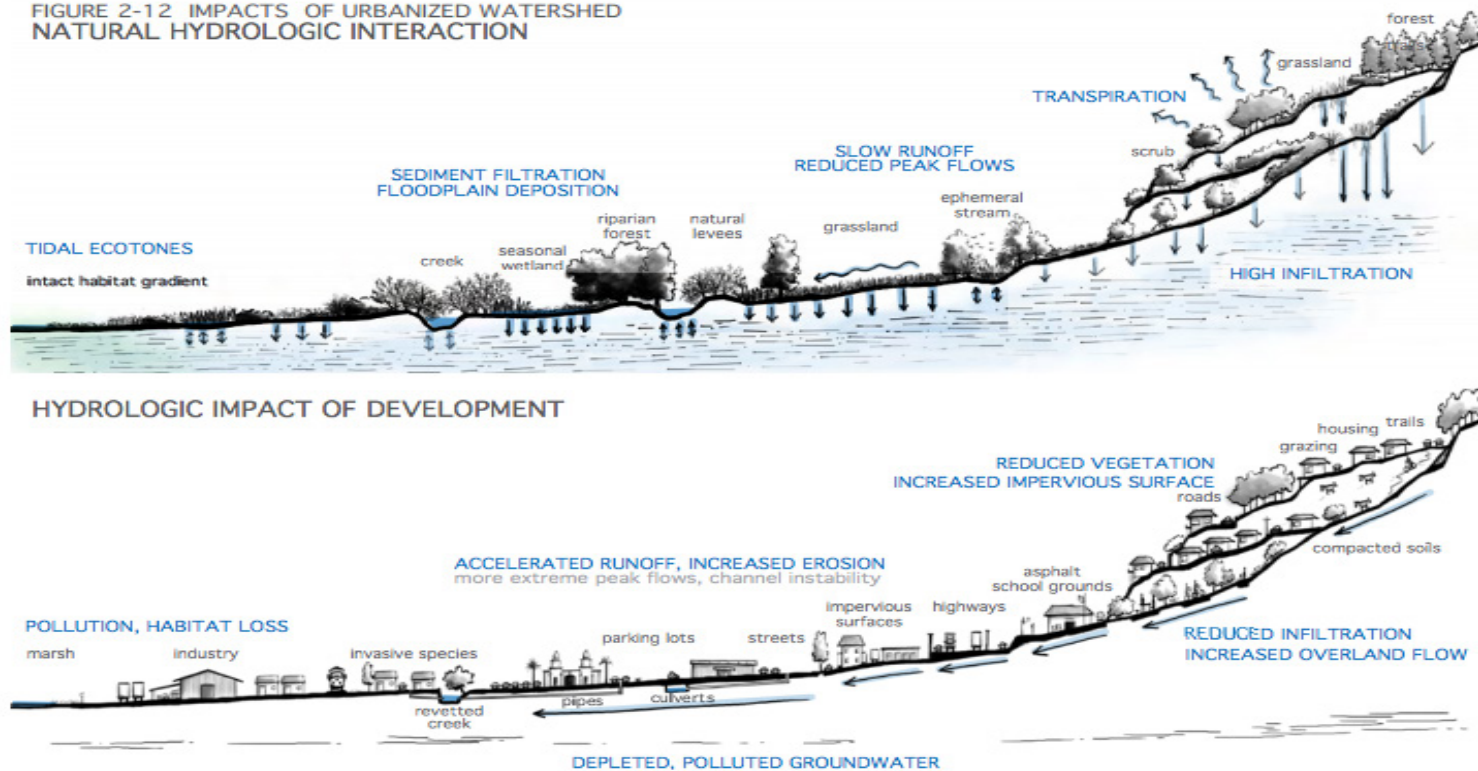


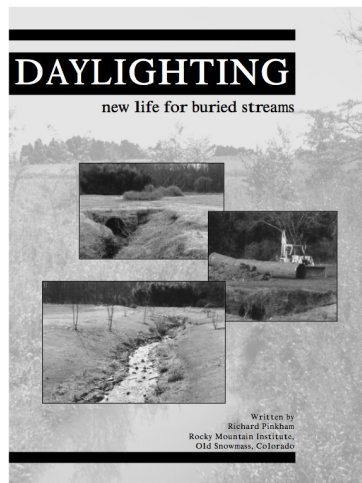
URBAN STREAM DAYLIGHTING AND RESTORATION

THE EVOLUTION OF LONG TERM PROJECT MANAGEMENT FOR FOUR URBAN WATERSHEDS IN THE EAST SAN FRANCISCO BAY AREA

FIGURE 2-12 IMPACTS OF URBANIZED WATERSHED NATURAL HYDROLOGIC INTERACTION



BACKGROUND



What is Daylighting?

The term describes projects that deliberately expose some or all of the flow of a previously covered river, creek, or storm water drainage. Daylighting projects liberate waterways that were buried in culverts or pipes, covered by decks, or otherwise removed from view. Daylighting re-establishes a waterway in its old channel where feasible, or in a new channel threaded between the buildings, streets, parking lots, and playing fields now present on the land. Some daylighting projects recreate wetlands, ponds, or estuaries. All require the removal of concrete, or de-paving.

PIONEERS

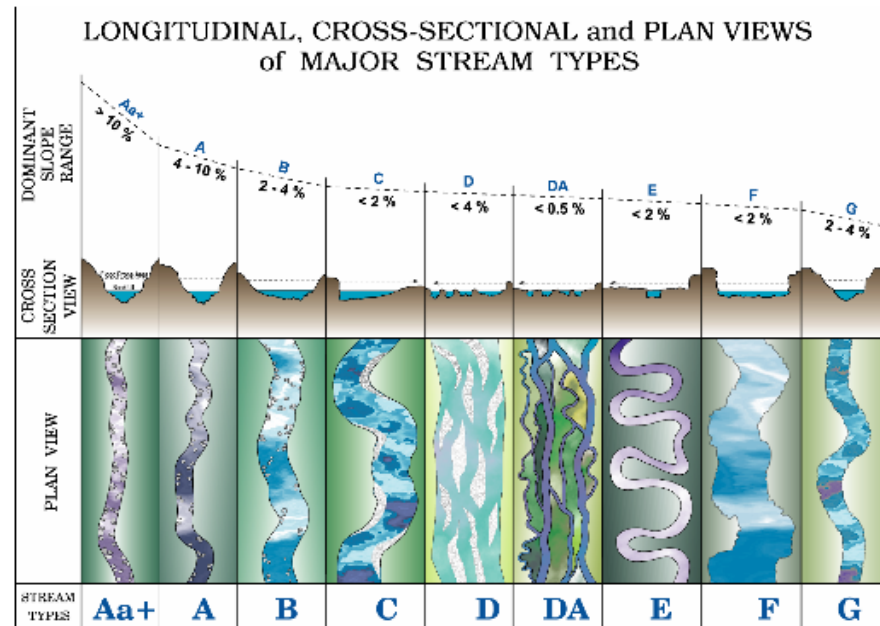
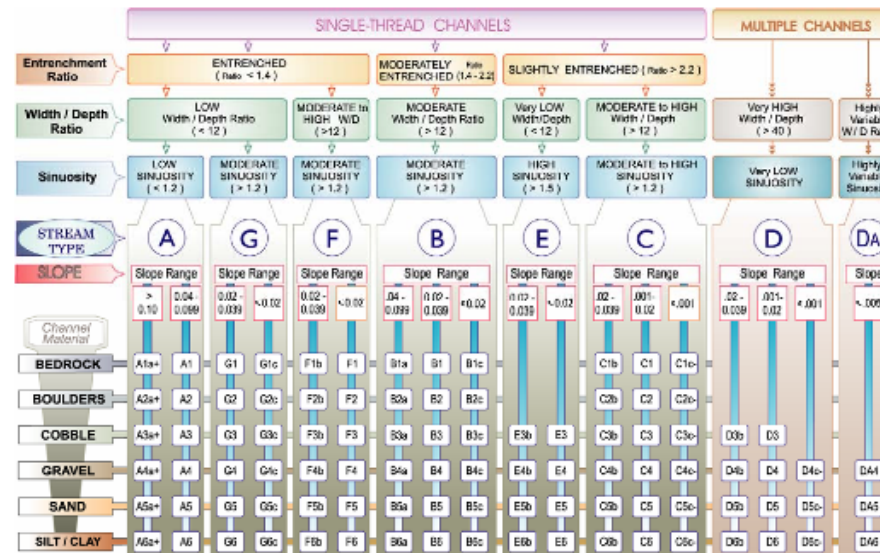
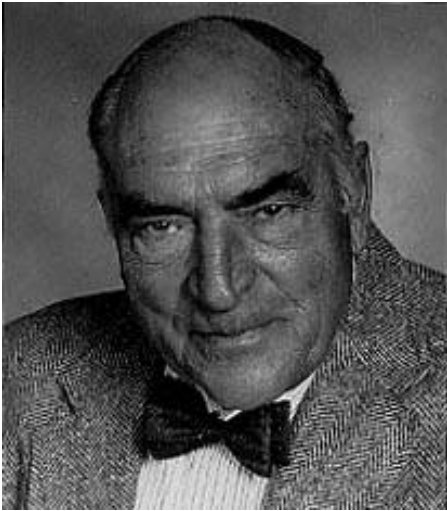


Figure 1. Broad-level stream classification delineation showing longitudinal, cross-sectional and plan views of major stream types (Rosgen, 1994).



PIONEERS



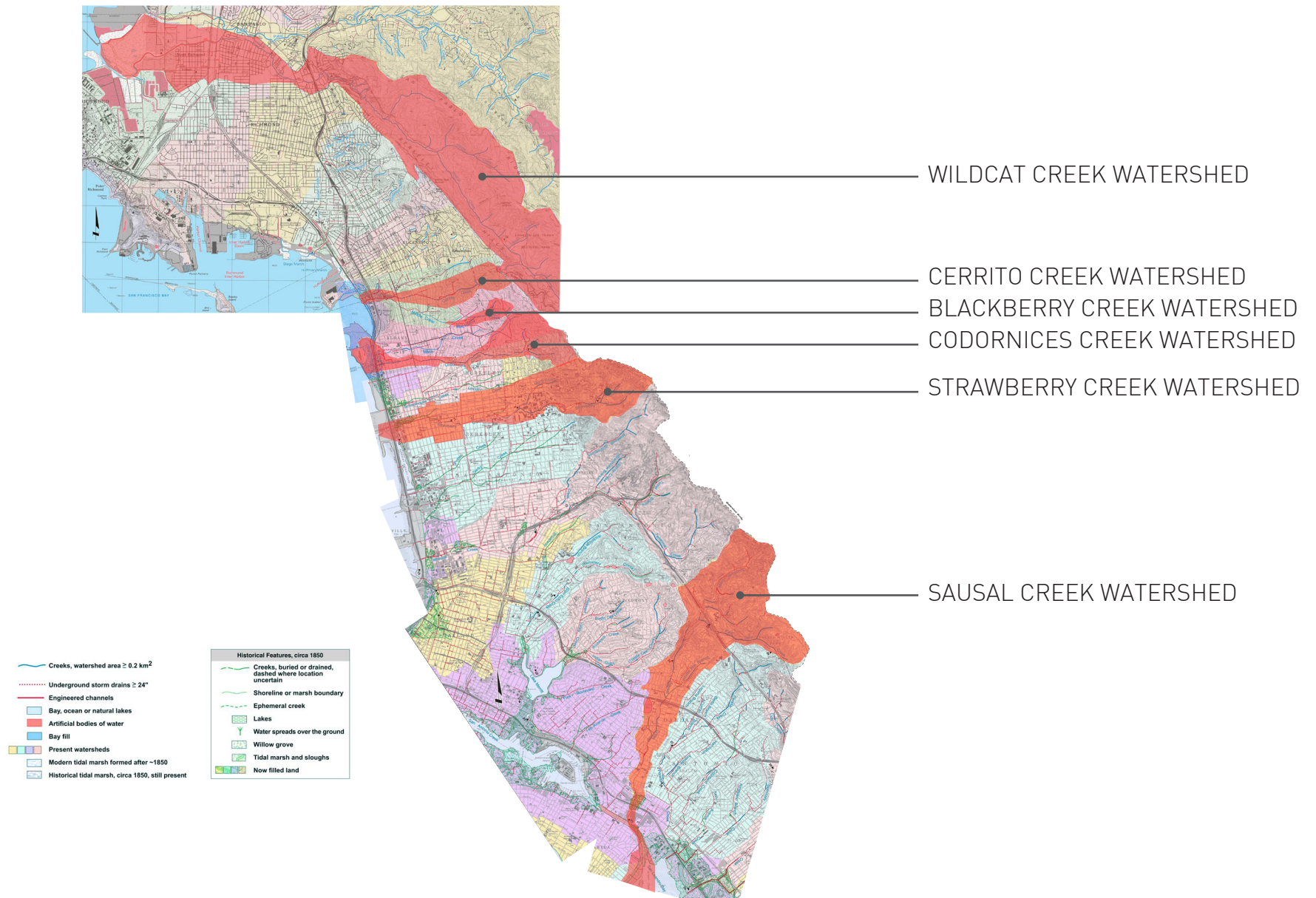
LUNA LEOPOLD Geomorphologist

Luna Bergere Leopold (October 8, 1915 in Albuquerque, New Mexico – February 23, 2006 in Berkeley, California) was a leading U.S. geomorphologist and hydrologist, and son of Aldo Leopold. He received a B.S. in Civil Engineering from the University of Wisconsin, Madison in 1936; an M.S. in Physics-Meteorology from the University of California, Los Angeles in 1944; and a Ph.D. in Geology from Harvard University in 1950.

Leopold is widely known in his primary field for his multitude of work in fluvial geomorphology and for the classic book, *Fluvial Processes in Geomorphology*, that he wrote with Gordon Wolman and John Miller.

Leopold suggested that a new philosophy of water management is needed, one based on geologic, geographic, and climatic factors as well as traditional economic, social, and political factors. He argued that the management of water resources cannot be successful as long as it is naively perceived from an economic and political standpoint, as it is in the status quo

EAST BAY WATERSHED MAP SITES OF ACTION



TIME-LINE

1980	1982 Ann Riley and Carole Schemmerling Founded Urban Creeks Council	1980 Carole Schemmerling Berkeley Parks and Rec Commissioner	
1985	1984 the California Dept of Water Resources Urban Streams Restoration Program established	1985 Wildcat San Pablo Creeks Watershed Council Founded to reverse	1984 Strawberry Creek at Sante Fe Railroad corridor by Wolfe, Gary Mason, Carole Schemmerling
	1987 The Aquatic Outreach Institute		
1990			
	1993 Coalition to Restore Urban Waterways (CRUW) established		
1995	1996 The Friends of Five Creeks The Friends of Sausal Creek Waterways Restoration Institute	1995 Blackberry Creek at Thousand Oaks Elementary School by Wolfe Mason Associates in collaboration with the Urban Creeks Council	1994 Lower Codornices Creek at 8th and 9th by Wolfe Mason Associates in collaboration with the Urban Creeks Council and Ecocity Builders
	1998 Restoring Urban Creeks Published		
2000		2000 Friends of Five Creeks restore Cerrito Creek at El Cerrito Plaza.	1999 Strawberry Creek Downtown Project study
	2003 Restoration Design Group		
2005		2004 Wildcat Creek Restoration Action Plan begun	2004 Lower Codornices Creek at 5th-6th
			2006 Lower Codornices Creek at 7th-8th
			2007 Lower Codornices Creek at 2nd
2010	2010 Wildcat Creek Action Plan Complete	2010 Wildcat Creek Restoration Plan at Davis Park	2010 Strawberry Creek Center Street Approved by City and Designed by Walter Hood Design
	2012 Urban Creeks Council Changes focus to Urban Nature Sites	2011 Sausal Creek Restoration Plan at Dimond Park RDG	
2013			

PIONEERS



ANN L. RILEY, PH.D. Vertical Integration

- Watershed and river restoration advisor for the San Francisco Regional Water Quality Control Board .
- Co-founder of the Urban Creeks Council of California 1982
- Established the California Dept of Water Resources Urban Streams Restoration Program 1984, approximately \$9 million from remaining Proposition 84 and Proposition 13 allocations
- Developed Coalition to Restore Urban Waters including Friends of Chicago River and Friends of Trashed Rivers 1993
- Executive Director of the Waterways Restoration Institute, (WRI) a technically oriented organization which works on a national level to promote and sponsor demonstration stream restoration projects. 1996
- Author of the book Restoring Streams In Cities 1998
- Her PhD from the University of California, Berkeley under Dr. Luna Leopold specialized in flood and river management. 1982

