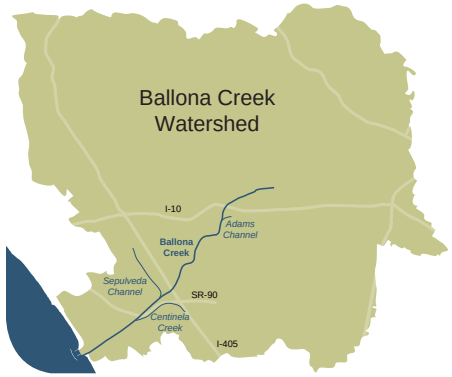
Each Reach Plan features at least one site-specific Early Action Plan, reflecting the ideas of stakeholders developed during design charrettes. Following each Early Action Plan is a Vision Plan that integrates a naturalized stream with the surrounding community. These plans can serve as advance planning for the U.S. Army Corps' Lower Ballona Ecosystem Restoration Feasibility Study.

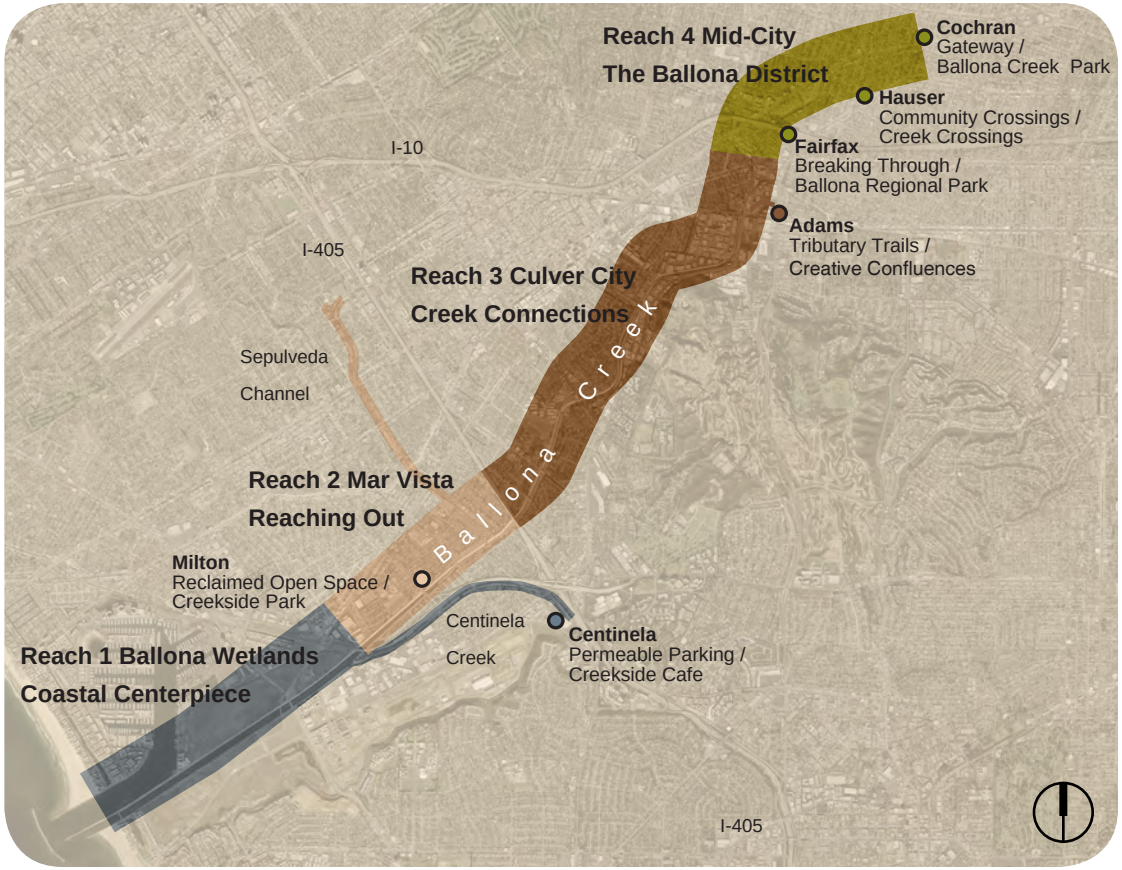
Reach 1: Ballona Wetlands
The Coastal Centerpiece
While the Ballona Wetlands are a defining feature of the Los Angeles coast, the interdependent features that comprise the wetlands as a system are disconnected from each other and highly disturbed. Planning for the restoration of this wetland system is a larger effort outside the scope of the Ballona Creek Greenway Plan. The Plan reflects stakeholder recommendations for access that would complement wetlands restoration.

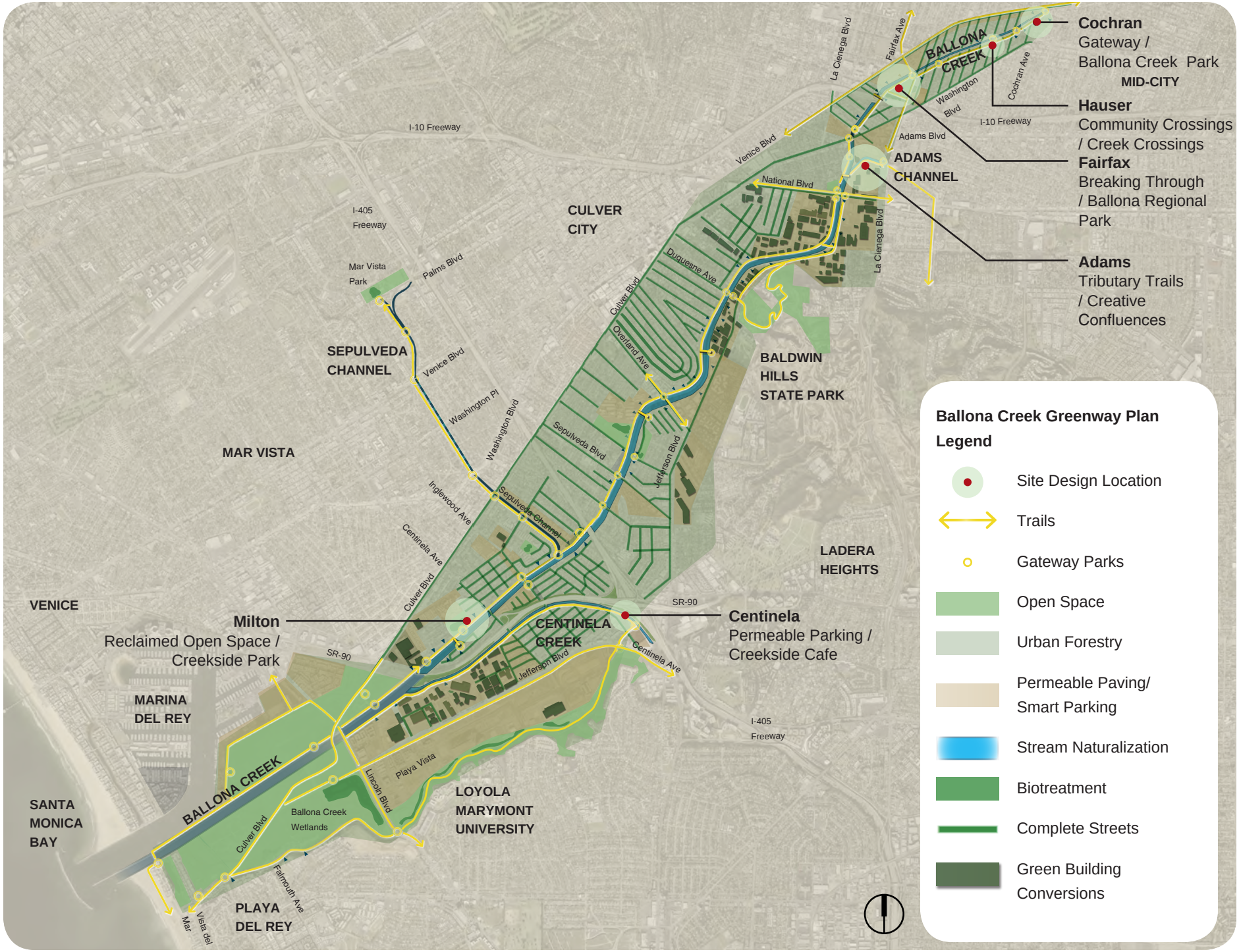
Reach 2: Mar Vista
Reaching Out
Through Mar Vista, Ballona Creek's presence can be enhanced by continuing the Greenway experience into the neighborhoods bordering the creek. Urban forestry, pedestrian enhancements, and extensions of the Greenway landscape are some of the elements that can reinforce connections.

Reach 3: Culver City
Creek Connections
Improving connections to local parks integrates Ballona Creek with the Culver City neighborhoods. The Greenway Plan balances access with privacy for residents bordering the creek.

Reach 4: Mid-City
The Ballona District
The under-utilized Mid-City reach of Ballona Creek can be redefined by enhancing its creek-side character with distinctive native plants, landscape treatments, and trails that connect and beautify neighboring residential and business districts.






Cochran
Gateway / Ballona Creek Park
MID-CITY
Hauser
Community Crossings / Creek Crossings
Fairfax
Breaking Through / Ballona Regional Park
Adams
Tributary Trails / Creative Confluences
Milton
Reclaimed Open Space / Creekside Park
Centinela
Permeable Parking / Creekside Cafe
BALLONA CREEK
CENTINELA CREEK
ADAMS CHANNEL
SEPULVEDA CHANNEL
CULVER CITY
BALDWIN HILLS STATE PARK
MAR VISTA
LADERA HEIGHTS
VENICE
MARINA DEL REY
SANTA MONICA BAY
LOYOLA MARYMONT UNIVERSITY
PLAYA DEL REY
Ballona Creek Wetlands
Mar Vista Park
I-10 Freeway
I-405 Freeway
SR-90
La Cienega Blvd
Fairfax Ave
Washington Blvd
Cochran Ave
Adams Blvd
Venice Blvd
National Blvd
Duquesne Ave
Culver Blvd
Overland Ave
Palms Blvd
Washington Pl
Sepulveda Blvd
Jefferson Blvd
Inglewood Ave
Sepulveda Channel
Centinela Ave
Playa Vista
Lincoln Blvd
Fairmouth Ave
Mar Vista del
Ballona Creek Greenway Plan Legend
Site Design Location
Trails
Gateway Parks
Open Space
Urban Forestry
Permeable Paving/ Smart Parking
Stream Naturalization
Biotreatment
Complete Streets
Green Building Conversions

Core Approaches

Pervious Paving

Pervious Paving replaces impervious surfaces throughout a range of land uses to increase stormwater infiltration and reduce flooding.

Biotreatment

Biotreatment relies on the action of soil and plant microorganisms to break down pollutants. Biotreatment works well in bioswales, detention or retention basins, subsurface trenches, and treatment wetlands.

Urban Forestry and Greenway Landscape

Tree canopies reduce the urban heat island effect, increase infiltration of stormwater, beautify communities, and enhance habitat. Native landscaping reduces dependence on irrigation and provides habitat for birds and small animals.