PIONEERS



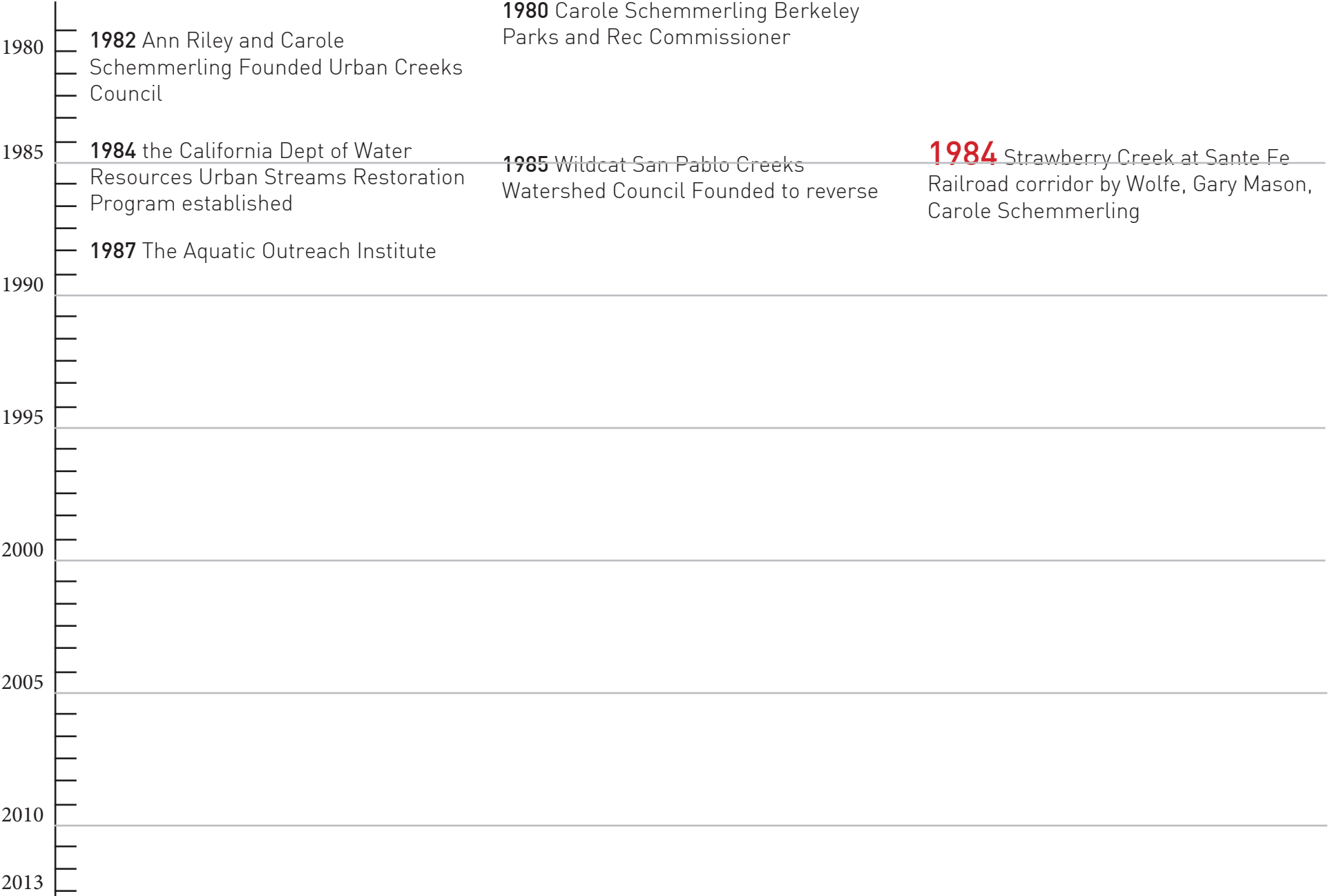
CAROLE SCHEMMERLING

Parks and Rec Commissioner 1980- Urban Creeks Council 1982

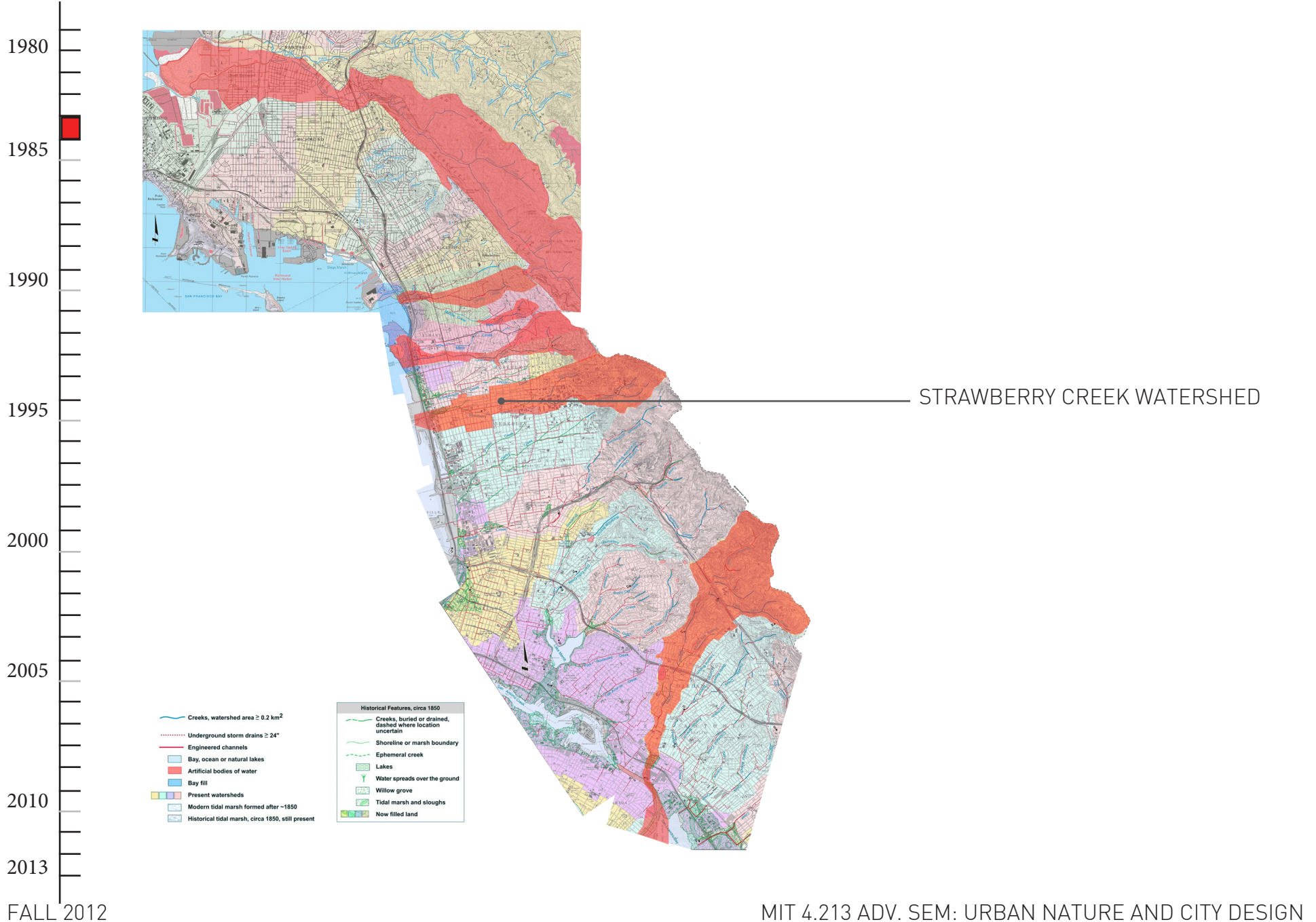
Urban Creeks Council (UCC) is a non-profit organization located in the Bay Area, California, working to preserve, protect, and restore urban streams and their riparian habitats.

We facilitate programs that protect streams, restore riparian habitats to urban areas and give people the chance to experience nature in the urban context, and offer support and technical service to agencies, creeks groups and landowners.

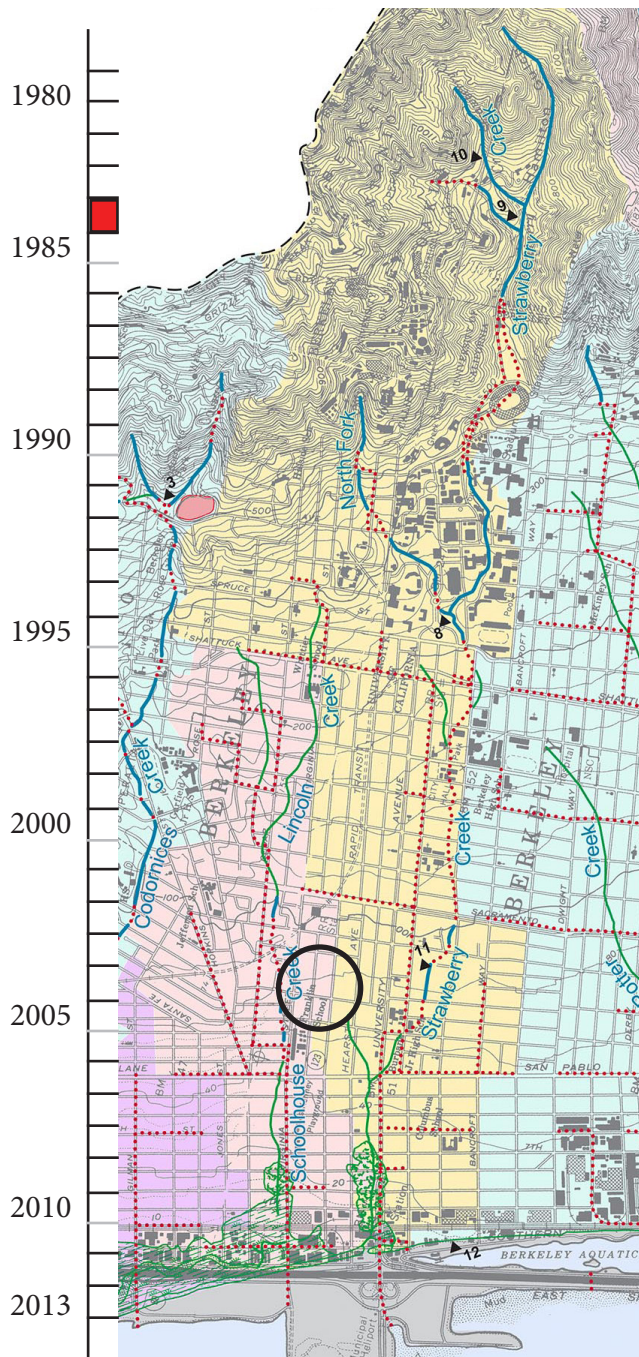
TIME-LINE



1982-84_STRAWBERRY CREEK PARK



1982-84_STRAWBERRY CREEK PARK



FALL 2012

WATERSHED: 2.0 SQUARE MILES; URBAN AND UNIVERSITY

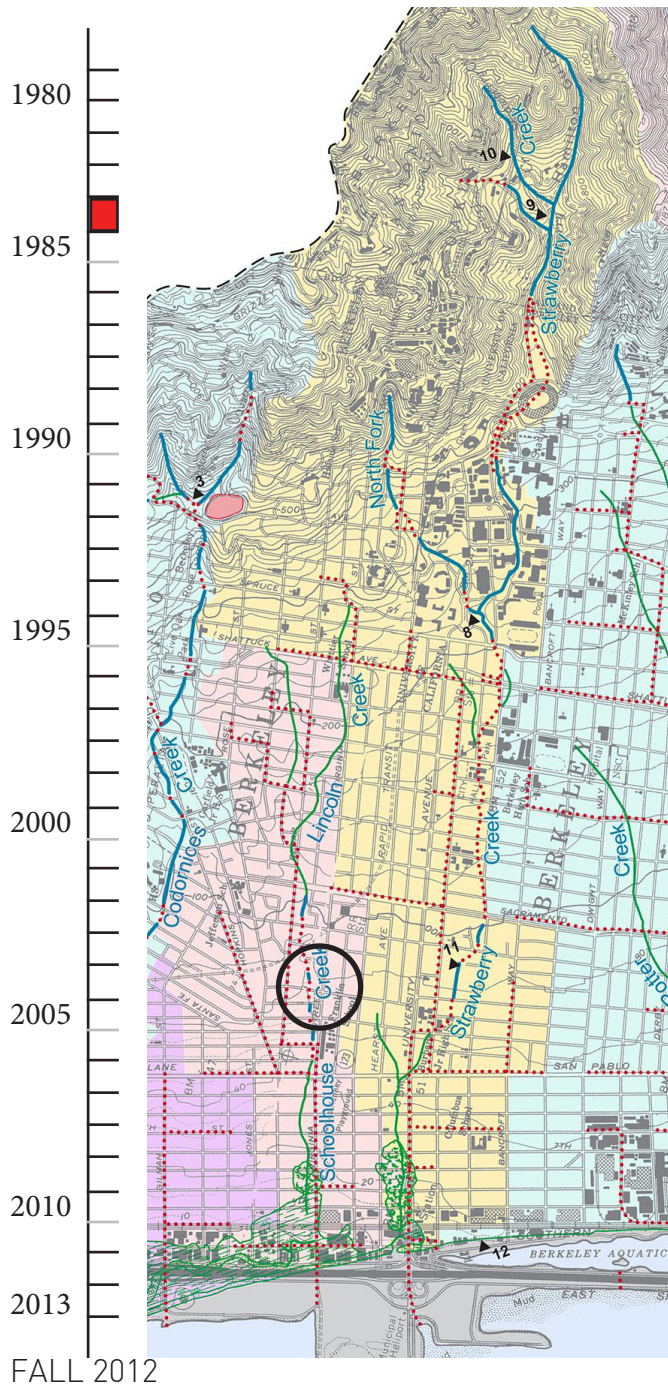
FLOW RATES: 2-6 CFS AVERAGE SEASONAL FLOW
800-1000 cfs 100 year peak flow

LENGTH DAYLIGHTED: 200 feet of new channel

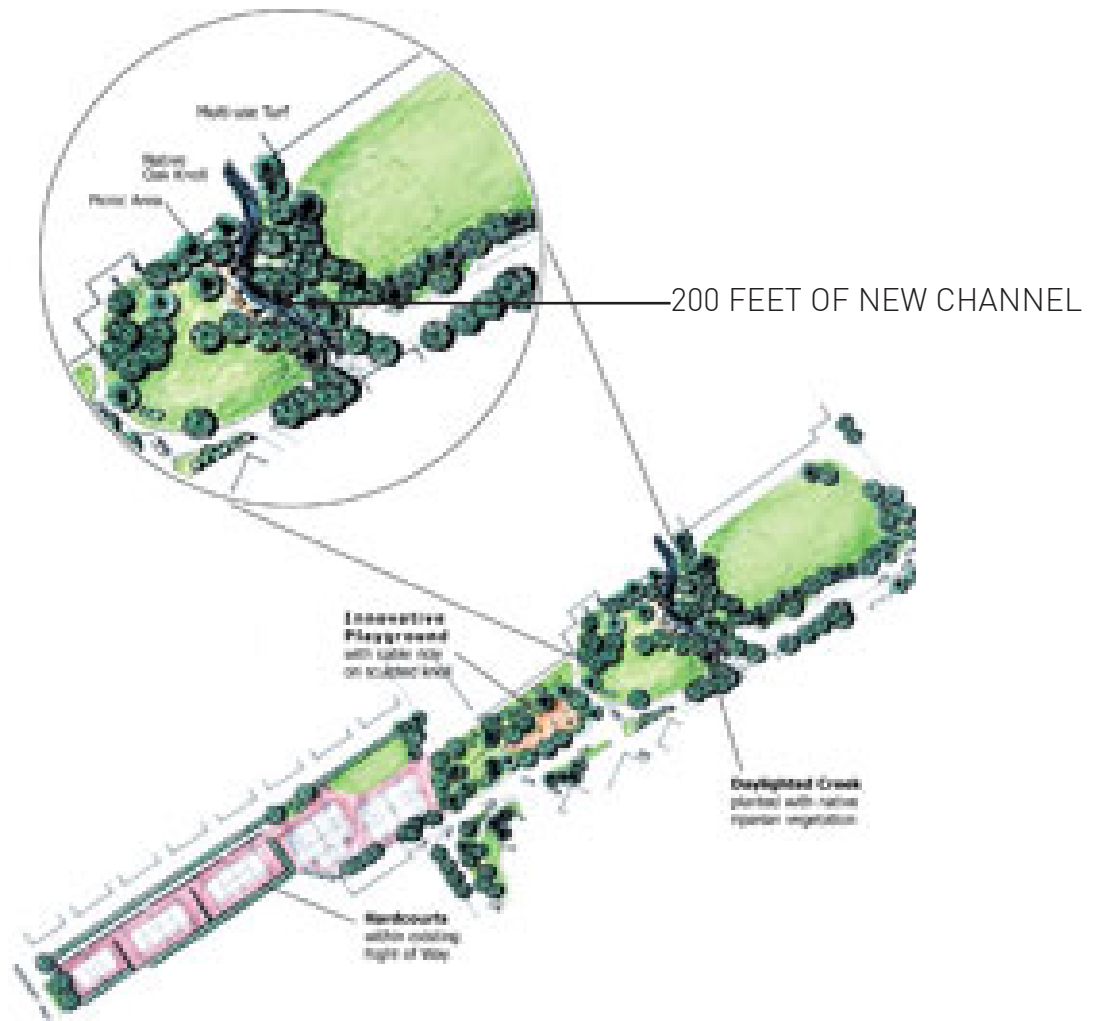
DAYLIGHTING PROJECT COST: \$50,000 + Volunteer Labor
OVERALL PROJECT COST : \$580,000

MAINTENANCE: EAST BAY CONSERVATION CORPS
\$81,000 FOR PROGRAM FUNDING

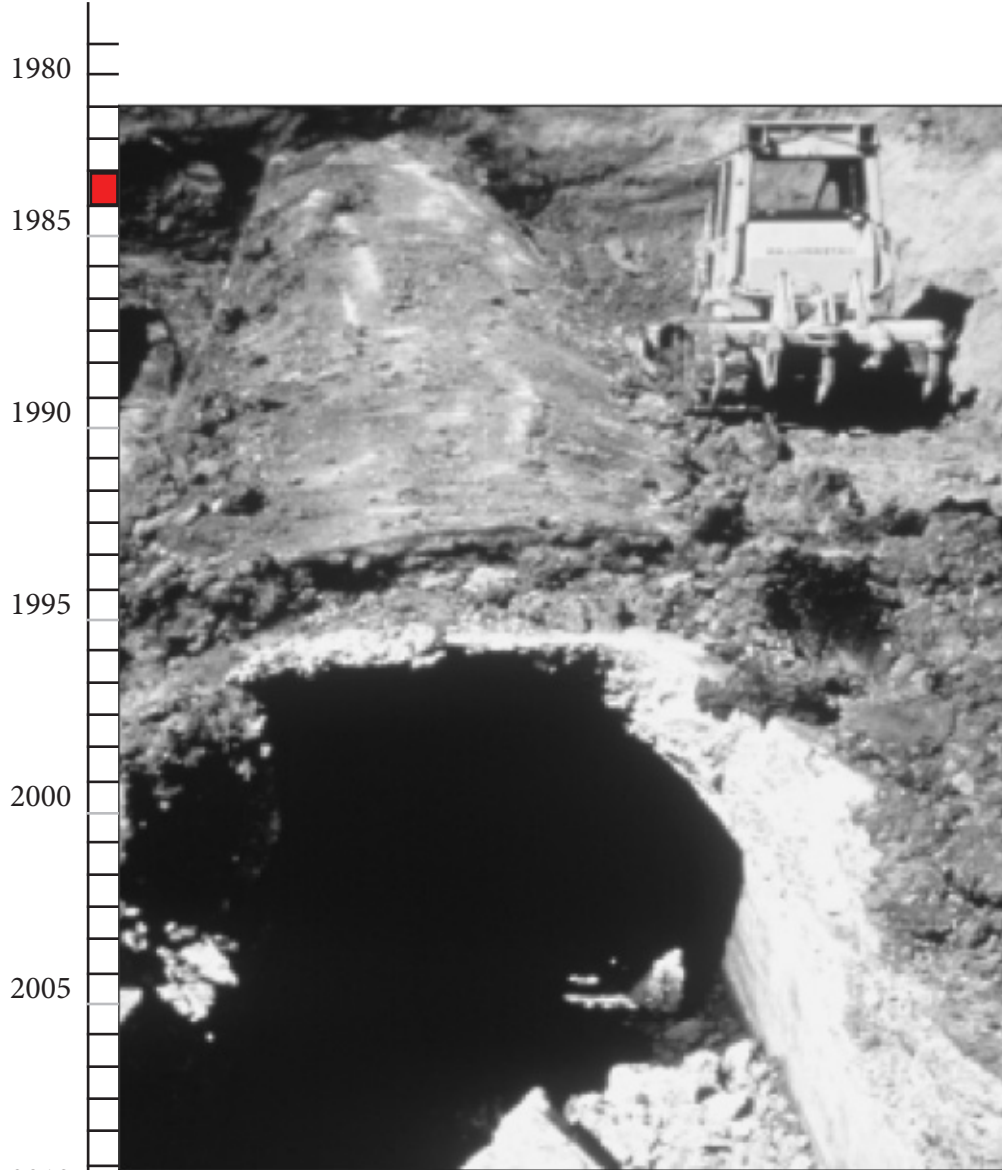
1982-84_STRAWBERRY CREEK PARK



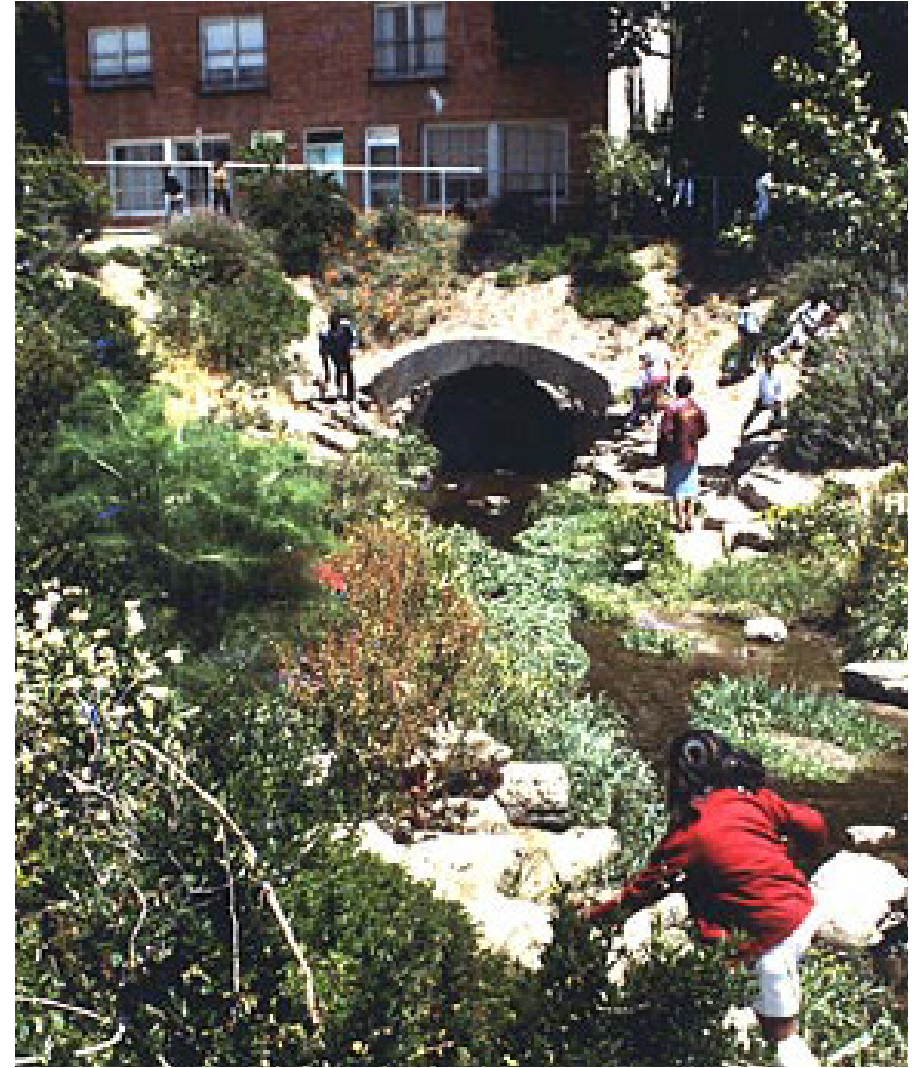
FALL 2012



1982-84_STRAWBERRY CREEK PARK

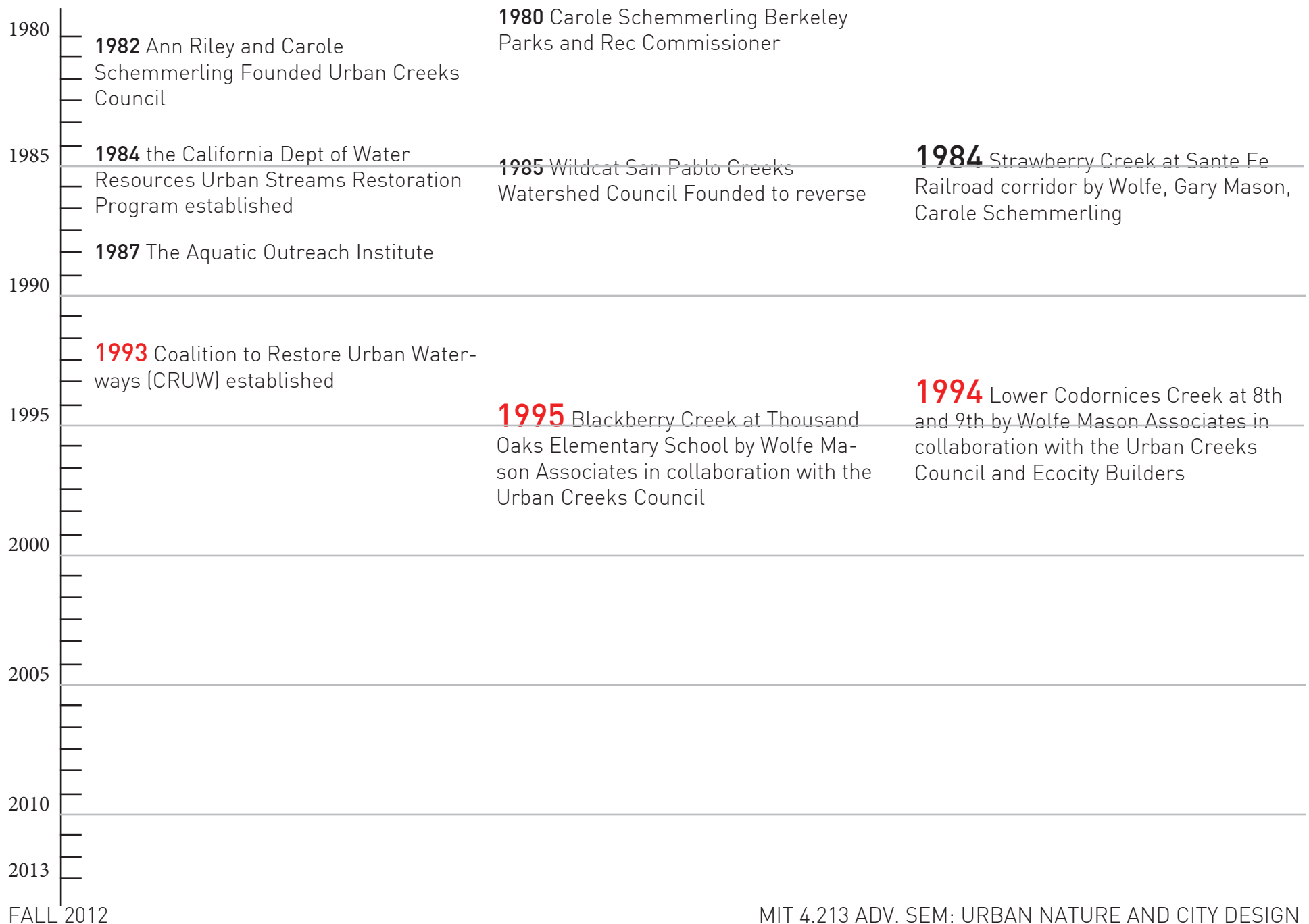


*Removal of the culvert at Strawberry Creek in Berkeley, California in 1984.
Courtesy of Wolfe Mason Associates.*