Channel Naturalization

Channel naturalization removes concrete from the channel bottom, accommodating restoration of some stream function. The Lower Ballona Ecosystem Restoration Feasibility Study will explore channel naturalization potential in detail. The Greenway Plan provides a preliminary hydraulic modeling evaluation of a naturalized channel.

Combined Approaches

Complete Streets

Complete Streets provide multiple benefits for pedestrians, cyclists, automotive traffic, stormwater management and habitat enhancement. Features in a typical Complete Street may include conversion of some parking spaces to traffic-calming “bulb-outs” and/or bioswales or rain gardens; consistent tree canopy; permeable paving in parking zones; and bicycle “sharrows” indicating the appropriate path of travel for bicycles in the traffic lane.

Street Narrowing

Street Narrowing can create space for Complete Streets features or channel greenway improvements. Complete or partial street closures are another tool to improve open space and connections.

Smart Parking

Smart Parking concepts reduce the negative visual and watershed impacts of parking areas by increasing permeability and biotreatment and/or reducing the footprint of parking area square footage.

Green Building Conversions

Existing structures can be retrofitted to capture and use rainwater, increase permeability, and connect to the surrounding landscape. Redevelopment zones can factor these improvements into new construction.

Restoration Planning

Channel Design

Naturalization of Ballona Creek has long been considered an impossibility. Extensive development to the edges of the channel’s right-of-way limits restoration of the historical floodplain. Observations of partially channelized streams and examples of partial naturalization of urban waterways offer clues to returning some stream functions to Ballona Creek.

To maintain existing levels of flood protection while converting from a concrete channel to one with a natural bottom with some riparian/wetland vegetation requires increasing the overall cross-sectional area of the creek and channel. Increasing the cross-section is achieved by widening the channel within the right-of-way, adding low floodwalls, and/or increasing the width of the right-of-way. Another factor that impacts flooding are constrictions such as bridges. Widening the channel typically requires bridge replacement to eliminate the constriction.

The Los Angeles Regional Curve (2006) developed by Natural Channel Design, Inc. was used for initial channel naturalization planning. The regional curve plots the relationship between watershed size and channel width, depth, and area for waterways at bankfull flows within the same climatic and geographic area as Ballona Creek. The regional curve was used to determine the width of the channel bottom in the development of the Greenway Plan and site designs presented herein.

(Top) Channel naturalization re-establishes riparian habitat while trail and right-of-way landscape provide upland habitat and recreational access.

(Left) A typical Complete or Green Street enhances safe pedestrian and bicycle access through the traffic calming effects of a continuous tree canopy, curb extensions and marked shared lane markings. Curb extensions double as rain gardens for the treatment of stormwater runoff.

(Right) Urban Forestry and native plants improve habitat connectivity for birds while creating pocket parks for residents. Street Narrowing slows traffic, enhancing the pedestrian zone.

The Ballona Creek Greenway Plan uses these common BMPs to achieve water quality, habitat, livability and sustainability goals. They can be combined and applied to specific land uses that affect watershed function.

Hydraulic Modeling

In 2008, initial channel naturalization cross-sections for four reaches were developed using Manning's Equation as a reference for estimating channel capacity. Cross-sections for the upper two miles of the creek (National Boulevard, Culver City to Cochran Avenue, Mid-City), were then developed by Restoration Design Group for flood modeling. This preliminary modeling effort evaluated the existing conditions and a proposed natural bottom channel for three design storm conditions:

1959 As-Built Design Flows: The creek's 1959 As-Built plans indicate the volume of runoff the channel was designed to convey. It is not known if the channel was designed to convey a 100-year storm (a storm with a 1 percent chance of occurring in any year) or 50-year storm (2 percent chance of occurring). It should be noted that upstream of the channel and some areas on tributaries, fall within the 100-year floodplain. FEMA maps indicate that the right-of-way of part of the channel floods during the 100-year storm.

2008 LBERF Flows: The U.S. Army Corps updated the 100-year storm calculations in 2008 as part of the Lower Ballona Ecosystem Restoration Feasibility Study (LBERF). Better data and new methods for calculating runoff may reflect changes from the 1959 As-Built estimates. The 2008 LBERF data reflect the federal government's standard for flood protection.

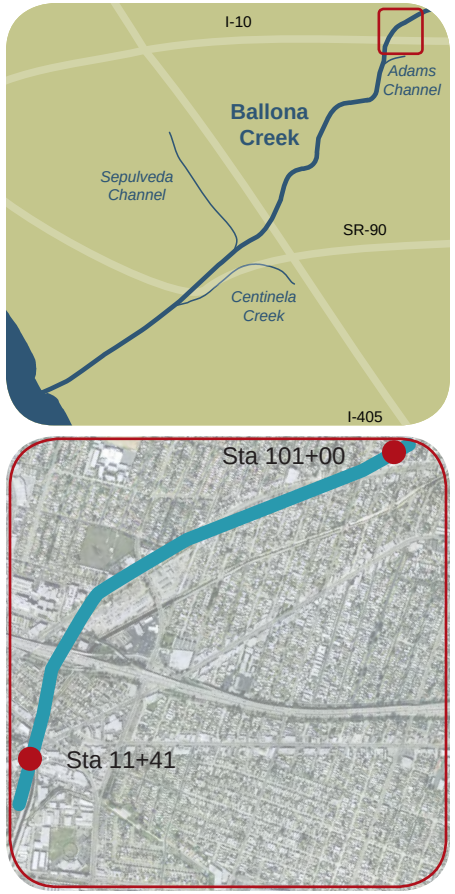
1968 County Capital Storm: While the Capital Storm for Ballona Watershed is in the process of being updated, the calculations performed in 1968 remain the current standard. These standards were used during planning to evaluate the capacity of both the existing and proposed channel conditions.

Initial findings confirm that designs proposed for the creek from National Boulevard to Cochran Avenue can contain the 1959 As-Built design flows. When evaluating the LBERF 100-year storm, flows overtop the channel in a small area around Burchard Street. Overtopping could be prevented by modifying area flood walls and Burchard Bridge elevations. Containing the 1968 Capital Storm, however, is challenging not only for the naturalization design, but also for the channel in its current condition; in either scenario, additional flood storage is needed. The lower water surface elevations of the Capital Storm in naturalization cross-sections result from replacing existing low clearance bridges with free-spanning bridges.

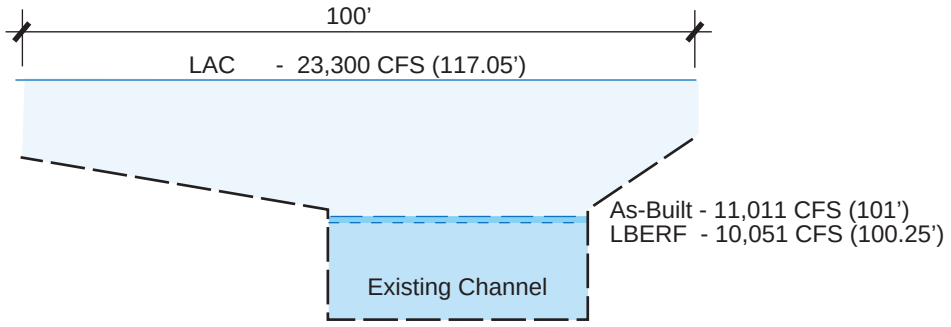
Preliminary modeling focused on extreme flood conditions in order to ascertain the value of more detailed restoration design and planning. Initial results suggest further analysis is warranted. The potential flood protection role of adjacent public land, such as large DWP maintenance yards that could act as flood storage, should be considered in future modeling.

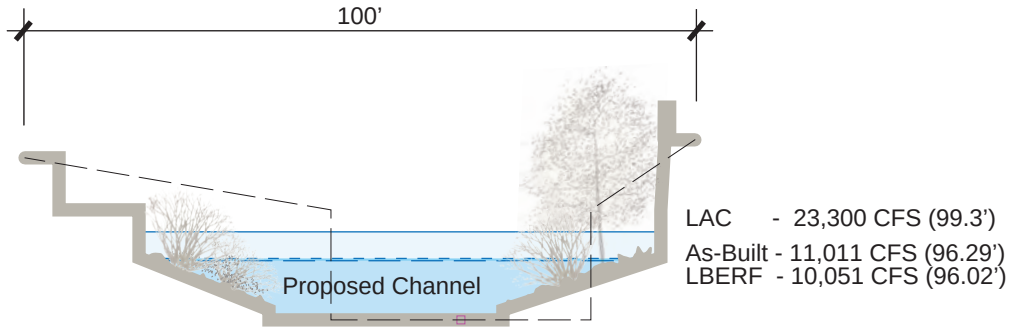
The Vision Plans, which propose naturalized channels for the Mid-City and Culver City reaches (pp.52-53, 58-59, 62-63, and 66-67) incorporate the modeled channel cross-sections into their designs. The Vision Plans for Mar Vista and Ballona Wetlands (pp. 38-39 and 44-45) use the conceptual channel cross-sections estimated with Manning's Equation as the preliminary reference for naturalization.

Modeling results are described in detail in the Appendix.

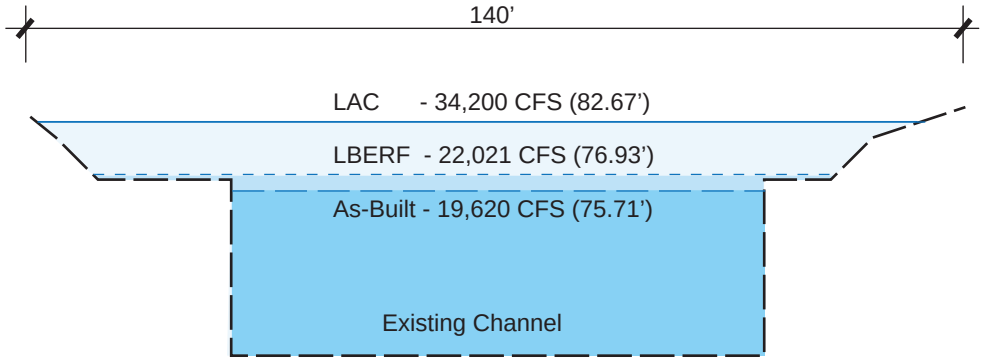


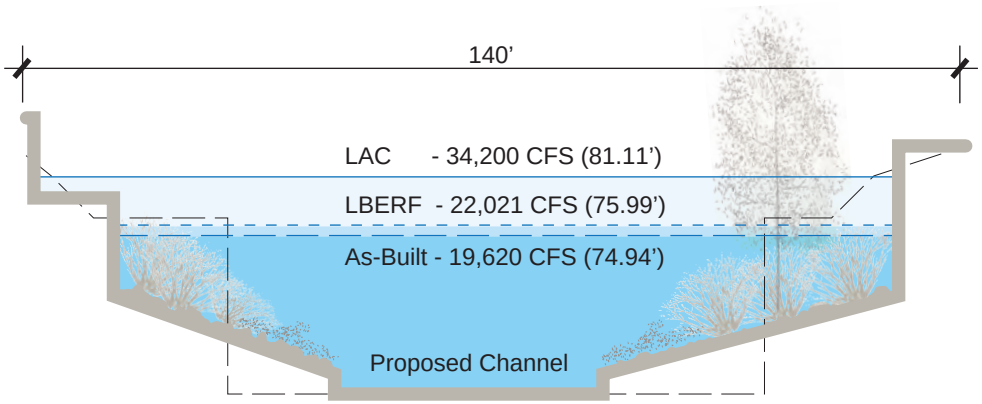
Location of Modeled Reach





Modeled Water Surface Elevations, Existing and Proposed Channels
Station 101+00 near Cochran Ave





Modeled Water Surface Elevations, Existing and Proposed Channels
Station 11+41 near Sentney Ave

Legend

Existing Channel (no vegetation)

Proposed Naturalization Channel with vegetation

Modelled Water Surface Elevations for the Following Flows:

1959 As-Built Design Storm

1968 Capital Storm

2008 LBERF Design Storm

Cross Section Comparison: Existing and Proposed Channel Geometries and Water Surface Elevations

REACH 1 BALLONA WETLANDS

Ballona Wetlands: Coastal Centerpiece

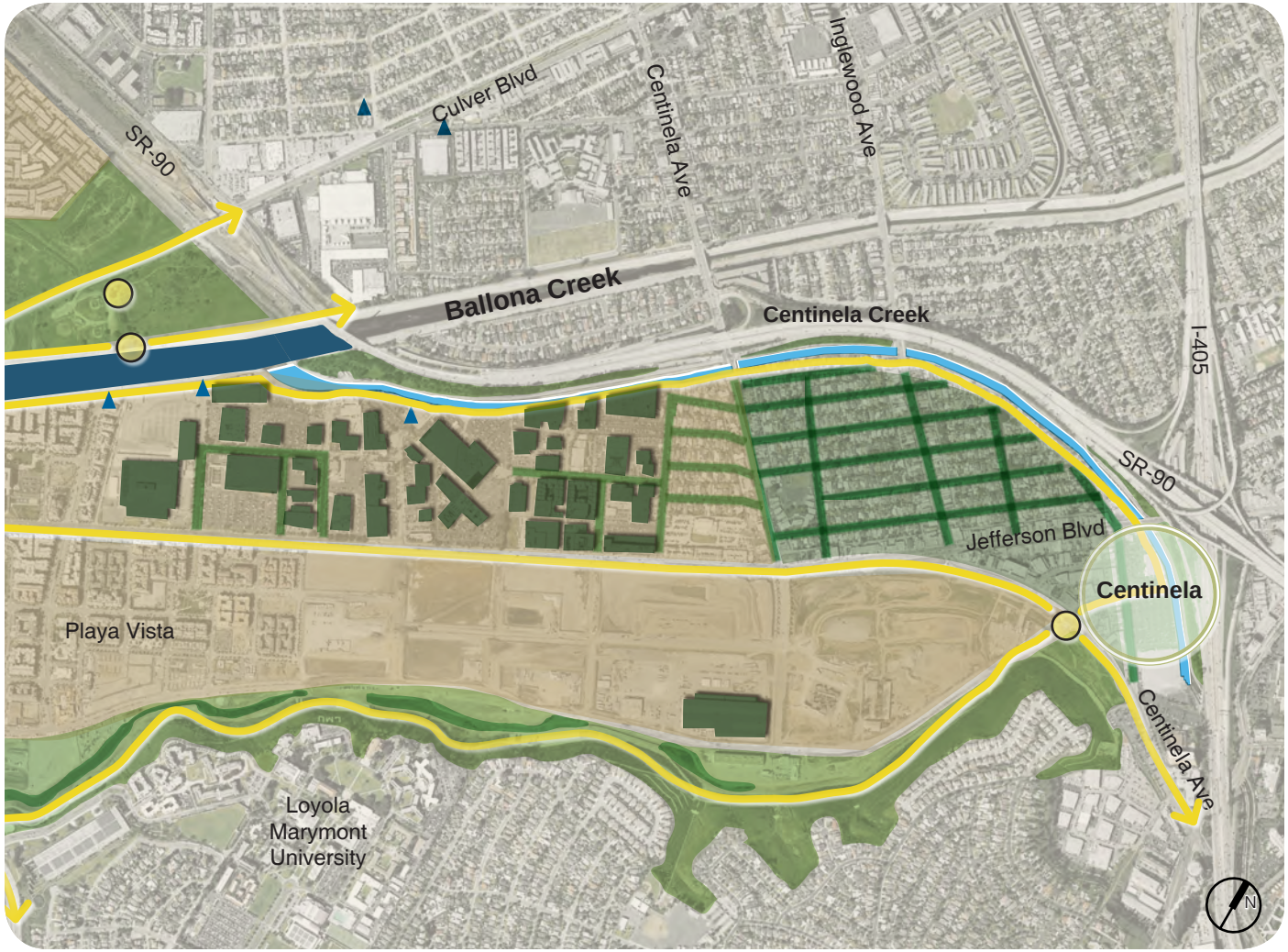
The Ballona Creek Greenway Plan begins at the downstream end with the Ballona Wetlands. Wetland restoration by the State Coastal Conservancy, Department of Fish and Game, and partner agencies will enhance public access and connections to adjacent remnant habitats. Here the coastal bike trail along the Pacific Ocean connects to the Ballona Creek Bike Path. The Greenway Committee identified opportunities for a series of walking and/or bicycle trails throughout the wetlands complex and nearby neighborhoods that could reinforce the wetlands as the coastal centerpiece of Los Angeles.

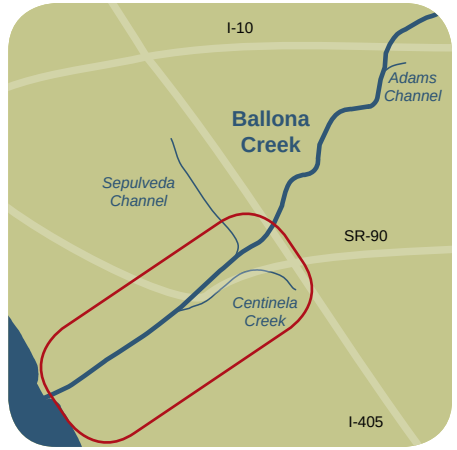
New trails create safe pedestrian and bicycle access on Culver Boulevard and Cabora Road and increase multi-modal options for commuters and residents. The trails provide views across the wetlands and of the beautifully restored bluffs.

The Cabora Road Trail provides new bicycle connections along either Lincoln Boulevard or the bluffs to LMU and through Playa Vista to Centinela Avenue and a new Centinela Creek Path. Signs and designated vista points enhance the route. The Centinela Creek Path connects to a new trail on Ballona Creeks's south bank, connecting to the Playa Vista neighborhood.

Upstream, beyond the project area, the Centinela Creek path is a Class III route along Centinela Ave until Bristol Parkway, where it is a Class I bike path along the Ballona Creek right-of-way, connecting to La Cienega Boulevard.

The Centinela site design on the following pages includes many of the strategies discussed in the Ballona Creek Greenway Plan.





Reach 1: Ballona Wetlands

Legend

Access

- Access Gateway
- Bicycle / Pedestrian Route
- Bicycle / Pedestrian Bridge

Hydrology

- Creek (Existing Channel)
- Naturalized Creek
- Creek - Culverted
- Storm Drain Outfall Entering Creek

Landscape

- Open Space / Park
- Urban Forestry
- Biofiltration
- Pervious Paving
- Green Roof
- Complete Street
- Site Design Location

Early Action Plan: Centinela Permeable Parking

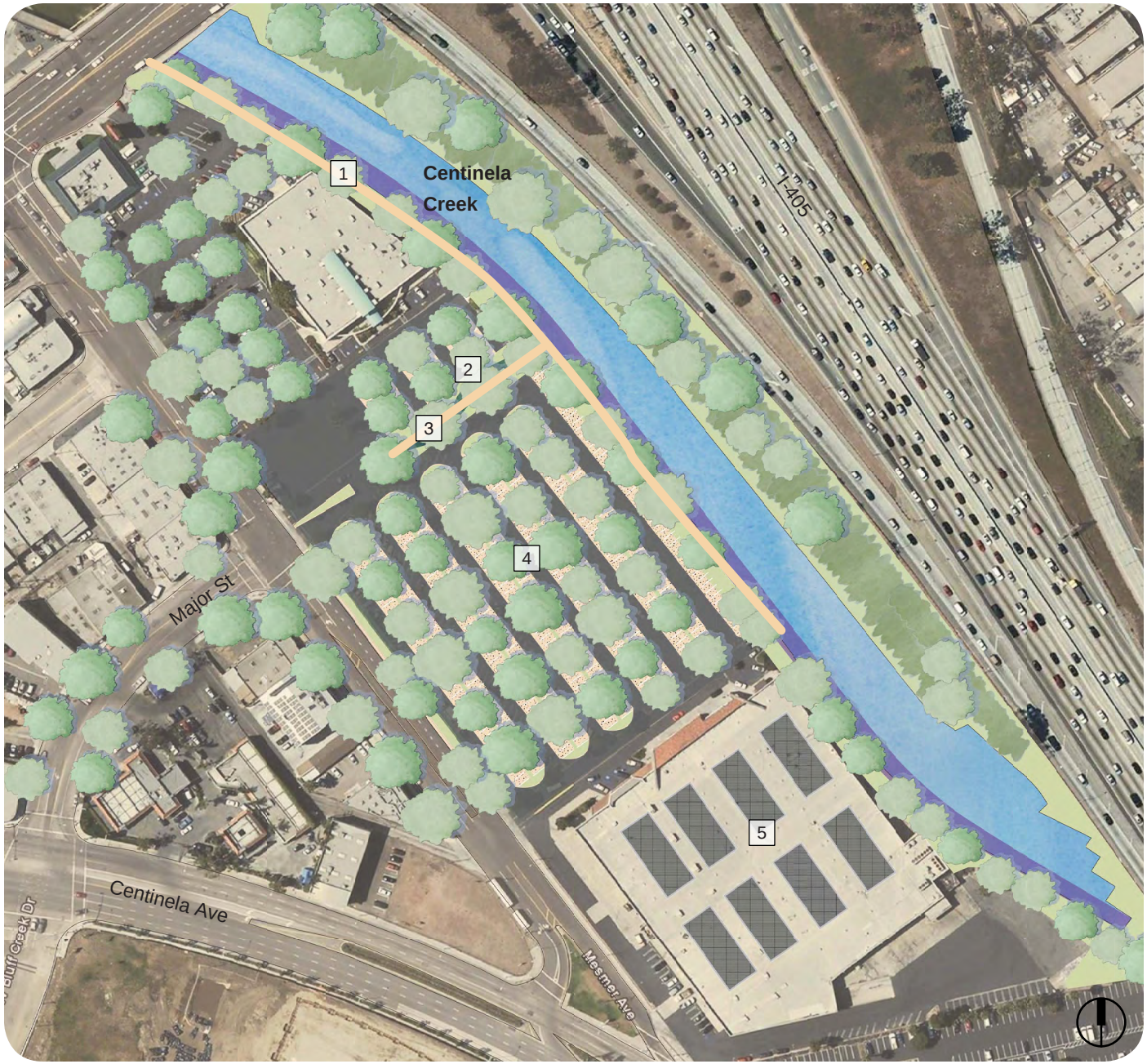
Adjacent to the Centinela Creek Channel is a shopping center with a supermarket, medical center, and restaurant. Across the channel are rights-of-ways for the flood control district and Caltrans. Prior planning efforts by others included concepts for diverting low flows for treatment into this site.