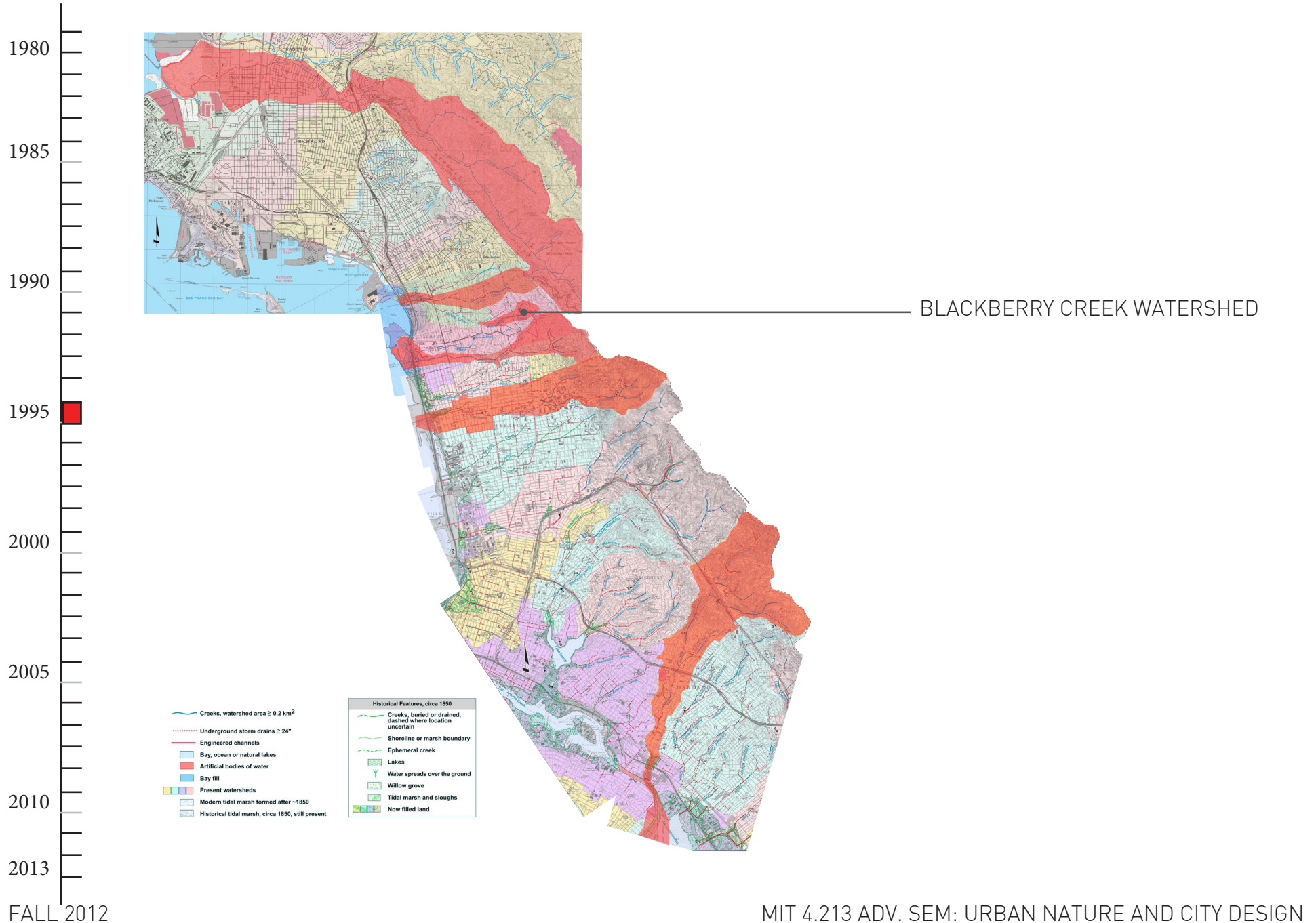


2010
2013
FALL 2012

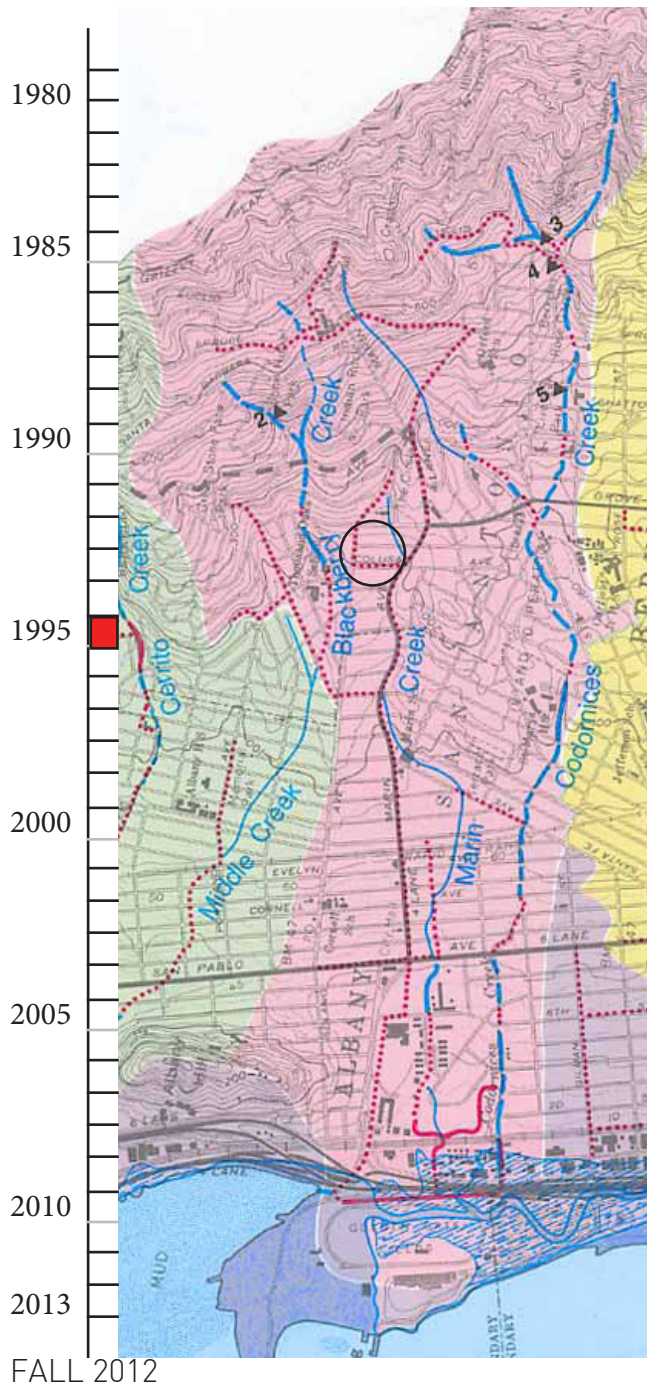
TIME-LINE



1995_BLACKBERRY CREEK AT THOUSAND OAK ELEMENTARY



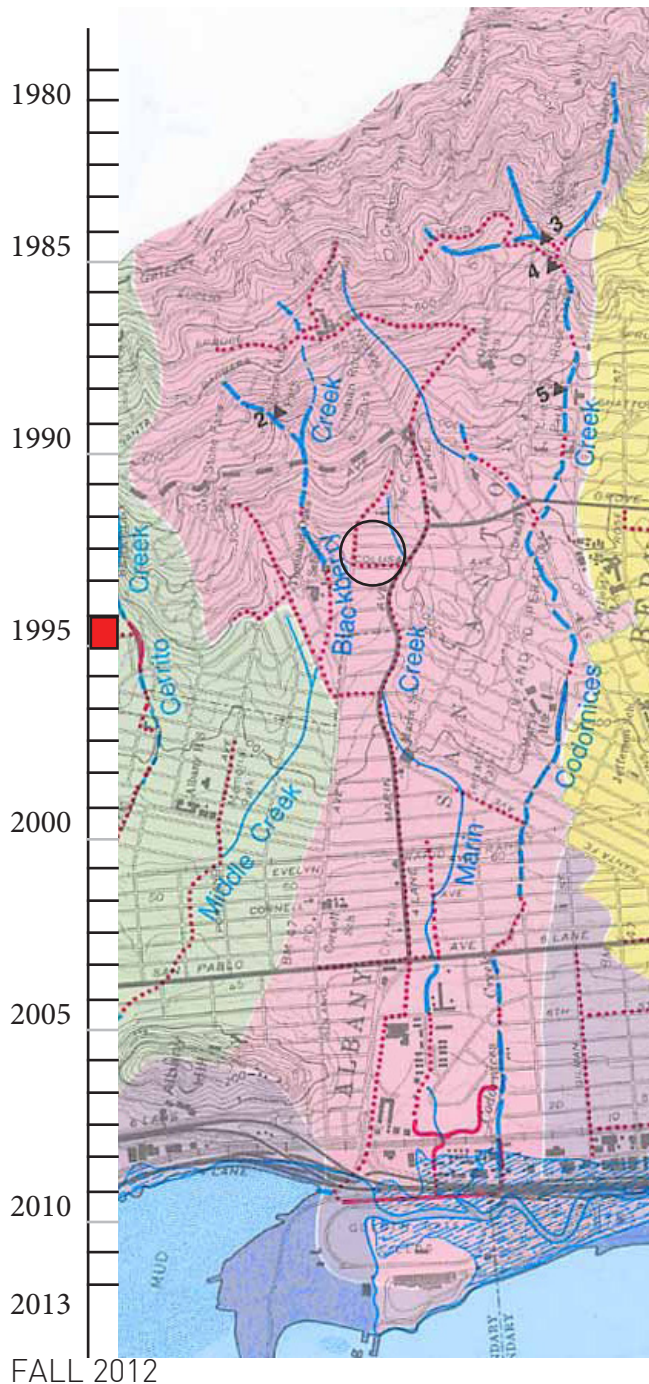
1995_BLACKBERRY CREEK AT THOUSAND OAK ELEMENTARY



FALL 2012

WATERSHED:	.3 SQUARE MILES; URBAN
FLOW RATES:	15 CFS AVERAGE SEASONAL FLOW 220 cfs 100 year peak flow
LENGTH DAYLIGHTED:	250 feet of new channel
DAYLIGHTING PROJECT COST:	\$144,000 + Volunteer Labor
MAINTENANCE:	CURRICULUM EDUCATION STUDENT AND VOLUNTEER