The Centinela Permeable Parking concept prescribes alterations that could enhance the uses of the parking area, while enhancing water quality. Driving lanes remain paved with asphalt, while parking stalls are converted to permeable pavement. A bioswale with native plants is centered between parking stalls to treat runoff. The concept may require cooperation from the planning department to reduce required parking.

The Centinela Permeable Parking concept emphasizes alternative modes of transportation. Bicyclists are welcomed on-site with a designated path leading to the Centinela Creek Trail. The right-of-way along the channel is planted with native plants to create new habitat and enhance the creek experience.

Existing Conditions: Aerial Photograph

Early Action Plan: Plan View



Legend

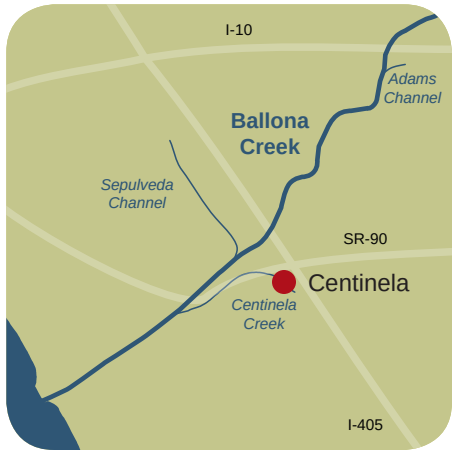
1 Centinela Creek Trail

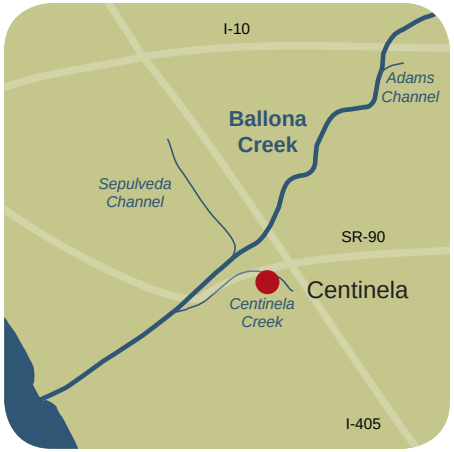
2 Bioswale

3 Bike Access

4 Permeable Parking

5 New Solar Panels





Legend

1 Naturalized Centinela Creek

2 Centinela CreekTrail

3 Biotreatment

4 Lawn

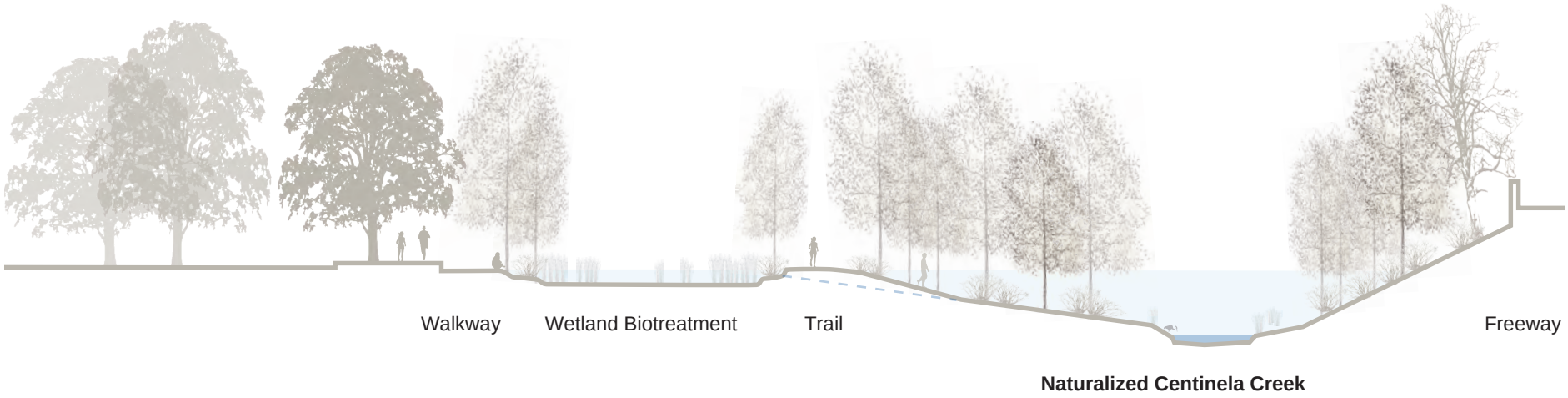
5 Permeable Plaza

6 Cafe

7 Parking Structure

8 Solar Panels

Vision Plan: Plan View



Vision Plan: Section

Vision Plan: Centinela Creekside Cafe

The Creekside Cafe Vision Plan explores the potential for re-thinking the existing shopping center in a way that enhances the watershed, provides a new public space, and meets the needs of the commercial property owner.

Parking has a significant impact on watersheds and viewsheds. Reducing the parking footprint with parking structures allows for a greater diversity and intensity of uses.

A new parking structure creates space to naturalize Centinela Creek, treat stormwater runoff, create public plaza and play space for shoppers and their families, and revitalize the shopping center.

For a commercial property owner, widening the right-of-way of a creek may seem counter-intuitive but it creates space for amenities that will in turn draw visitors to the site. Naturalizing Centinela Creek can be part of a business strategy to create a creekside focal point.

The creek's natural beauty attracts shoppers and enhances property values. Widening the creek right-of-way creates habitat and enhances flood control. The naturalized creek maintains a trail connecting to Ballona Creek, while a bike route from the shopping center connects to a trail along Cabora Road, benefitting students and staff at Loyola Marymount University, residents at Playa Vista, and others with regional destinations.

The creekside cafe is the center for socializing as well as a staging area for trail users. Children and nature buffs venture down the banks to a naturalized Centinela Creek. A biotreatment facility treats runoff and forms a buffer around a recreational lawn area.

These park improvements create an attractive destination to shop and linger. The Creekside Cafe Vision Plan improves habitat, water quality, community connectivity, and opportunities.

Mar Vista: Reaching Out

The new Greenway through Mar Vista reaches out into the community, prioritizing people and parks; reclaiming streets for pedestrians and bicyclists; supporting sustainable communities; creating recreational opportunities; and enhancing existing parks.

Neighborhood access gateways and pocket parks at entries to Ballona Creek, invite residents and visitors to the Greenway. Since Greenway planning began in 2006, many gateways have been opened or are under construction.

The Mar Vista plan reclaims streets as open space. Portions of Culver Boulevard, Milton Street, and Rosy Circle are narrowed for landscape, paths, or future rights-of-way, either by limiting parking or creating one-way streets. Milton Street between Mascagni Street and Westlawn Avenue is closed to create new parkland connecting Mar del Rey Middle School's yard to the channel. A new pedestrian bridge connects an isolated neighborhood with the new park and provides a shortcut to school.

Inglewood Avenue becomes a Complete Street, creating a walkable and bikeable street that treats stormwater pollution.

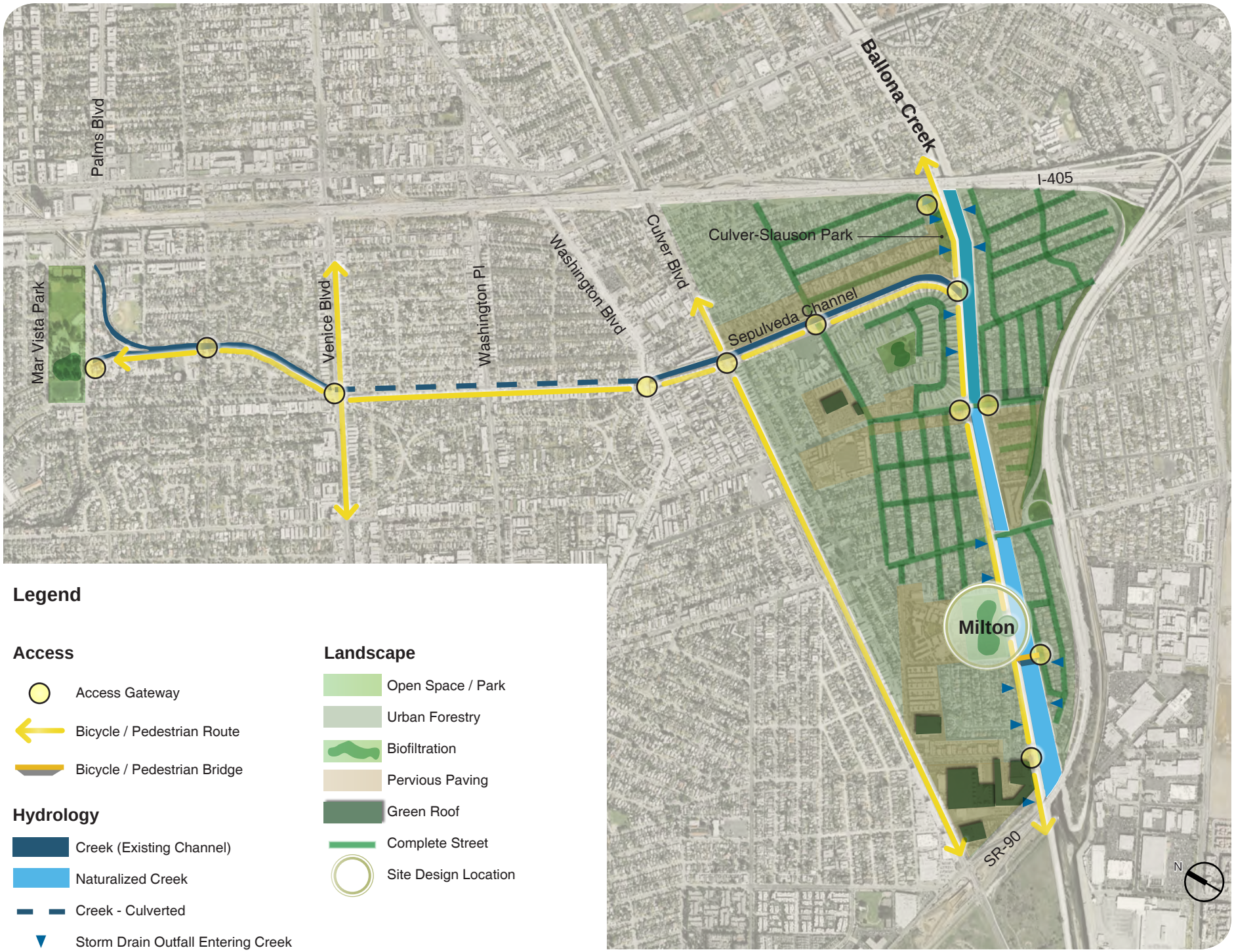
The Mar Vista Gardens residences becomes a sustainability showcase retrofitted with native and drought-tolerant plants, permeable paving on its private streets, driveways, and parking areas, green roofs and solar technology, and site drainage redirected into its central park.

The edge between Culver-Slauson Park and Ballona Creek is softened, creating openness and accessibility. A bike/pedestrian path along the Sepulveda Channel marks a new major entry point to the creek.

Ballona Creek's floodplain is integrated with adjacent parkland. The right-of-way is widened from Milton to the Centinela gateway. Appropriate native planting provides upland habitat for birds in the estuary.

Crosstown Connections: Sepulveda Channel Bikeway

Under the Ballona Creek Greenway Plan, the Sepulveda Channel provides a mixed-class bikeway that connects the Ballona Creek Bike Path to Palms Boulevard in West Los Angeles. This route benefits UCLA and LMU commuters as well as others seeking safe routes to Playa del Rey and downtown. Between Ballona Creek and Braddock Drive, a vegetated loop trail doubles as a bike path and exercise route. The Sepulveda Channel Greenway connects to a Class I bike path on Culver Boulevard and a Class II bike lane on Venice Boulevard. At Washington Boulevard, bicyclists exit the Bikeway and along McLaughlin Avenue join a sharrows-marked Bicycle Boulevard. McLaughlin Avenue is modified to become a Complete Street. At Venice Boulevard, users re-enter the bikeway. The bike path terminates at the Mar Vista Recreation Center on Palms Boulevard. Here users can continue on to Westwood, Santa Monica Boulevard, or Brentwood.



Legend

Access

- Access Gateway
- Bicycle / Pedestrian Route
- Bicycle / Pedestrian Bridge

Hydrology

- Creek (Existing Channel)
- Naturalized Creek
- Creek - Culverted
- Storm Drain Outfall Entering Creek

Landscape

- Open Space / Park
- Urban Forestry
- Biofiltration
- Pervious Paving
- Green Roof
- Complete Street
- Site Design Location

Early Action Plan: Milton / Reclaimed Open Space

The Early Action Plan demonstrates how rethinking streets can improve pedestrian and bicyclist access, enhance the urban forest, mitigate stormwater, and create open space.

Narrowing wide streets along Ballona Creek such as Rosy Circle create a more inviting creek-side environment. Using Complete Streets detailing - bioswales, trees, enhanced pedestrian areas - is one of the best redesign approaches. Narrowing the street allows for expansion of upland areas along the creek. Upland native vegetation complements views of Ballona Creek, recreating a sense of the natural environment. The creekwalk along Rosy Circle leads to a pedestrian bridge connecting an isolated residential area to Marina del Rey Middle School and its new creek-side park.

Mascagni Avenue and Westlawn Avenue also benefit from a Complete Streets redesign.

Existing Conditions: Aerial Photograph

Closing Milton Street between the school and creek affords an opportunity to create a park fronting Ballona Creek.

This shared school and public space is used for the school during school hours and for the public on evenings and weekends. A dual-fence system controls access to play areas. On the public park side, a small plaza allows parents to gather and watch children play, offers space for a farmers' market, and accommodates picnics and other activities. An equipment room provides storage and rest rooms. Seating along the fields is terraced down the outer banks of the flood control levee.

Milton Street is closed for one block and some of its right-of-way provides for access and trail continuity. Native vegetation maintains the Greenway aesthetic and improves habitat.

Early Action Plan: Plan View

Legend

1 Athletic Fields

2 Lawn

3 Underground Cistern

4 Plaza

5 Equipment Room

6 Ballona Creek Bike Path and Maintenance Access

7 Pedestrian Bridge

8 Terraced Seating

9 Ballona Creek Bike Path

10 Creek Walk

11 Complete Street

Legend

1 Athletic Fields

2 Underground Cistern

3 Permeable Playground

4 Jogging Track

5 Plaza

6 Ballona Creek Bike Path

7 Native Landscape

8 Widened Right-of-Way

9 Pedestrian Bridge

10 Naturalized Creek

11 Creek Walk

12 Complete Street

Vision Plan: Plan View

Vision Plan: Milton / Creekside Park

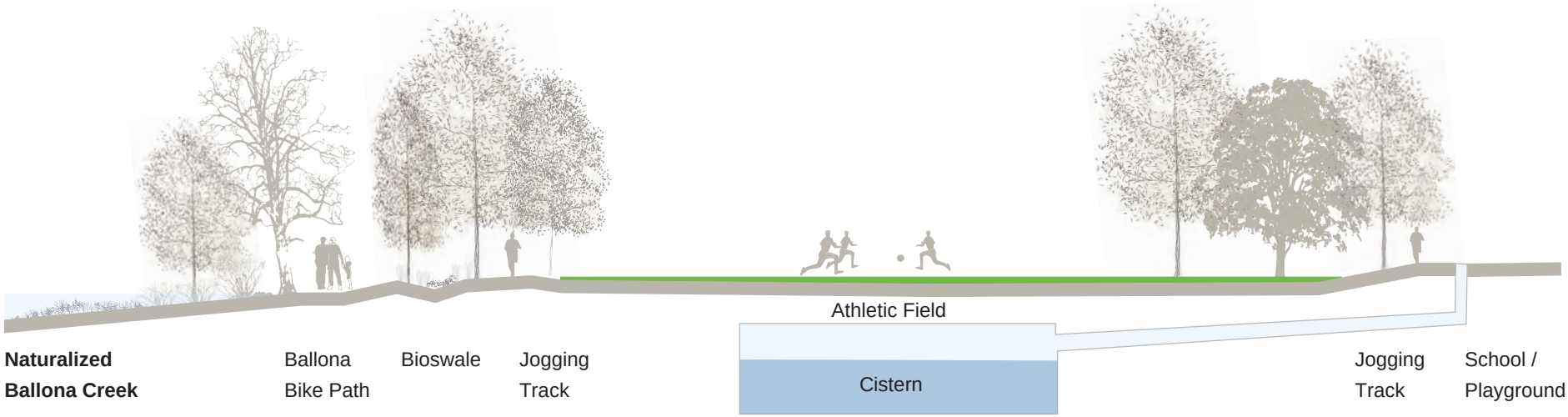
The Greenway's naturalization scenario at Milton utilizes an expanded right-of-way to increase the flood capacity necessary in a naturalized channel and creates floodable park area. The design engages visitors in diverse park experiences and brings users to Ballona Creek.

Vegetation in this tidally-influenced reach is characterized by salt-tolerant plants: mulefat, saltgrass, and saltbush. Above the marsh floodplain, coastal wetland plants migrate upstream and colonize the reach.

From the upland creek banks, trails lead down to the creek providing direct creek access from the new park.

For the school, Ballona Creek is now an outdoor learning laboratory, where children can conduct water quality

Vision Plan: Section A "Ballona Creek"



Vision Plan: Section B "Creekside Park"

monitoring tests, observe wildlife, and study sediment movement.

While habitat and flood protection are managed within the channel, stormwater quality is improved by using BMPs throughout the neighborhood. Bioswales within new Complete Streets capture and infiltrate stormwater. Permeable paving and bioswales at the school collect runoff and transport it to a cistern. Cistern water is used to augment irrigation of the joint school-park playing field.

Rosy Circle becomes a Complete Street with a creek walk, bioswales, and sharrows. A new pedestrian bridge provides a direct connection from an isolated residential neighborhood to the middle school.

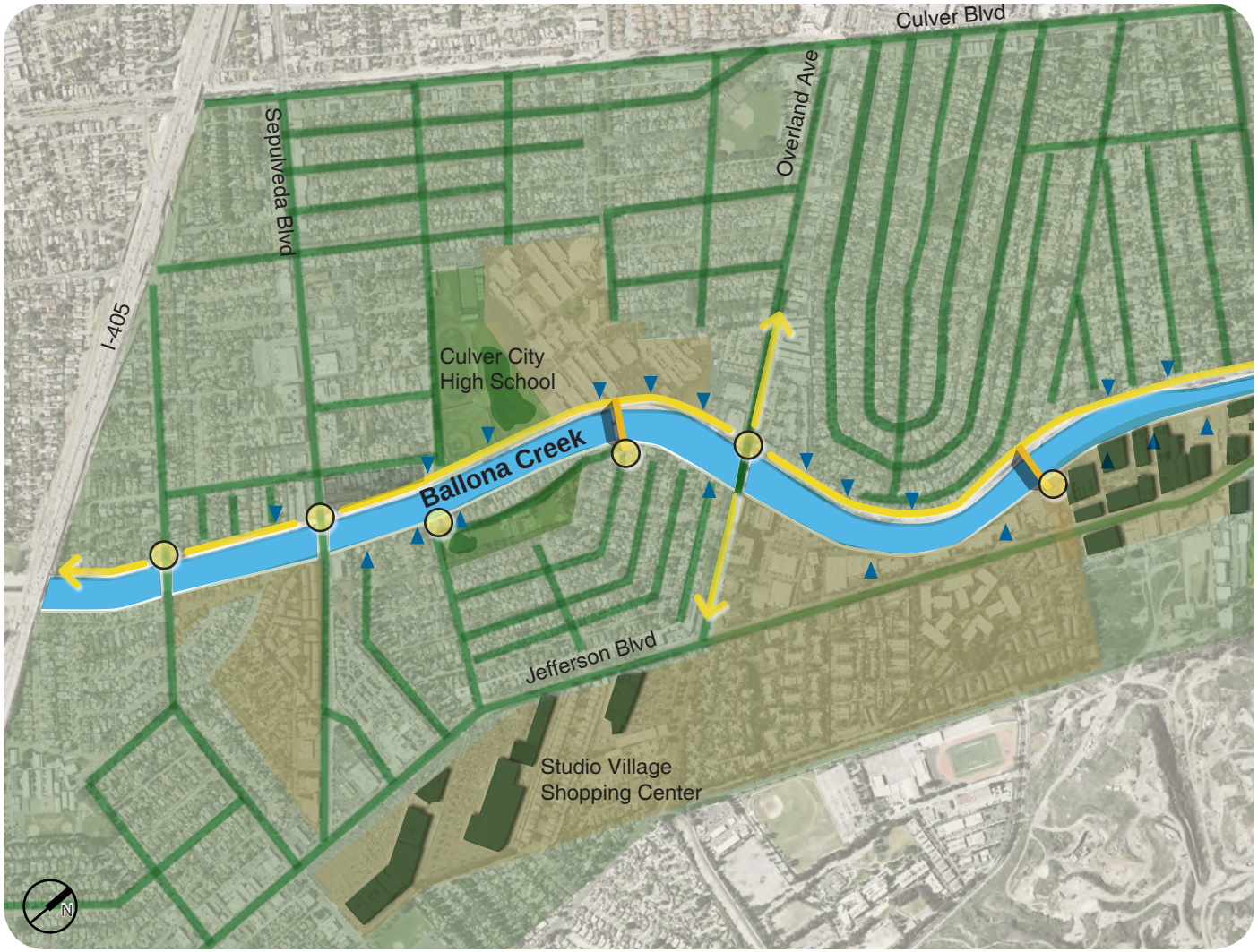
Oak, sycamore, toyon, elderberry, mulefat, sage, buckwheat and native grasses populate the site.