1995_BLACKBERRY CREEK AT THOUSAND OAK ELEMENTARY



FALL 2012

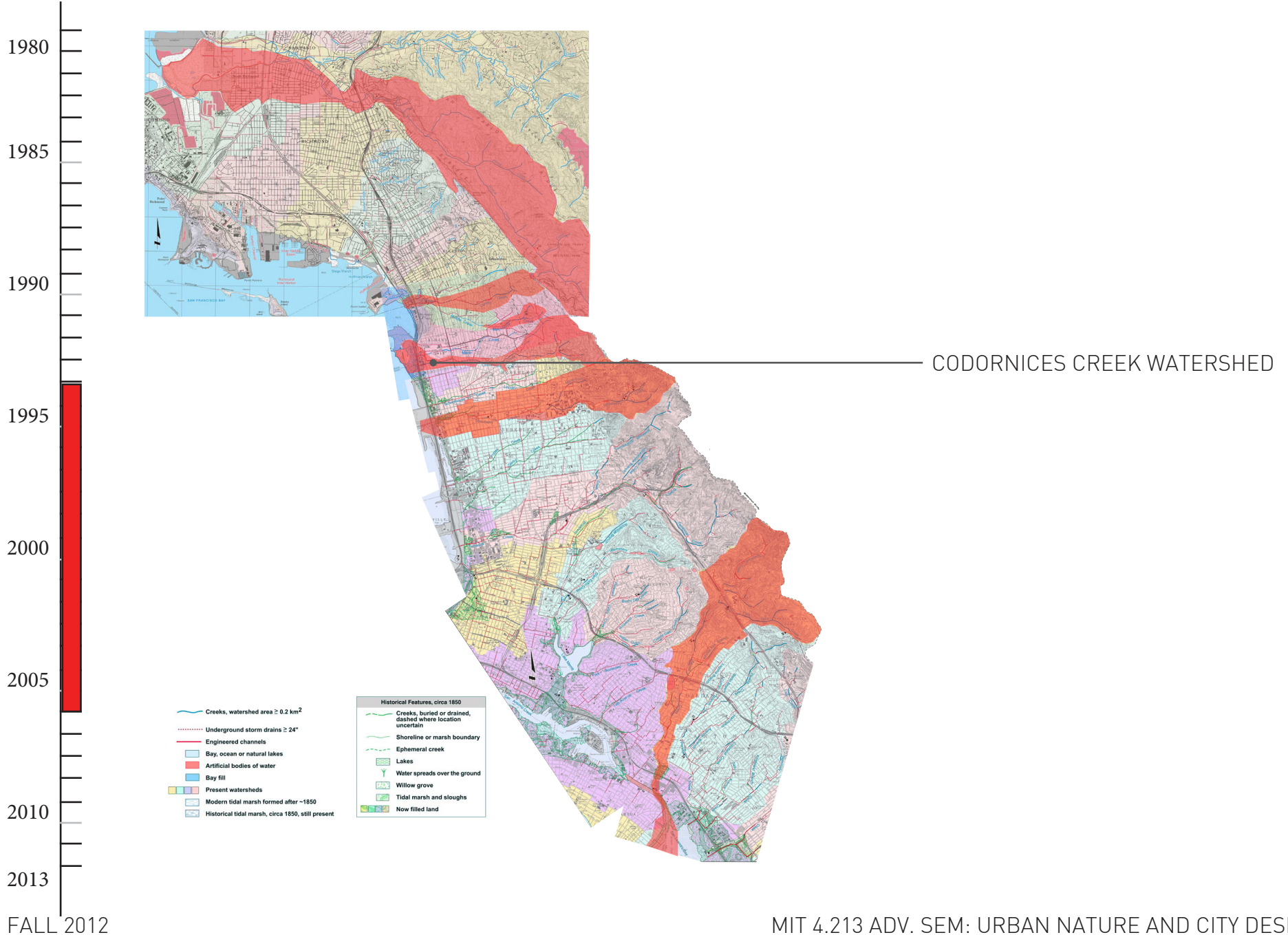


MIT 4.213 ADV. SEM: URBAN NATURE AND CITY DESIGN

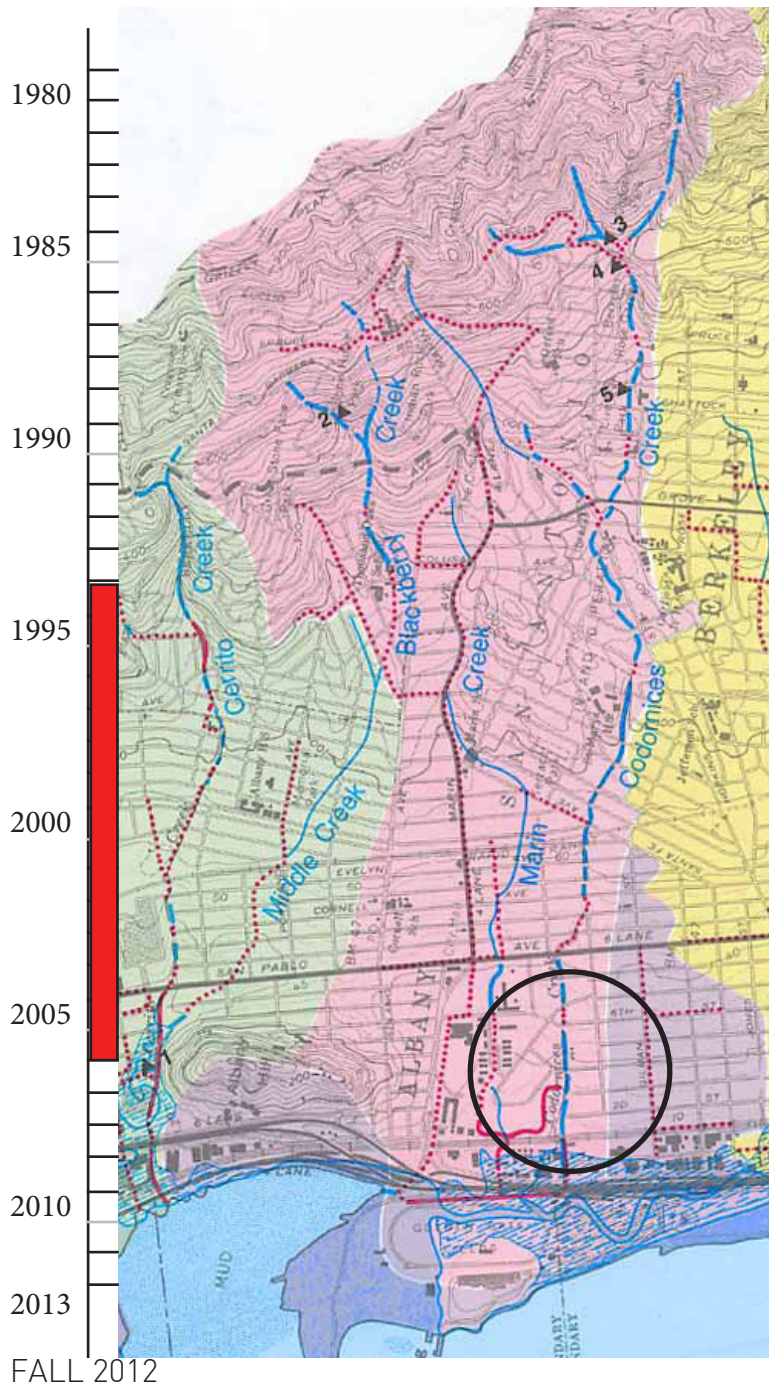
1995_BLACKBERRY CREEK AT THOUSAND OAK ELEMENTARY



1994-2006_LOWER CODORNICES CREEK



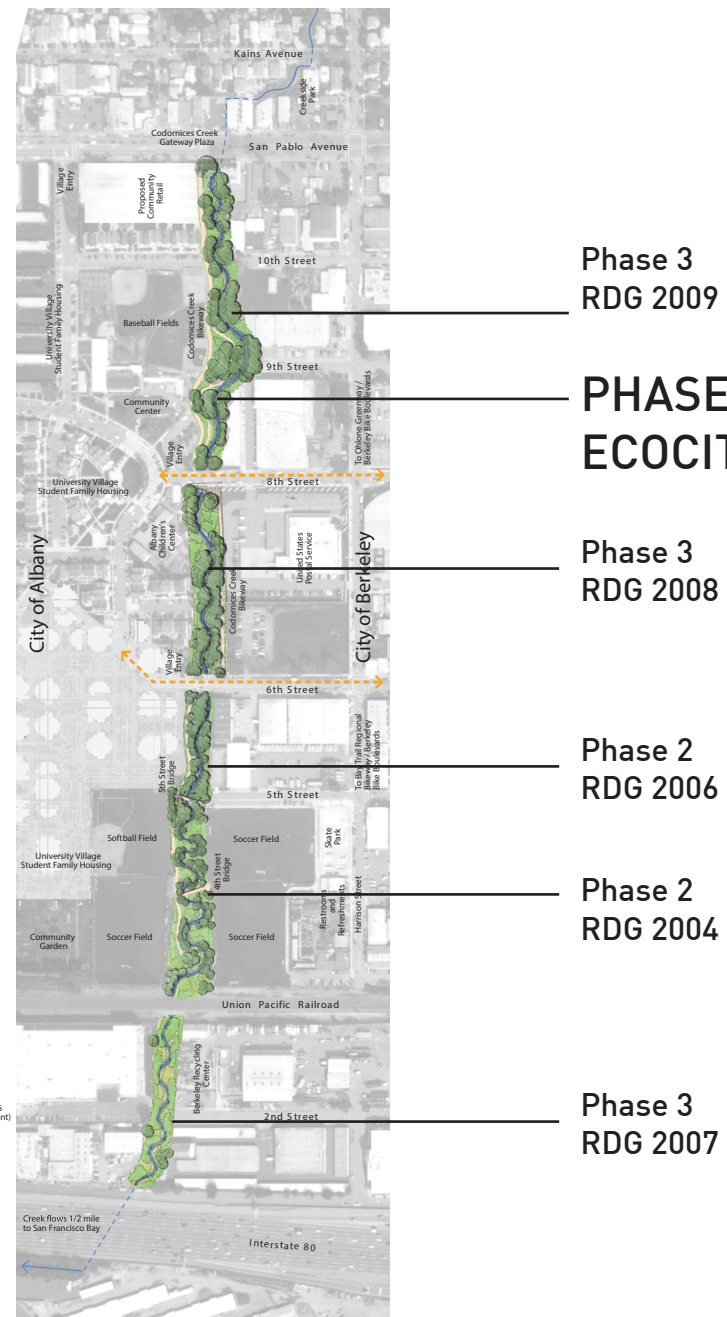
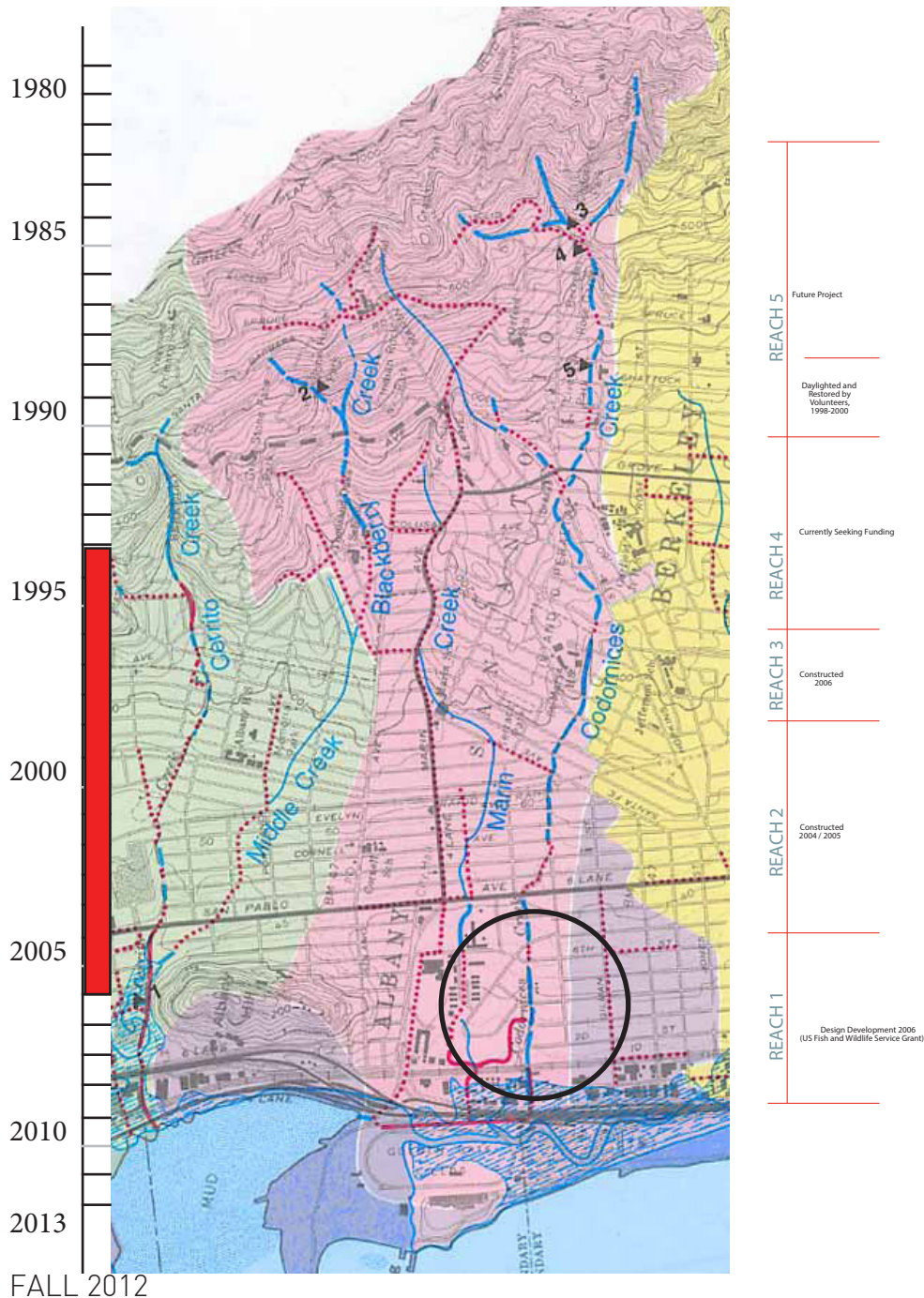
1994-2006_LOWER CODORNICES CREEK



FALL 2012

WATERSHED:	1.5 SQUARE MILES; URBAN
FLOW RATES:	2-6 CFS AVERAGE SEASONAL FLOW 800-1000 cfs 100 year peak flow
LENGTH DAYLIGHTED:	400 feet of new channel
DAYLIGHTING PROJECT COST:	\$33,000 + Volunteer Labor \$25,000 for bulldozer to remove culvert
MAINTENANCE:	FRIENDS OF FIVE CREEKS

1994-2006_LOWER CODORNICES CREEK



1994_LOWER CODORNICES CREEK PHASE 1

Underfunded Volunteer Effort \$33,000 1.5 YEARS DIGGING AND PLANTING



FALL 2012

MIT 4.213 ADV. SEM: URBAN NATURE AND CITY DESIGN

1996_LOWER CODORNICES CREEK PHASE 1

400 FEET 375 VOLUNTEERS FRIENDS OF FIVE CREEKS 1.5 YEARS



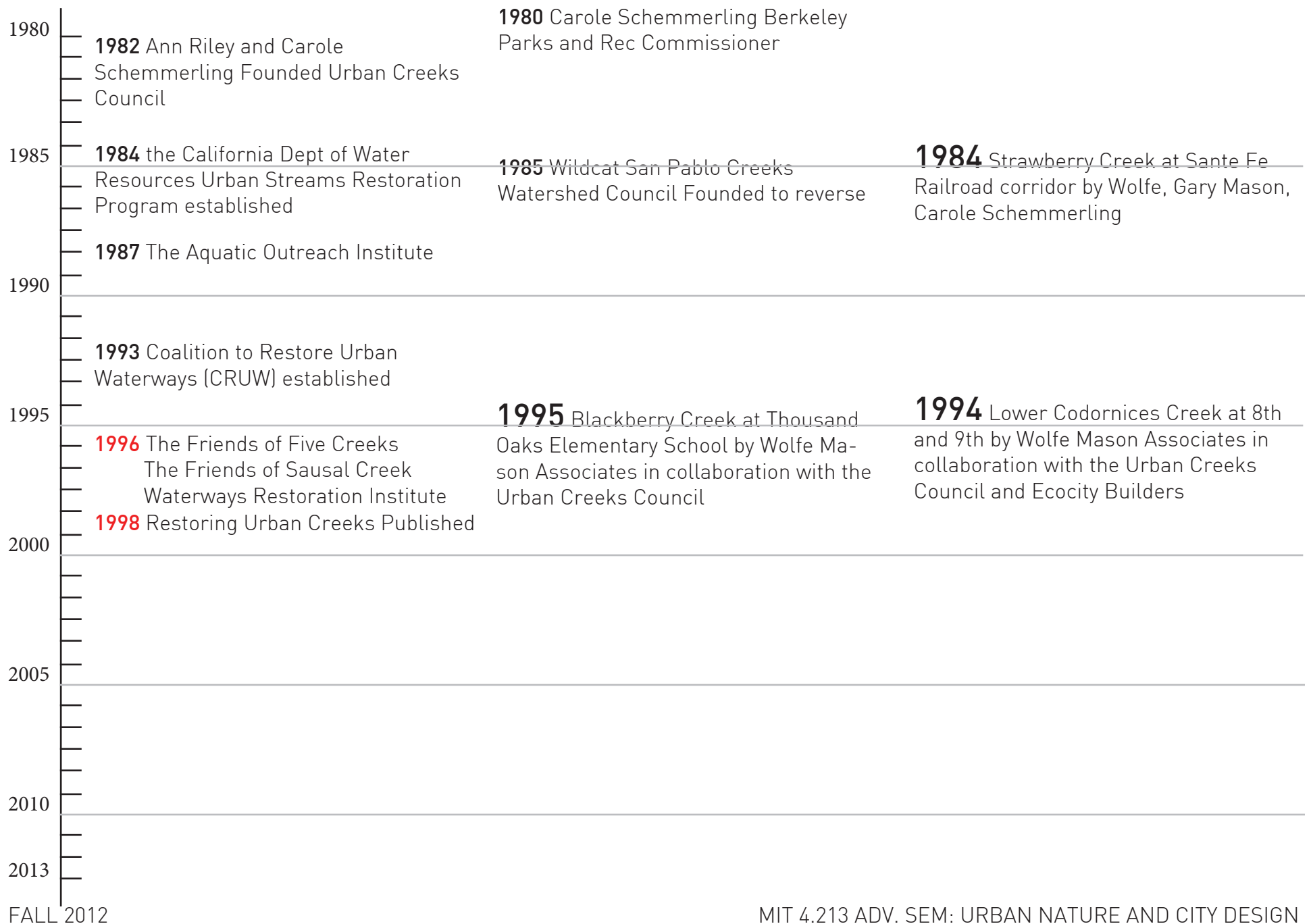
1996_LOWER CODORNICES CREEK PHASE 1

But the new habitat provided shelter for homeless camps

1980
1985
1990
1995
2000
2005
2010
2013
FALL 2012



TIME-LINE



GRASS ROOTS



SUSAN SCHWARTZ
Stewardship

President Friends Of Five Creeks 1996

Helping nature in the East Bay – Hands On. Friends of Five Creeks is an all-volunteer group working hands-on for clean water and healthy watersheds. We protect and restore natural areas that welcome both wildlife and people on the urbanized east side of San Francisco Bay.

COMMUNITY

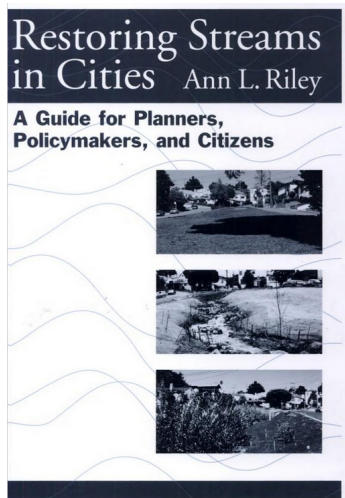


FRIENDS OF SAUSAL CREEK Preservation

Formed in 1996, the Friends of Sausal Creek is a group of community members protecting Sausal Creek at a grassroots level. The Friends recognize that citizen participation, from residents to decision-makers, teachers, and students, is critical for building long-term commitment to protecting Sausal Creek as a natural resource for the greater Oakland community.

STANDARDS

1980
1985
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1995
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2010
2013
FALL 2012



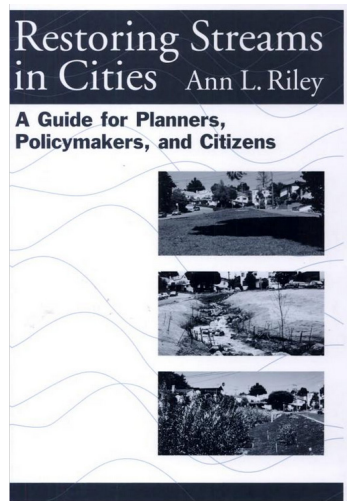
1998

What is Restoration?

“The Society of Ecological Restoration defines restoration as “the process of intentionally altering a site to establish a defined indigenous, historical ecosystem. The goal of this process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem.” An interesting definition that adds more of a human social component is “the process of intentionally compensating for damage by humans to the biodiversity and dynamics of indigenous ecosystems by working with the sustaining natural regenerative processes in way which lead to the re-establishment of sustainable and healthy relationships between nature and culture.”

STANDARDS

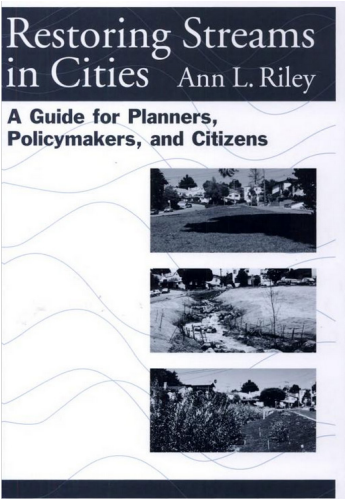
1980
1985
1990
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2013
FALL 2012



Why?

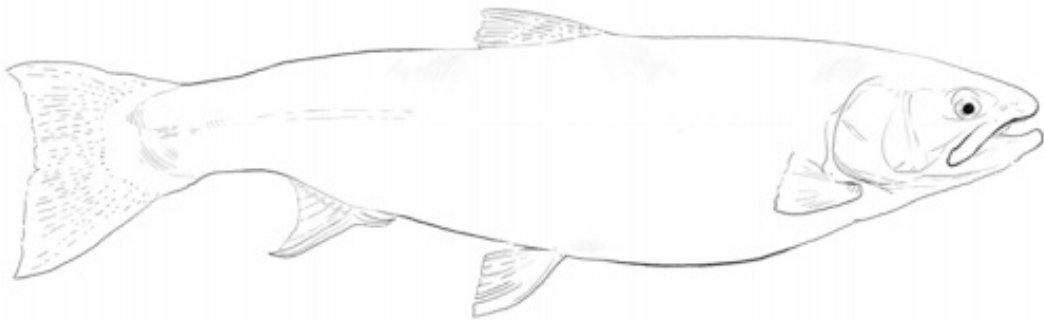
- REDUCE FLOOD DAMAGES
- REDUCE DAMAGES FROM STREAM BANK EROSION
- PRESERVE OR RESTORE A HISTORIC OR CULTURAL RESOURCE
- ENCOURAGE THE RETURN OF BIRDS AND WILDLIFE IN URBAN REFUGES
- DEVELOP PEDESTRIAN AND BICYCLE TRAILS
- UPGRADE THE QUALITY OF LIFE IN URBAN AND NEIGHBORHOOD ENVIRONMENTS
- RESTORE A REGIONAL OR LOCAL IDENTITY
- PROVIDE GREENBELTS, OPEN SPACES AND PARKS
- CREATE INTERESTING EDUCATIONAL OPPORTUNITIES FOR SCHOOLS
- REVIVE A DECAYING DOWNTOWN AND DEPRESSED COMMERCIAL ECONOMY
- CREATE MEANINGFUL JOBS AND JOB TRAINING
- INCREASE PROPERTY VALUE
- CORRECT THE PERFORMANCE AND REVERSE DAMAGES OF LARGE OR SMALL ENGINEERING PROBLEMS
- RETURN PUBLIC LIFE AND COMMERCE TO URBAN WATERFRONTS

STANDARDS



AND...

FIGURE 2-22 STEELHEAD/RAINBOW TROUT, A CRITICAL KEYSTONE SPECIES



INNOVATORS

1980
1985
1990
1995
2000
2005
2010
2013
FALL 2012



DREW GOETTING Innovation

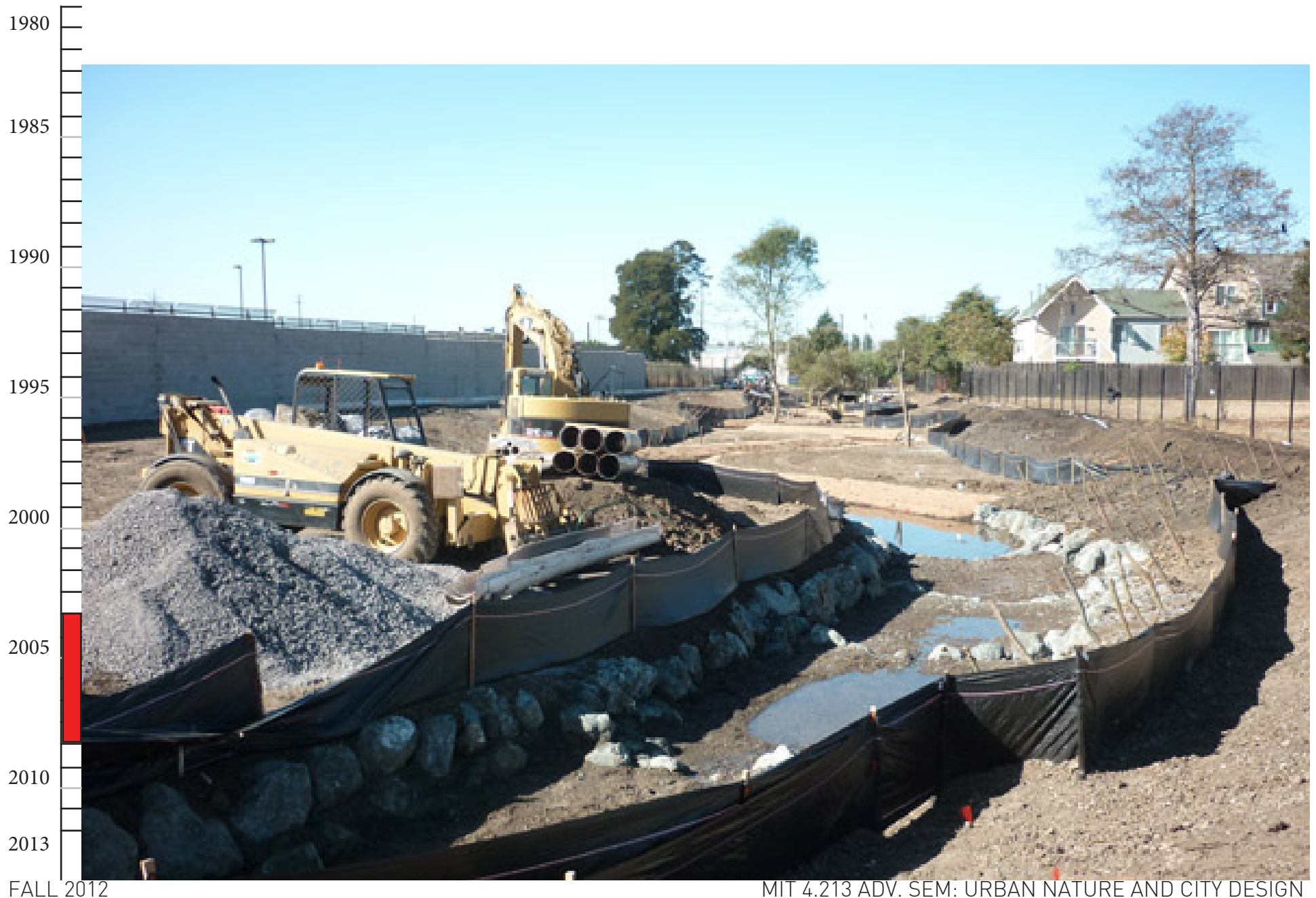
The Restoration Design Group (RDG) 2003

- Approaches urban and rural settings as opportunities to bring together environmental restoration and design to create meaningful places that serve communities and ecosystem health.

Drew Goetting has over twelve years of experience designing and managing stream restoration projects. He has worked extensively with complex teams of scientists, resource managers, regulatory agencies, and private property owners to achieve multi-objective restoration projects. His work focuses on the technical aspects of fluvial geomorphology, flood control, and native riparian vegetation. Mr. Goetting also brings significant expertise in public process facilitation and has conducted numerous community-based planning processes for local, state, and federal agencies. As a leader in the field of environmental restoration, he bridges the gap between public policy, technical stream dynamics, and local community interests. His background is in plant ecology, natural resource management, community and regional development, and landscape architecture. He is an appointed member of the City of Berkeley's Creeks Task Force, charged with reviewing and recommending revisions to policies and ordinances related to urban creeks.

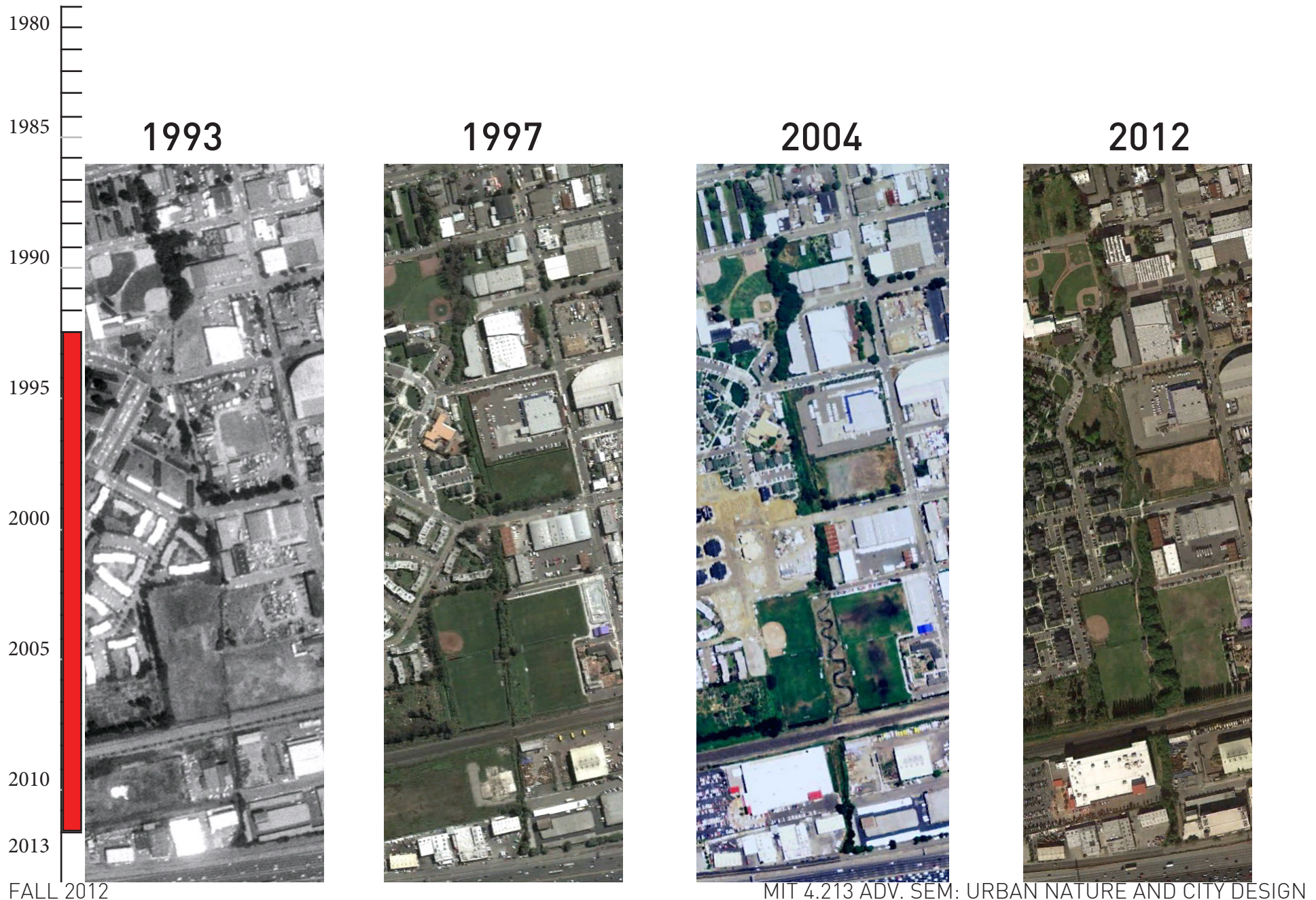
2004-2008 LOWER CODORNICES CREEK PHASE 2,3,4

RDG AND WATERWAYS RESTORATION INSTITUTE + PRIVATE FUNDS TO MITIGATE NEW HOUSING DEVELOPMENT \$3 MILLION FROM WATER RESOURCES URBAN STREAMS RESTORATION PROGRAM FOR 2500 FEET OF STREAM RESTORATION



2004-2008 LOWER CODORNICES CREEK PHASE 2,3,4

RDG AND WATERWAYS RESTORATION INSTITUTE + PRIVATE FUNDS TO MITIGATE NEW HOUSING DEVELOPMENT \$3 MILLION FROM WATER RESOURCES URBAN STREAMS RESTORATION PROGRAM FOR 2500 FEET OF STREAM RESTORATION



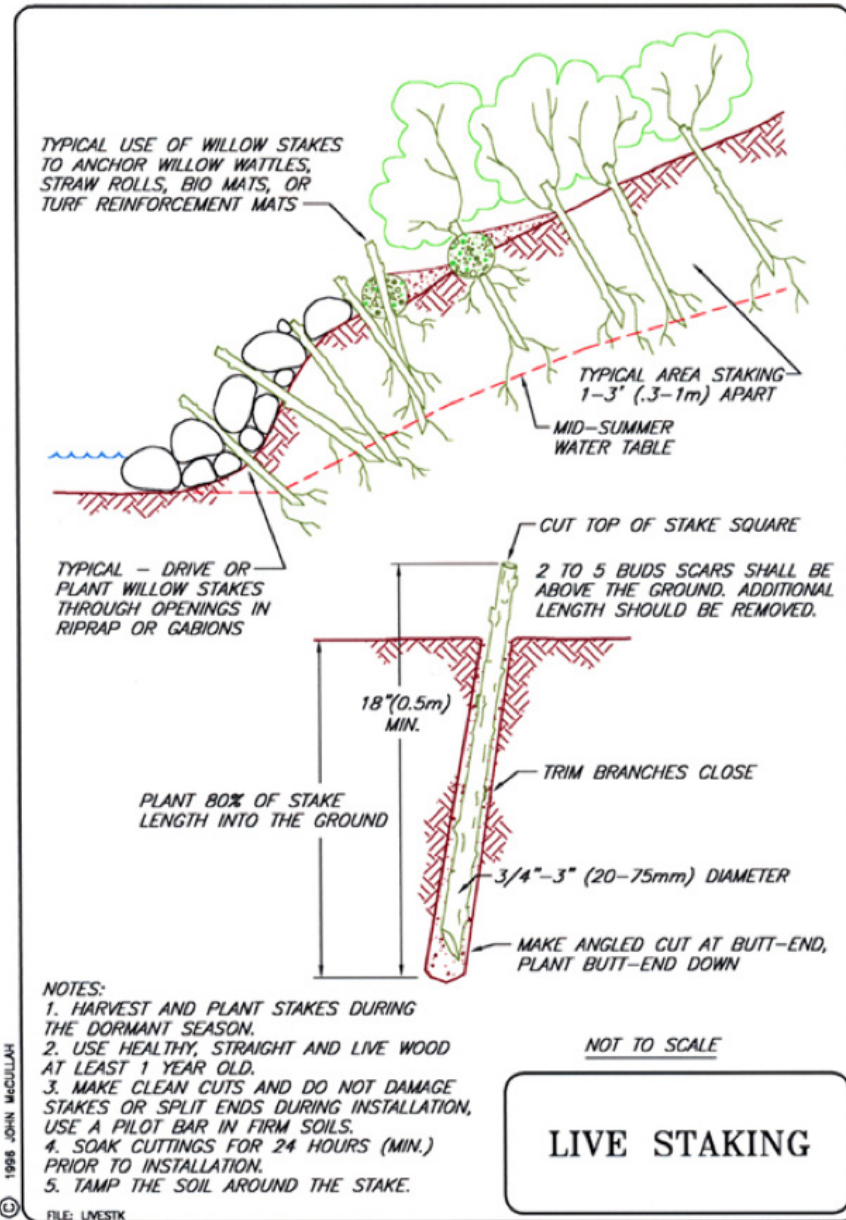
2004-2008_LOWER CODORNICES CREEK MEANDER