Culver City: Creek Connections

The Greenway Committee endorses Culver City's Ballona Creek and Trail Focused Special Study (BCTFSS) projects. The BCTFSS plan is included in the Appendix. Public discourse and sensitivity to public safety and the privacy of properties abutting the creek are paramount. Beyond the BCTFSS, the Ballona Creek Greenway Plan focuses on creek and park connections through Culver City.

The Greenway Committee recommends working closely with public safety agencies to ensure that the bike path is a safe and pleasant route, and that neighboring communities are protected from illicit activities.

In this concept, bicycle access points provide easy neighborhood access and



prevent riders from being isolated on the bike path. Maintaining and increasing access points should be a high priority.

Along the right-of-way, plantings and bike path improvements create shade and attract birds and beneficial insects. Signage addresses wayfinding, regulations, and site features. Underground filtration and surface biotreatment intercept and treat stormwater before it enters the creek.

Major streets are retrofitted with bike-friendly improvements and Complete Street technologies, improving safety, shade, and water quality, while increasing connections between the creek and downtown Culver City's many amenities.

Reach 3: Culver City

Legend

Access

- Access Gateway
- Bicycle / Pedestrian Route
- Bicycle / Pedestrian Bridge

Hydrology

- Creek (Existing Channel)
- Naturalized Creek
- Creek - Culverted
- Storm Drain Outfall Entering Creek

Landscape

- Open Space / Park
- Urban Forestry
- Biofiltration
- Pervious Paving
- Green Roof
- Complete Street

The Studio Village Center at Sepulveda and Jefferson Boulevards is retrofitted with bioswales and permeable paving. Special areas with concrete are designated for heavy delivery vehicles. Street improvements between the community, creek, and shopping center encourage locals to walk or ride to shopping. Complete Streets present possibilities for community redevelopment zoning resulting in a commercial district alongside the creek.

Following the lead of a concept presented in the Ballona Creek Watershed Management Plan, the high school's field is retrofitted to infiltrate runoff from the surrounding community. Liability issues pertaining to off-site runoff on school grounds are resolved through partnership agreements between the City, County, and School District. Streets that dead-end at the creek incorporate Complete Streets bioswales and infiltration designs.

Projects that focus on permeability accompany this reach of the creek. Locations include the county library, middle school, and high school. Culver City's Ballona Creek entry is enhanced with native plants and retrofits of the public library parking lot and landscape. Seating areas at the library encourage patrons to enjoy reading outdoors in a native garden setting.

Beyond Duquesne Avenue, Ballona Creek crosses through residential neighborhoods. Fencing and regrading of the right-of-way increase privacy for backyards on the creek. Public access is focused at newly revegetated street end access points. Landscape enhances both banks of the creek; the bike path remains on the north bank.

A Baldwin-to-Ballona Creek loop trail overlaps with the bike path starting from Rodeo Road to Duquesne Avenue. This loop trail takes hikers up to the Baldwin Hills overlook.

Jefferson Boulevard, which parallels the creek, is upgraded with shade trees, creek-side bicycling and strolling on a new sidewalk. A native grassland landscape provides visual interest in the right-of-way. Acquisition of a small parcel at Rodeo Road creates a pocket park that can be converted to additional channel right-of-way for long-term restoration.

Between Ince Boulevard and Syd Kronenthal Park, an industrial zone parallels both sides of the channel. These properties are retrofitted with green roofs or solar panels, and runoff is captured, filtered, and where possible, infiltrated via permeable paving and swales. Increasing the effective permeability of private property in this area is another plan priority.

Moving upstream, where the Adams Channel drains to Ballona Creek, a triangular pocket park is located adjacent to industrial properties that are walking distance to the future La Cienega Exposition Blue Line station. A small loop trail around the Adams Channel provides active recreation. Long-term, this confluence has the potential to be a major destination with terraced access to natural creeks and wetlands in either an industrial or mixed-use setting.

At Washington Boulevard, the Ballona Creek Bike Path directs pedestrians and cyclists to small businesses.

(facing page) Culver City's projects to enhance the bike path echo the Greenway Committee's goals.

PROPOSED ENTRY TREATMENT AT OVERLAND AVENUE

-BICYCLE AND MAINTENANCE VEHICLE ACCESS
-WINDING PEDESTRIAN PATH, ADA ACCESSIBLE
-NATIVE, DROUGHT TOLERANT TREES & PLANTS
-DECORATIVE FENCE
-ENTRY SIGN

BALLONA CREEK BIKEWAY PROPOSED DESIGN PERSPECTIVES

CITY OF CULVER CITY

September 18, 2007

Lawrence R. MOSS & Associates

Early Action Plan: Adams / Tributary Trails

The concept for this area explores trail and water quality mitigation opportunities in an industrial context. The Greenway Committee often referred to this concept as “Blackwelder” after a nearby street.

The Early Action Plan emphasizes trail connections along Ballona Creek, Adams Channel, and the Baldwin Hills-to-Ballona Trail. The Baldwin Hills-to-Ballona Trail, proposed in the Ballona Creek Watershed Management Plan, is an important link between the creek and the neighboring community. Active recreation features, biotreatment, native landscape, and trail connections are integrated into the Baldwin Hills-to-Ballona Trail.

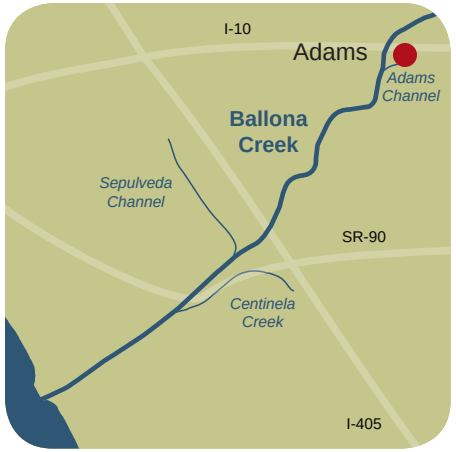
An enhanced crossing at the fork of La Cienega Boulevard and Fairfax Avenue encourages community use of the trail.

Trails and landscape improvements along the top of the channel create a loop with a new pedestrian bridge. The group envisions this trail primarily

Existing Conditions: Aerial Photograph

serving employees of adjacent industrial companies.

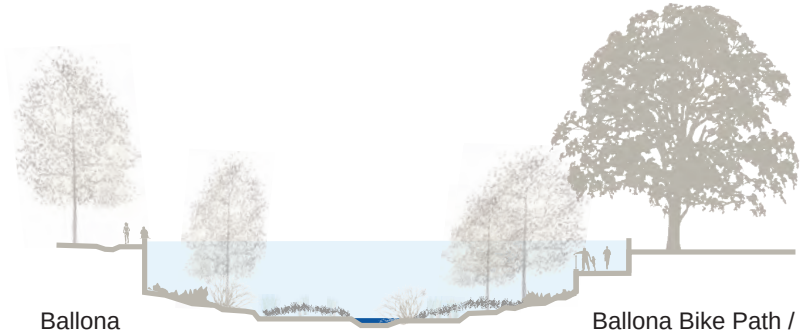
Native plantings create a habitat patch that over time can become part of a wildlife corridor between the Baldwin Hills and Ballona Creek. This concept pumps water from Ballona Creek into a treatment swale and small wetland basin along the top of the right-of-way. This diversifies local habitat and improves the quality of low flows in the channel. Acquisition of currently under-utilized private property in the industrial zone will increase opportunities to implement biotreatment.



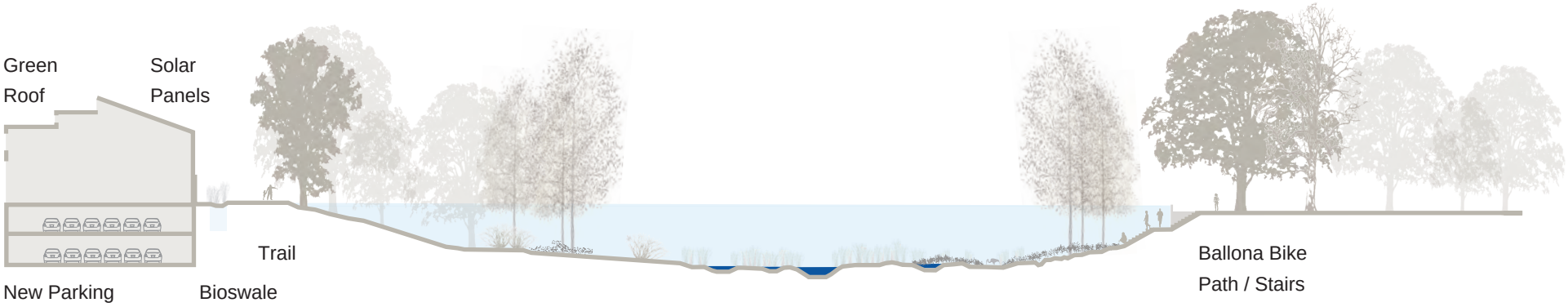
Early Action Plan: Plan View

Legend

1. Ballona Creek Bike Path
2. Biotreatment
3. Pedestrian Bridge
4. Loop Trail
5. Solar Panels
6. Enhanced Crossing
7. Trail to Ballona Creek at Fairfax Ave
8. Park
9. Trail to Baldwin HIlls



Vision Plan: Section A "Ballona Creek"



Vision Plan: Section B "Ballona-Adams Channel Creative Confluence"

Vision Plan: Adams / Creative Confluence

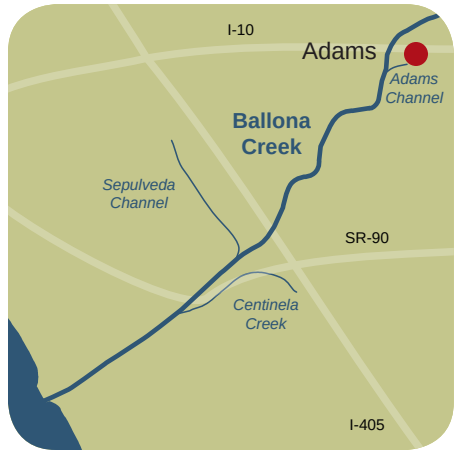
Confluences are meeting places of waters where two streams converge to mix and blend. From this disturbance, new patterns emerge. At this site, Ballona Creek and the Adams Channel meet and mix. Other confluences abound. Culver City meets the City of Los Angeles. The Baldwin Hills-to-Ballona Trail reaches along the transmission corridor to Adams Channel and Ballona Creek and extends northward. Residential housing abuts industrial. The much-anticipated Exposition Line will stop nearby.

The Greenway Committee anticipates transit-oriented development in the area with the advent of the Expo Line. Local planning authorities should strive to have development enhance the availability and quality of adjacent open space. Options to explore include zoning that creates open space along the creek. Developers' open space requirements are committed to an agreed upon zone to maximize multi-use restoration and parkland and exchange air rights for land.

There appear to be inefficiencies in parking and circulation in one of the adjacent industrial areas. Shared docking and subsurface employee parking could create additional right-of-way for Ballona Creek without compromising industrial land use.

Legend

1. Naturalized Ballona Creek
2. Ballona Creek Bike Path
3. Access Stairs
4. Industrial Redevelopment
5. Green Roofs
6. Solar Panels
7. Subterranean Parking
8. Naturalized Adams Channel
9. Enhanced Crossing
10. Trail to Ballona Creek at Fairfax Ave
11. Biotreatment
12. Park
13. Daylighted Creek
14. Trail to Baldwin Hills



Vision Plan: Plan View

Another consideration in industrial areas is the increased runoff caused by large building footprints. Industrial rooftops present opportunities for solar panels and green roofs.

Together with the planning strategies described above, longer-term thinking for Ballona Creek and Adams Channel becomes viable. A long-term restoration scenario proposes naturalizing both channels and widening the right-of-way to re-establish a wetland delta at the confluence of the two creeks. Trails and landscape terrace down to the creek habitat. The culverted reach of the Adams Channel is daylighted through the electrical right-of-way similar to other local examples of transmission corridors running along creeks (e.g., Johnny Carson Park at 7446 Figueroa Street, Burbank). Industrial zoning remains along the creek, integrating infiltration swales, green roofs on north-facing roofs, and solar panels on south-facing roofs. Pedestrian enhancements assume

Mid-City: The Ballona District

The Ballona Greenway Committee proposes a Ballona District concept in Mid-City. The concept blends past and present cultural and natural influences on the landscape.

The scale and layout of this reach lends itself to beautification as a District, where native landscape signals the creek-side zone. This work can be implemented in concert with redevelopment or neighborhood improvement projects.

The Ballona District's amenities provide a framework for community redevelopment, enhanced outdoor leisure, and connections to the rest of Ballona Creek, Ballona Wetlands, and Santa Monica Bay.

At Fairfax Avenue, the Los Angeles Department of Water and Power (DWP) maintenance yards and substation have stormwater BMPs that increase permeability, capture site runoff, and treat incoming flows. Due to major infrastructure blocking the right-of-way, in the short term, bicycling connections are made via Venice Boulevard. Alternatively, a bike path in the channel bottom, similar to the path in the bed of the Arroyo Seco, could maintain a path connection. A channel bottom path would lie under water during storm events. Another bikeway connection follows the DWP electrical transmission lines to the Adams Channel and Baldwin Hills.

Neighborhood access to the creek occurs at every street end. Increased entry points encourage greater use; more users create a safer greenway.

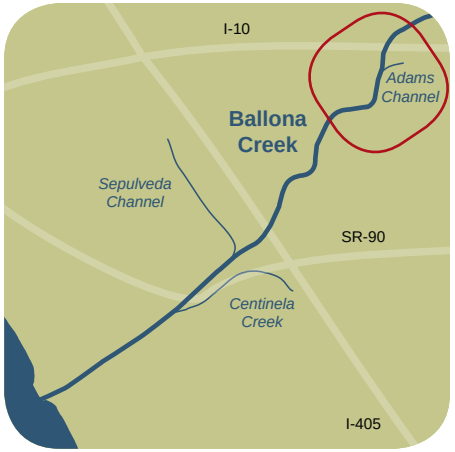
Biofiltration projects along the trail direct runoff to vegetated treatment areas. Continuous Deflection System (CDS) units are installed where storm drains connect. Some of the right-of-way is converted for community garden use.

Pedestrian improvements within Complete Streets concepts at Thurman Avenue, Hauser Boulevard, and Burnside Avenue reclaim the streets for people. Through-traffic slows and the creek trail appears better connected.

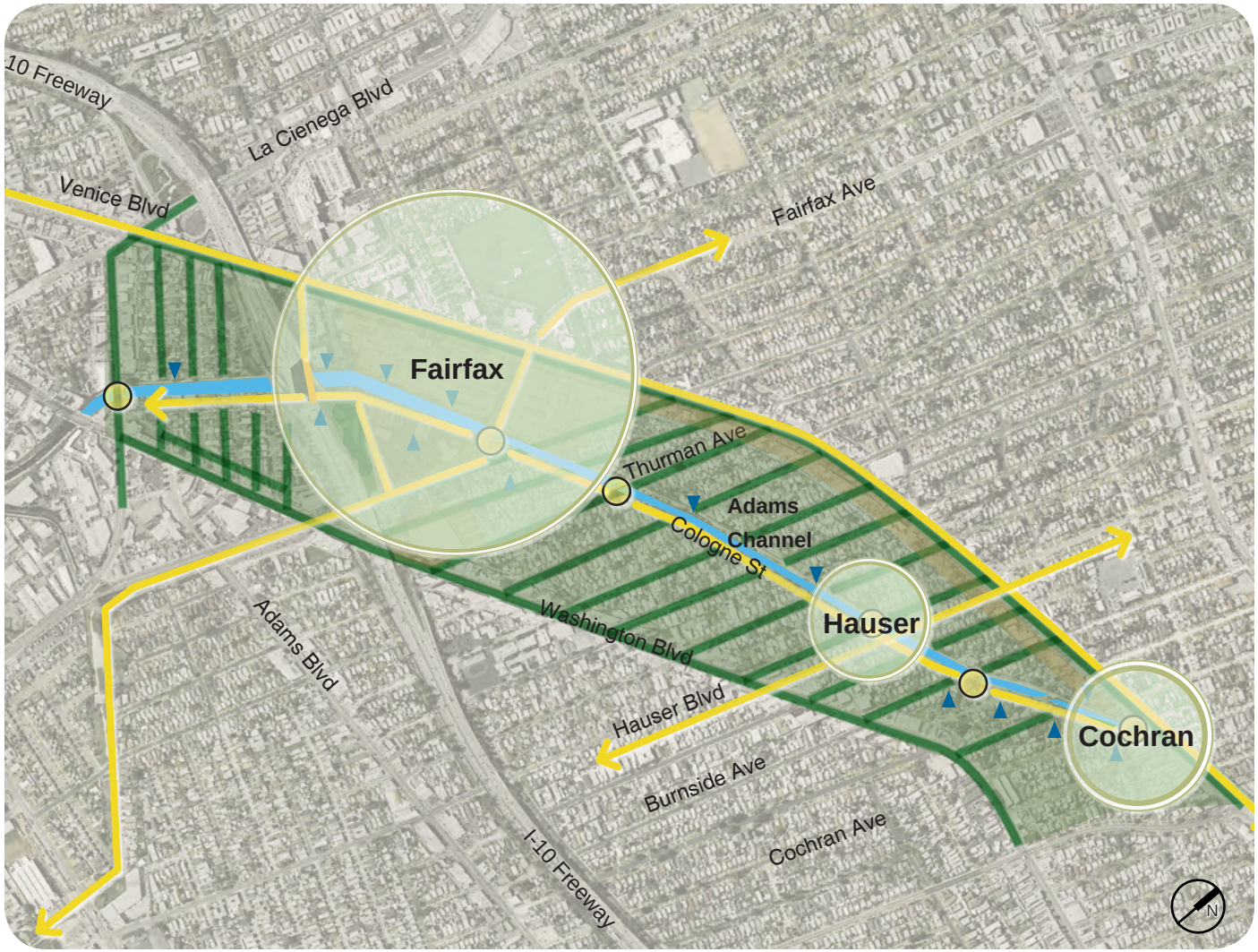
A gateway park at Cochran Avenue signals the creek's presence. Street improvements along Venice Boulevard and residential streets abutting the creek incorporate bioswales and urban forestry to capture and infiltrate runoff before entering Ballona Creek.

In the Early Action Plan, Ballona Creek's flows are redirected into the main channel, providing some visual interest and minor improvements in habitat.

Throughout this reach of Ballona, long-term restoration possibilities are promising. Initial flood modeling supports naturalization of the creek and should be explored further. Additionally, relocation of a maintenance yard at Fairfax can free space for Ballona Regional Park, a significant future destination on the Ballona Creek Greenway. Integrated into the park concept are the multiple benefits of watershed management: stream and floodplain restoration, flood storage, active and passive parkland, and water quality treatment.



Reach 4: Mid-City



Legend

Access

- Access Gateway
- Bicycle / Pedestrian Route
- Bicycle / Pedestrian Bridge

Hydrology

- Creek (Existing Channel)
- Naturalized Creek
- Creek - Culverted
- Storm Drain Outfall Entering Creek

Landscape

- Open Space / Park
- Urban Forestry
- Biofiltration
- Pervious Paving
- Green Roof
- Complete Street

Early Action Plan: Fairfax / Breaking Through

Breaking through or increasing permeability is the theme for this intensely paved reach of Ballona Creek. Permeability, however, does not refer to water alone. It includes permeable paving at Los Angeles Department of Water and Power (DWP) Maintenance yards, and the creation of Complete Streets. It also allows cyclists to break through the barrier of the 10 Freeway to the west, to connect Culver City, the Ballona Wetlands, and the Pacific Ocean.

Breaking through these barriers is a significant undertaking. The Greenway Committee considered several options including laying a bike path in the bed of the creek; terracing the right-of-way down and around freeway piers; cantilevering paths over the channel; and suspending short spans of bicycle bridge from the freeway structure. In the short-term, bicyclists will need to ride Fairfax Avenue to Venice Boulevard and connect to the creek via La Cienega Boulevard, or ride Fairfax Avenue to La Cienega Boulevard and the Adams Channel.

With or without this short-term solution, traffic calming and pedestrian improvements on Fairfax Avenue, Venice Boulevard, and La Cienega Boulevard are priorities.

Existing Conditions: Aerial Photograph

Early Action Plan: Plan View

Legend

1 Ballona Creek Bike Path

2 Biotreatment

3 Permeable Paving

4 Enhanced Crossing

5 Complete Street

6 Park

Legend

1 Naturalized Ballona Creek

2 Ballona Creek Bike Path

3 Biotreatment

4 Multi-Use Fields

5 Seating

6 Stage and Storage

7 Flood Detention

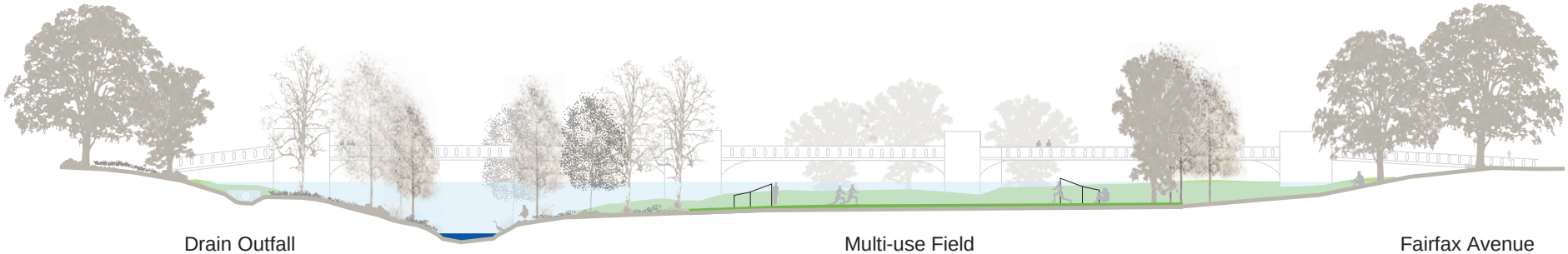
8 Bridge

9 Enhanced Crossing

10 Trail to Adams Channel and Baldwin HIlls

11 Complete Street

Vision Plan: Plan View



Vision Plan: Section through Ballona Regional Park

Vision Plan: Fairfax / Ballona Regional Park

This plan relies on visionary political support and cooperation of the City of Los Angeles Department of Water and Power to combine and manage two maintenance yards jointly. This allows for the southern yard to be transformed into the Ballona Regional Park in a restored floodplain. The park stores floodwaters, provides habitat, and allows for recreational activities, music, and theater.