DESIGN BY WATERWAYS RESTORATION INSTITUTE AND RDG



2004-2008_LOWER CODORNICES CREEK _WILLOW STAKING

1980
1985
1990
1995
2000
2005
2010
2013
FALL 2012



Typical drawing of Live Staking and Joint Planting

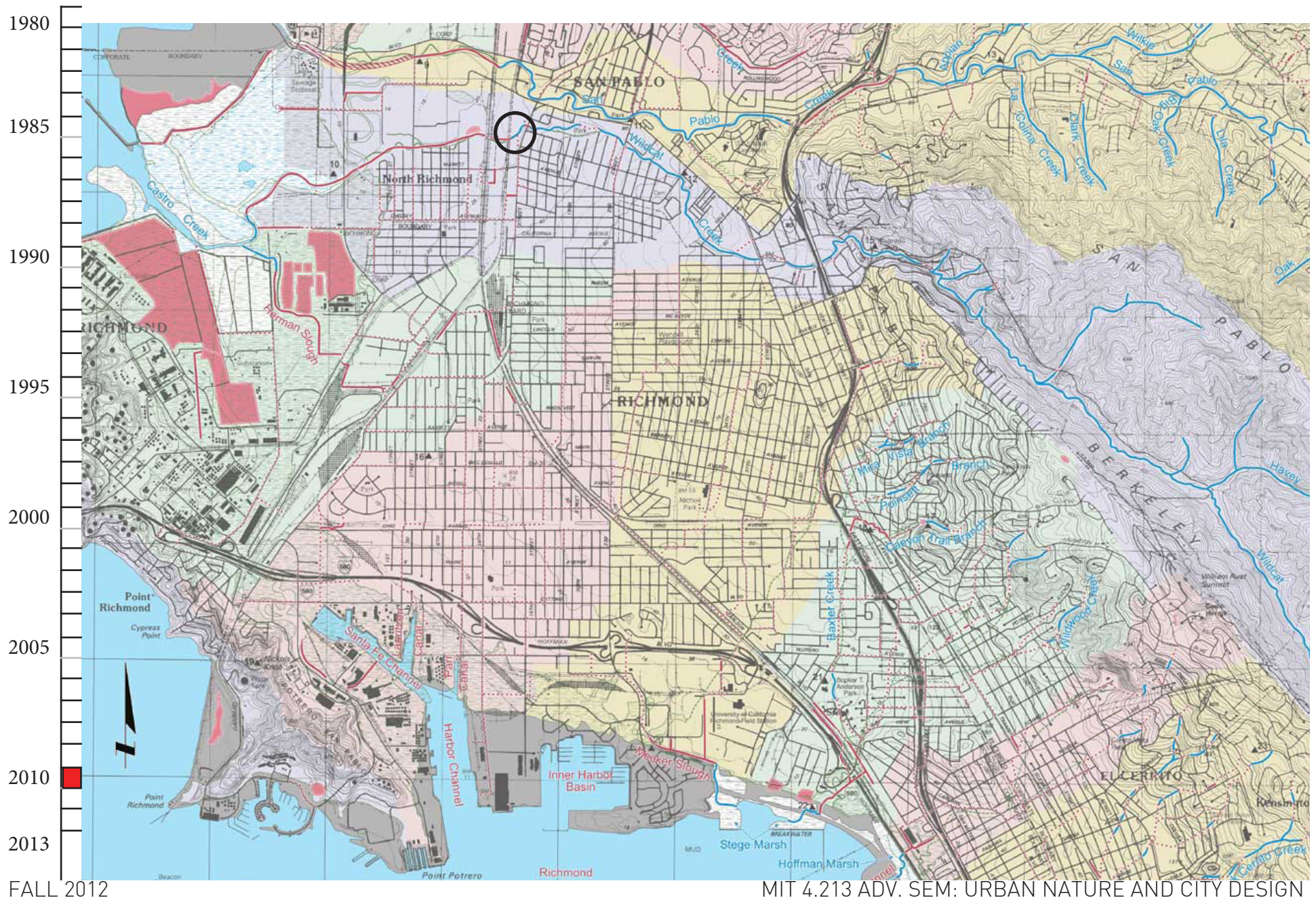


TIME-LINE

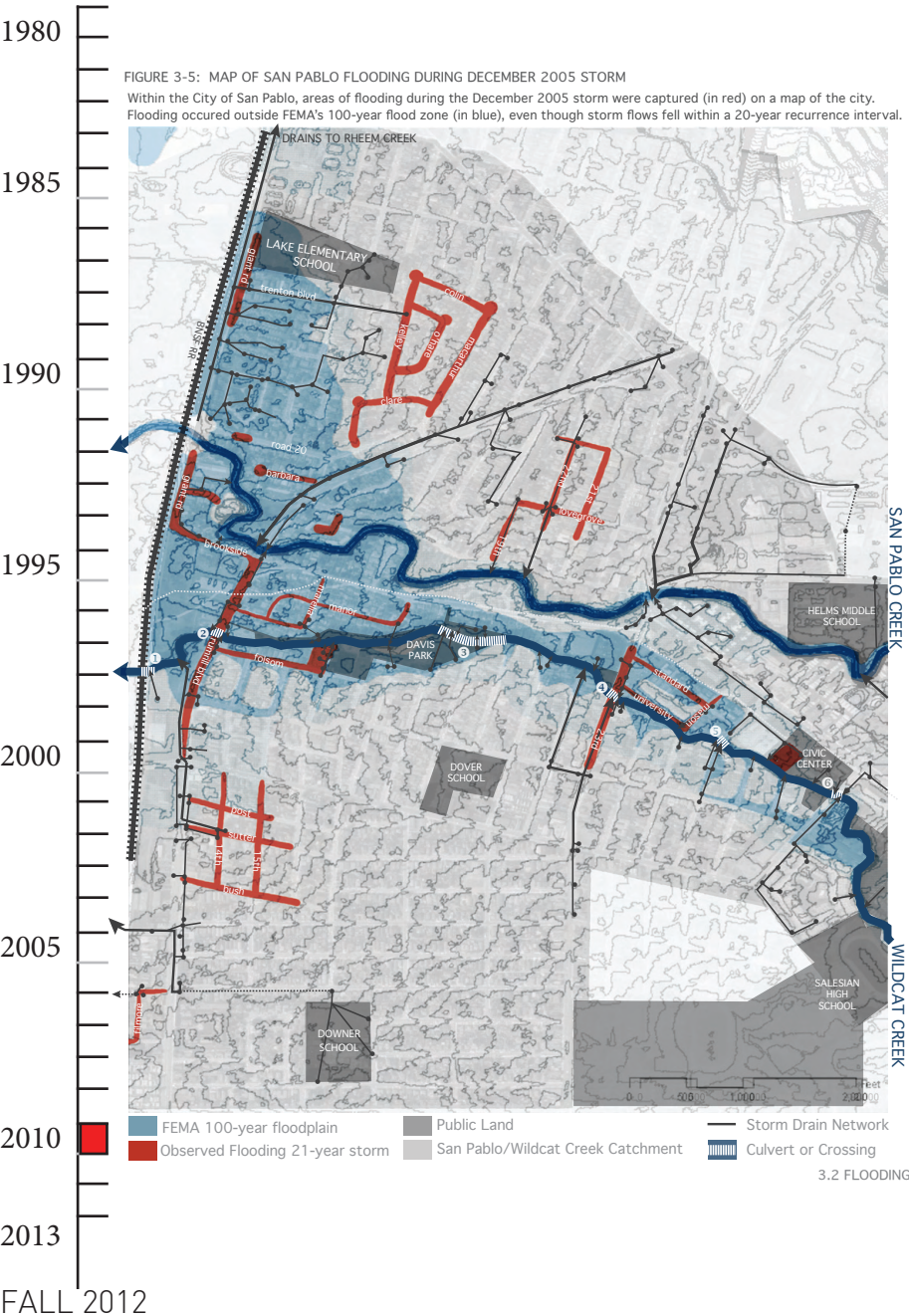
1980	1982 Ann Riley and Carole Schemmerling Founded Urban Creeks Council	1980 Carole Schemmerling Berkeley Parks and Rec Commissioner	
1985	1984 the California Dept of Water Resources Urban Streams Restoration Program established	1985 Wildcat San Pablo Creeks Watershed Council Founded to reverse	1984 Strawberry Creek at Sante Fe Railroad corridor by Wolfe, Gary Mason, Carole Schemmerling
	1987 The Aquatic Outreach Institute		
1990			
	1993 Coalition to Restore Urban Waterways (CRUW) established		
1995	1996 The Friends of Five Creeks The Friends of Sausal Creek Waterways Restoration Institute	1995 Blackberry Creek at Thousand Oaks Elementary School by Wolfe Mason Associates in collaboration with the Urban Creeks Council	1994 Lower Codornices Creek at 8th and 9th by Wolfe Mason Associates in collaboration with the Urban Creeks Council and Ecocity Builders
	1998 Restoring Urban Creeks Published		
2000		2000 Friends of Five Creeks restore Cerrito Creek at El Cerrito Plaza.	1999 Strawberry Creek Downtown Project study
	2003 Restoration Design Group		
2005		2004 Wildcat Creek Restoration Action Plan begun	2004 Lower Codornices Creek at 5th-6th
			2006 Lower Codornices Creek at 7th-8th
			2007 Lower Codornices Creek at 2nd
2010	2010 Wildcat Creek Action Plan Complete	2010 Wildcat Creek Restoration Plan at Davis Park	2010 Strawberry Creek Center Street Approved by City and Designed by Walter Hood Design
	2012 Urban Creeks Council Changes focus to Urban Nature Sites	2011 Sausal Creek Restoration Plan at Dimond Park RDG	
2013			

2010_WILDCAT CREEK WATERSHED ACTION PLAN

URBAN CREEKS COUNCIL FOR WILDCAT CREEK RESTORATION COUNCIL



2010_WILDCAT CREEK WATERSHED ACTION PLAN



WILDCAT CREEK RESTORATION ACTION PLAN | URBAN CREEKS COUNCIL | APRIL 2010

3. PROJECT AREA ANALYSIS

40

Natural levees form over long time periods where overbank sediment is deposited along the top of the banks. Wildcat Creek carries large amounts of suspended sediment and therefore is prone to forming natural levees.

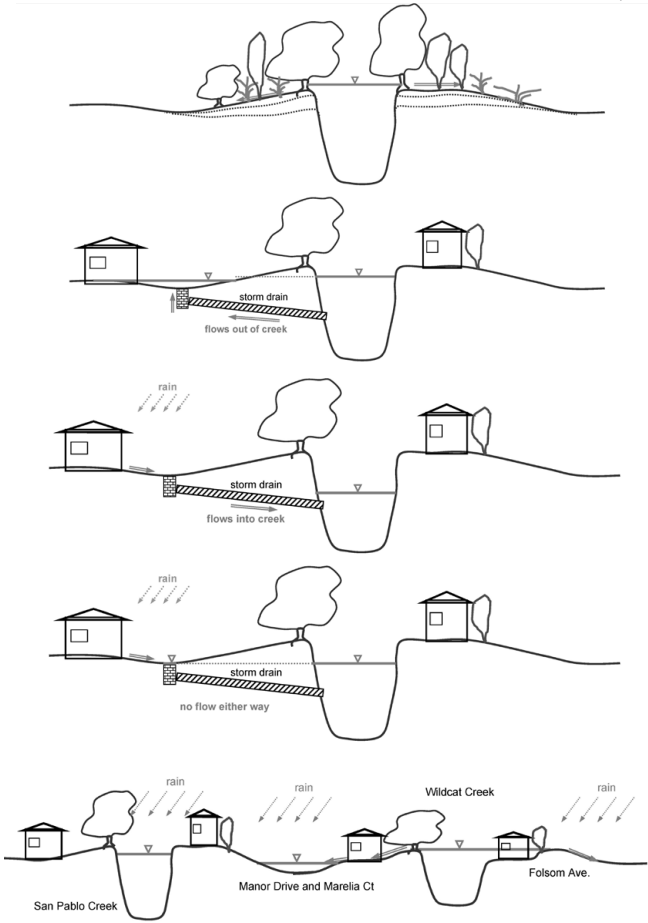
In an urban setting where storm drains are connected to the creek, natural levees may contain the creek within its banks while flood waters flow through the storm drain system and flood developed areas behind the levees.

When creek levels are low, the storm drain functions properly.

If the creek level rises above the elevation of the storm drain invert, the storm drains cannot convey water out of low elevation neighborhoods and in the worst case, creek water may be conveyed into neighborhoods via the storm drains.

During the 21-year storm of December 30, 2005, natural levees along the banks of San Pablo Creek and Wildcat Creek created a flood water trap between the creeks until the creek water surface elevation dropped low enough to allow the storm drain system to function. On Folsom Avenue, homes constructed on the channel terrace experienced extreme flooding.

FIGURE 3-7: STORM DRAIN INFRASTRUCTURE AND NATURAL LEVEES source: Balance (2007)



3.2 FLOODING

WILDCAT CREEK RESTORATION ACTION PLAN | URBAN CREEKS COUNCIL | APRIL 2010

3. PROJECT AREA ANALYSIS

43

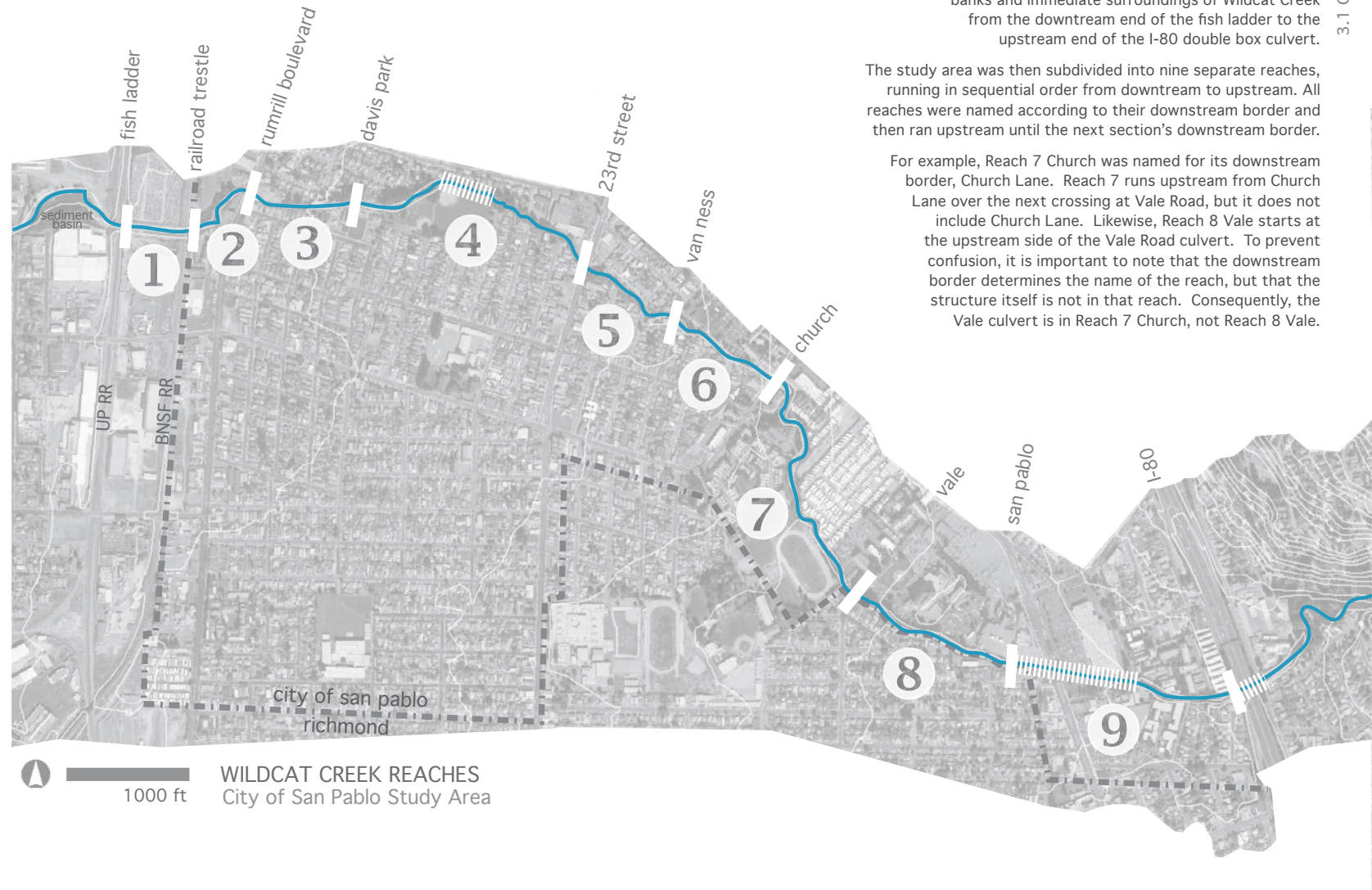
2010_WILDCAT CREEK WATERSHED ACTION PLAN

WILDCAT CREEK RESTORATION ACTION PLAN | URBAN CREEKS COUNCIL | APRIL 2010

3. PROJECT AREA ANALYSIS

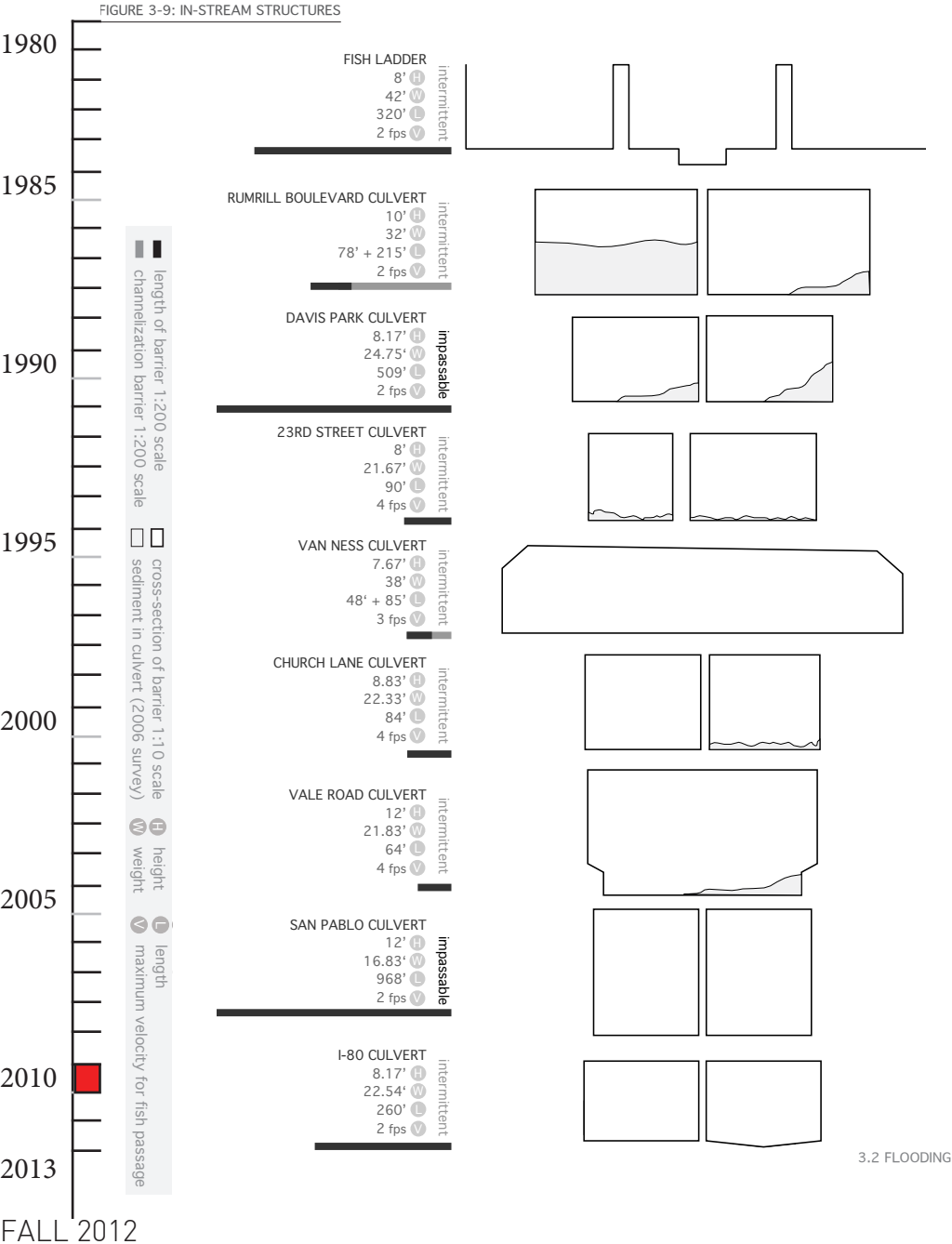
37

FIGURE 3-1: WILDCAT CREEK ACTION PLAN STUDY AREA AND REACHES



3.1 OVERVIEW

2010_WILDCAT CREEK WATERSHED ACTION PLAN



WILDCAT CREEK RESTORATION ACTION PLAN | URBAN CREEKS COUNCIL | APRIL 2010

3. PROJECT AREA ANALYSIS 46

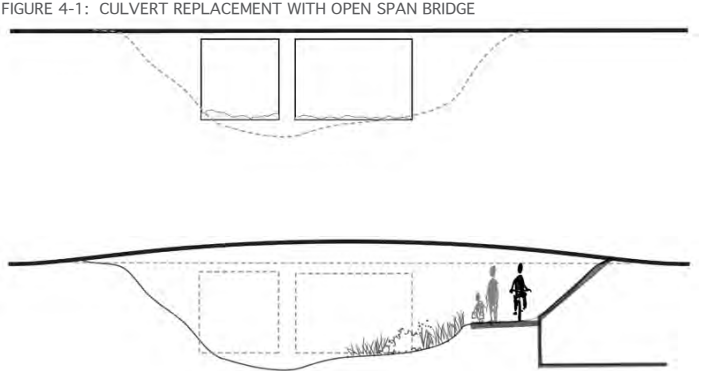
4. RECOMMENDED ACTIONS

This section presents a summary of the significant findings of the report and results of the flood reduction and restoration planning efforts. We present a roadmap of restoration actions along Wildcat Creek to reduce flooding, improve habitat quality and increase recreational resources within the City of San Pablo.