This park is a significant destination for residents in Mid-City and a regional attraction accessible via public transit and bicycling. The park is the terminus of the Baldwin Hills-to-Ballona Creek Trail. The park concept was developed first in the Ballona Creek Watershed Management Plan. It utilizes a DWP transmission corridor to integrate trails, park elements, and biofiltration technologies.

Ballona Creek's riparian corridor within Ballona Regional Park has room to meander. It would inundate a willow thicket and provide essential habitat.

The park features a building with rest rooms, equipment storage, and a stage. The fields surrounding the building accommodate multiple activities. The site slopes gently up to the street level with terraced amphitheater seating.

Soil is excavated to lower the park and create a basin that can be flooded. This major change in topography requires a new bridge at Fairfax Avenue. Park visitors can cross beneath this bridge to access adjacent residential streets or cross from the intersection of Fairfax Avenue and Apple Street.

Neighboring streets are improved with Complete Streets approaches and pedestrian enhancements.

Existing Conditions: Aerial Photograph

Early Action Plan: Hauser / Community Crossings

Greenway street crossings break trail continuity and create hazards. The Community Crossings concept strengthens continuity with landscape that slows and alerts traffic to trail users.

The concept can be applied to any trail street crossing. The example presented was developed for Burnside Avenue, Thurman Avenue, and Hauser Boulevard.

The trail meets the street and the existing cap over the creek is transformed into a small plaza and staging area. Low native shrubs soften the edges of the plaza. Patterned paving and signal-activated, flashing crossing lights highlight the crosswalk, expanded to the width of the right-of-way.

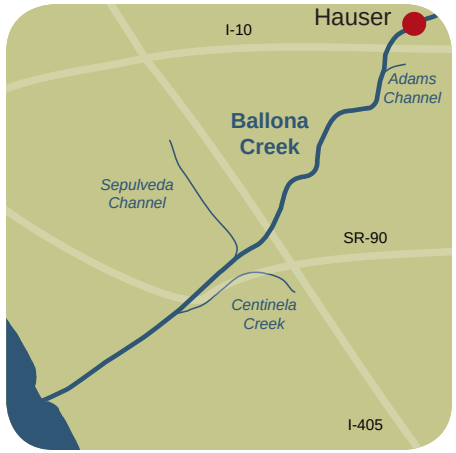
The Complete Streets concept combines rain gardens and urban forestry at Hauser Boulevard. Class II bike lane striping or Class III "sharrows" markers improve bike safety and biofiltration swales treat

Early Action Plan: Plan View

Legend

1. Ballona Creek Bike Path
2. Native Landscape
3. Seating
4. Enhanced Crossing
5. Bicycle Lanes
6. Complete Street

stormwater. The redesign increases non-motorized connections between Ballona Creek, nearby commercial areas, and the Venice Boulevard Class II bike lane.



Vision Plan: Hauser / Creek Crossings

The Hauser Creek Crossings plan reorients the experience of passers-by, calling attention to Ballona Creek and the natural park environment.

Naturalization of Ballona Creek reintroduces the sights and sounds of singing birds, rustling leaves, and flowing water. The former concrete cap is replaced by a bridge that gently raises travelers over the creek. Guardrails on the bridge replace walls and planters, inviting views of the creek.

This creek restoration concept maintains existing levels of flood protection and meets current standards for a 100-year storm event. Most of the year, trail users will only see a trickle of water.

Native landscape along the creek trail provides upland habitat to complement riparian habitat and reinforces the feeling of an ecological retreat.

Pedestrian travel is improved with paths from Hauser Boulevard to the bike path as well as over the new bridge; the Ballona Creek Bike Path passes below.

A Class II bike lane provides a continuous connection to Venice and Washington Boulevards. Hauser Boulevard's wide parking strips are transformed into rain gardens and urban forestry, creating a Complete Streets design.

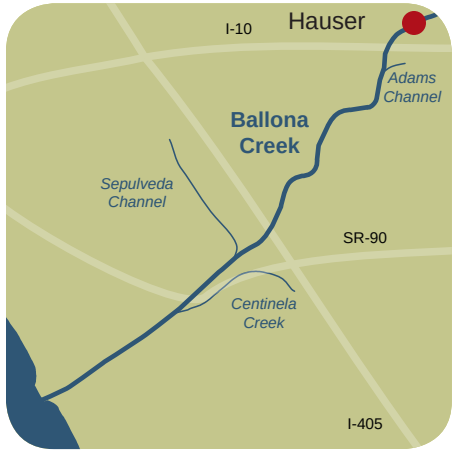
While the Hauser/Creek Crossings Vision Plan focuses on Hauser Boulevard, its principles can apply to all street crossings over Ballona Creek. Thurman and Burnside Streets are similar in scale, making them particularly strong candidates for the Hauser approach.

Vision Plan: Section

Vision Plan: Plan View

Legend

1. Naturalized Ballona Creek
2. Ballona Creek Bike Path
3. Bridge
4. Trail Underpass
5. Bicycle Lane
6. Native Landscaping
7. Complete Street



Existing Conditions: Aerial Photograph

Early Action Plan : Cochran / Gateway

The Ballona Gateway announces Ballona Creek's presence to travelers on Venice Boulevard. Pocket parks on either side of the intersection of Venice Boulevard and Cochran Avenue lead visitors to a daylighted channel. The Gateway Park marks the eastern terminus of the expanded Ballona Creek Bike Path.

With no parkland within a half mile radius of this location, the Gateway Park creates a rare public gathering area for the community. The park's seating encourages visitors to rest in the shade. Groups can meet in the park and prepare for their trail experience.

The Gateway Park pumps water from the channel bottom and runs it through a biofiltration fountain. These flows return to Ballona Creek.

Paving distinguishes the creek-side area and alerts motorists to this pedestrian-friendly zone. Venice Boulevard and all

Legend

1. Ballona Creek Bike Path
2. Native Landscaping
3. Seating
4. Enhanced Pedestrian Zone
5. Enhanced Crossing
6. Pocket Park
7. Biotreatment Fountain
8. Complete Street
9. Bicycle Lane

Early Action Plan: Plan View

streets that terminate at the creek are outfitted with rain gardens, bioswales, urban forestry and permeable paving.

Native vegetation along the channel is interspersed with community garden plots, encouraging stewardship of the creek.

In Ballona Creek, a low weir over the inlet to the diversion channel keeps low flows in the channel. The sight and sound of moving water increases interest for trail users.

Legend

1 Naturalized Ballona Creek

2 Ballona Creek Trail

3 Stairs

4 Native Landscaping

5 Seating

6 Street Closure

7 Enhanced Pedestrian Zone

8 Enhanced Crossing

9 Pocket Park

10 Biotreatment Fountain

11 Complete Street

12 Bicycle Lane

Vision Plan: Plan View

Vision Plan: Cochran / Ballona Creek Neighborhood Park

The Ballona Creek Neighborhood Park anchors a naturalized Ballona Creek within the Ballona District.

By closing a small stretch of Cochran Avenue, the park is extended to connect with Ballona Creek. Permeable paving lines the pedestrian area that replaced Cologne Street. Vehicular access between Venice Boulevard and the residential community is relocated one block east at Cloverdale Street.

The park provides seating and staging areas. Native trees shade benches and picnic tables. Shrubs buffer the park and residences from Venice Boulevard traffic. As in the Early Action Plan, biotreatment of Ballona Creek's low flows is integrated into the park's design.

Ballona Creek transitions from a box culvert to a naturalized channel with floodwalls. Willows and mulefat dominate the creek's floodplain. Sycamore, oak, toyon, native sage, blackberry, and grasses soften the edges of the trail. Preliminary modeling indicates that this natural, widened creek zone can contain the same flows as the current concrete channel.

Vision Plan: Section

The Ballona Creek Bike Path doubles as an access road approximately 13' above the channel bottom. Where street ends meet the channel at a higher elevation, stairs and ramps provide access down to the trail.

Venice Boulevard and smaller, residential streets in this area are retrofitted as Complete Streets. Street-side planted areas capture, treat, and infiltrate stormwater. Native landscape enhances the urban forest. Streets are striped to ensure that motorists can share the road with bicyclists.

The Park is a keystone of the Ballona District, signalling Ballona Creek's presence, improving the environment and creating better between residential and business areas.

Implementation

Ballona Creek Greenway improvements are already happening. Implementation on a broader scale, as envisioned in the Ballona Creek Greenway Plan, can occur through many mechanisms. Though time consuming, multi-agency collaboration can result in a more cohesive process.

Opportunistic Development

Initially, conservancies, cities, and activists can begin to implement the Ballona Creek Greenway Plan with pocket park improvements. Over time, the pieces will generate momentum and become a cohesive, unified Greenway.

Community Consortium

Conservancies, cities and NGOs could unite to create a consistent Greenway with common principles and details. They could apply individually or together for funding to implement reaches of development based on their abilities or entrust development to a single entity.

Land Trust

A significant barrier to Greenway development is identifying an agency willing to take responsibility for maintenance, liability, and operations of recreational elements. Formation of a land trust with the mission of providing insurance, maintenance and operations services for a Ballona Creek Greenway would facilitate Greenway development. As an NGO, it could receive corporate, private individual, and government contributions. Youth training programs could be integrated into its activities to engage community members while expanding funding options.

A Role for Planning Departments

Incorporation of the Greenway in planning open space elements and specific plans can help dedicate resources to Greenway development. Creekside zoning can dedicate setbacks that expand the Ballona Creek right-of-way. If necessary, this could be combined with a density bonus associated with a transfer of air or development rights from the Greenway land to the proposed development.

Ballona Land Bank

The Ballona Land Bank would map future open space. The mechanism for acquiring and developing open space would involve a transfer of a proposed development's required open space to purchase and improve a designated equivalent or greater acreage along the creek.

It would be essential to define the terms of the exchange to ensure the Greenway benefits. For example, language could call for a transfer of the equivalent acreage to the creek or, in the event that land along the creek is less expensive than the land in the development, the maximum acreage that can be acquired at the same value as the land in the development, whichever is greater.