4.1 OBJECTIVES, FINDINGS AND STRATEGIES

STRATEGY 1: REPLACE CONSTRICTIVE IN-STREAM STRUCTURES

The main objective of Wildcat Restoration Action Plan (WRAP) is to reduce flood risk in the City of San Pablo for 100-year flow volumes on Wildcat Creek. Years of flood observation (Section 3.2), geomorphic assessments and recent hydraulic modeling studies (Section 3.2.3) all suggest that insufficiently sized and poorly designed in-stream structures constrict storm flows, creating backwater conditions (raised water surface elevations upstream of the structure) that lead to overbank flooding and in-channel sedimentation. Excessive sedimentation within and upstream of these structures further reduce conveyance capacity, fill over-summering pools and spawning gravels for fish, and create a costly channel maintenance regime for the city. The hard-line entrance and exit angles of several culverts direct flood flows into banks causing erosion and need for revetment, another maintenance cycle. A major strategy of this plan is to remove the structures with the highest potential for reducing flood risks and to replace them with open span bridge structures in order to increase channel conveyance capacity, reduce water surface elevation, prevent overbank flows, reduce sedimentation, restore habitat quality, and allow a recreational trail to safely pass underneath road crossings.



4.1 OBJECTIVES, FINDINGS AND STRATEGIES

WILDCAT CREEK RESTORATION ACTION PLAN | URBAN CREEKS COUNCIL | APRIL 2010

4. RECOMMENDED ACTIONS 57

2010_WILDCAT CREEK DAVIS PARK DAYLIGHTING PLAN

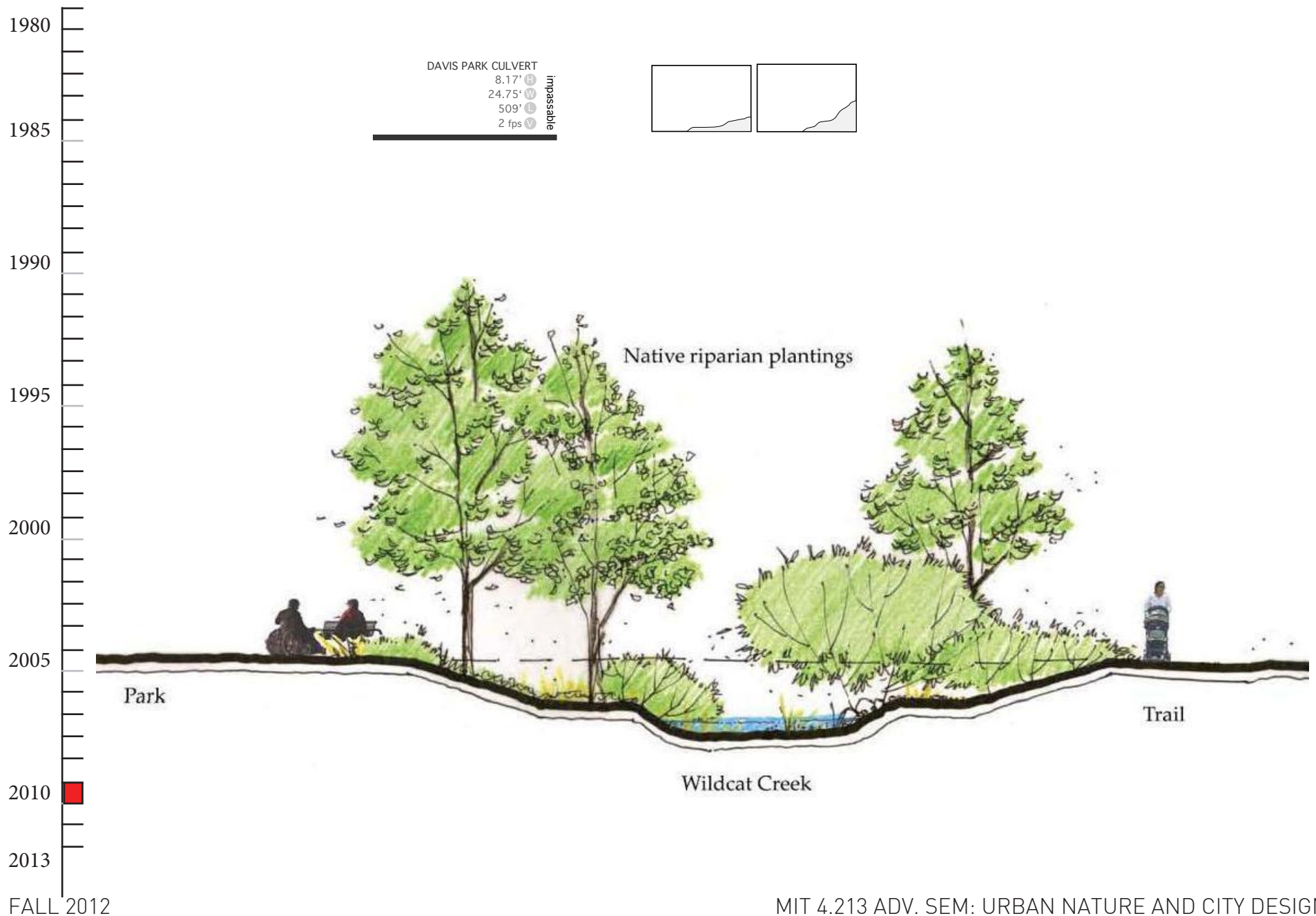


2010_WILDCAT CREEK DAVIS PARK DAYLIGHTING PLAN

RESTORATION DESIGN GROUP (RDG)



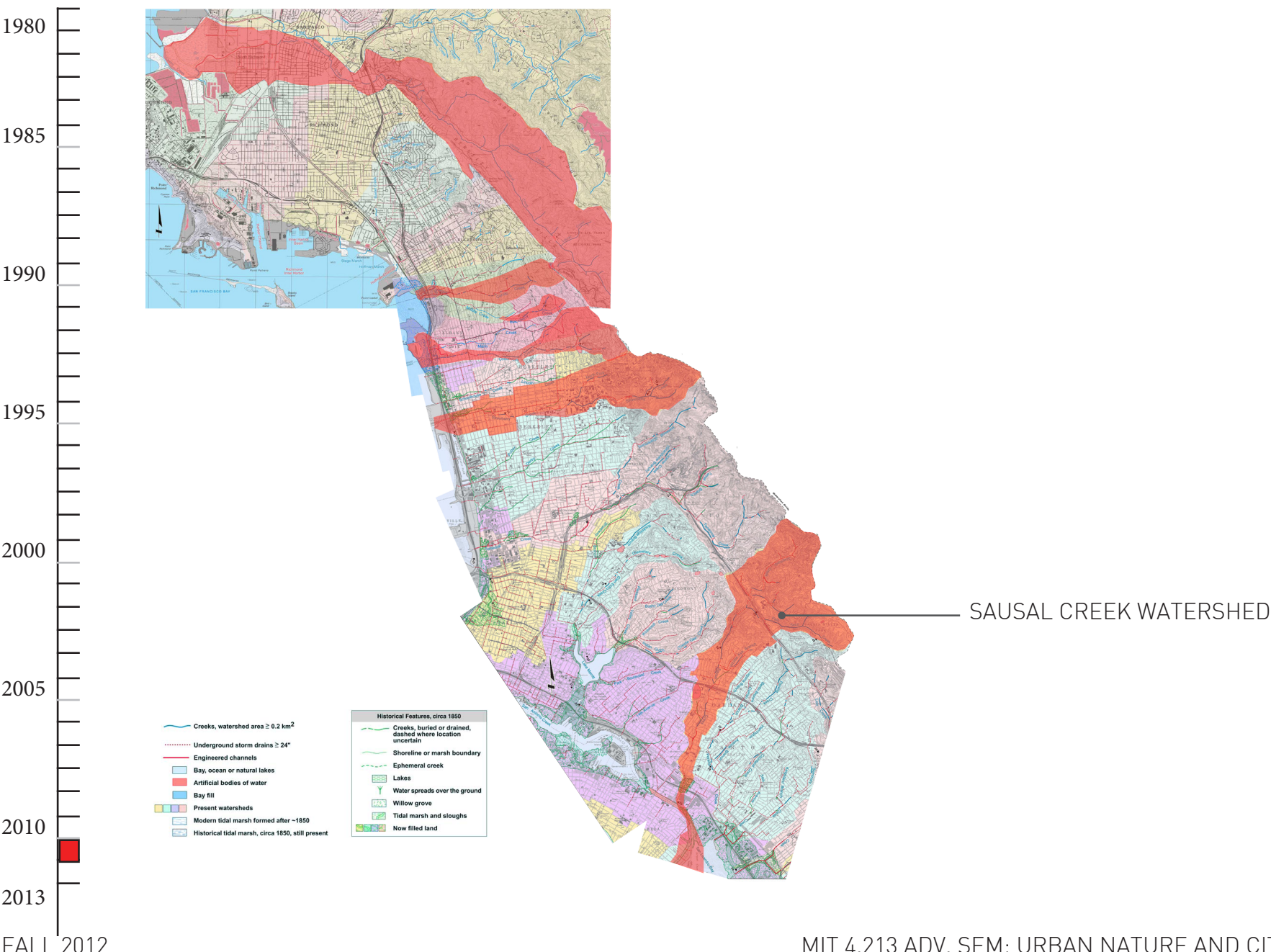
2010_WILDCAT CREEK DAVIS PARK DAYLIGHTING PLAN



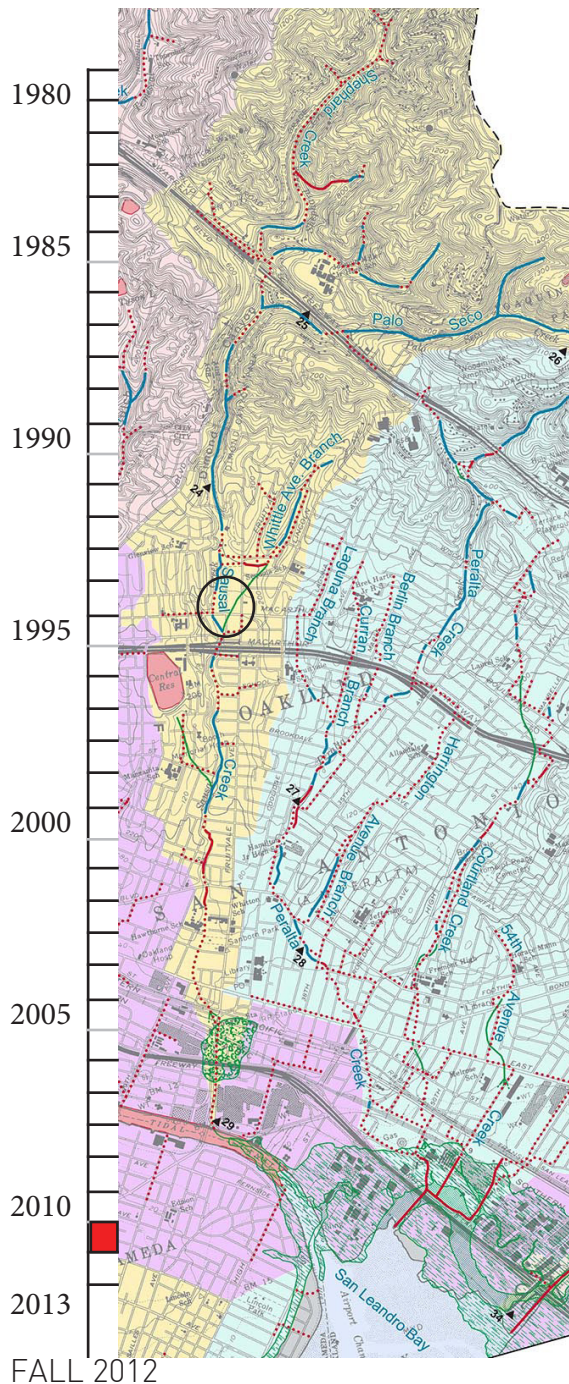
2010_WILDCAT CREEK DAVIS PARK DAYLIGHTING PLAN



2011_SAUSAUL CREEK ACTION PLAN_DIMOND PARK



2011_SAUSAUL CREEK ACTION PLAN_DIMOND PARK



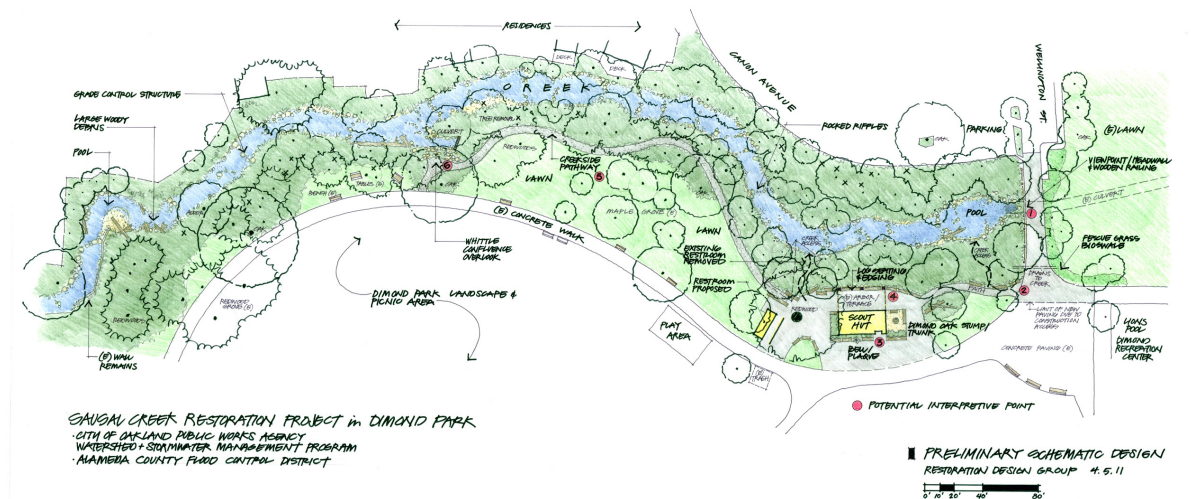
FRIENDS OF SAUSAUL CREEK

The project is funded by a State of California River Parkway Grant (Proposition 50), the Alameda County Flood Control & Water Conservation District and Measure DD: Oakland Trust for Clean Water & Safe Parks

42 trees, larger than 9 inch diameter (4 inch for oaks), would need to be removed for the project. 27 of those are native trees, including 17 redwoods. The remainder includes oak, plum, elm, acacia and pittosporum. Additionally, several small and one large eucalyptus are also proposed to be removed.

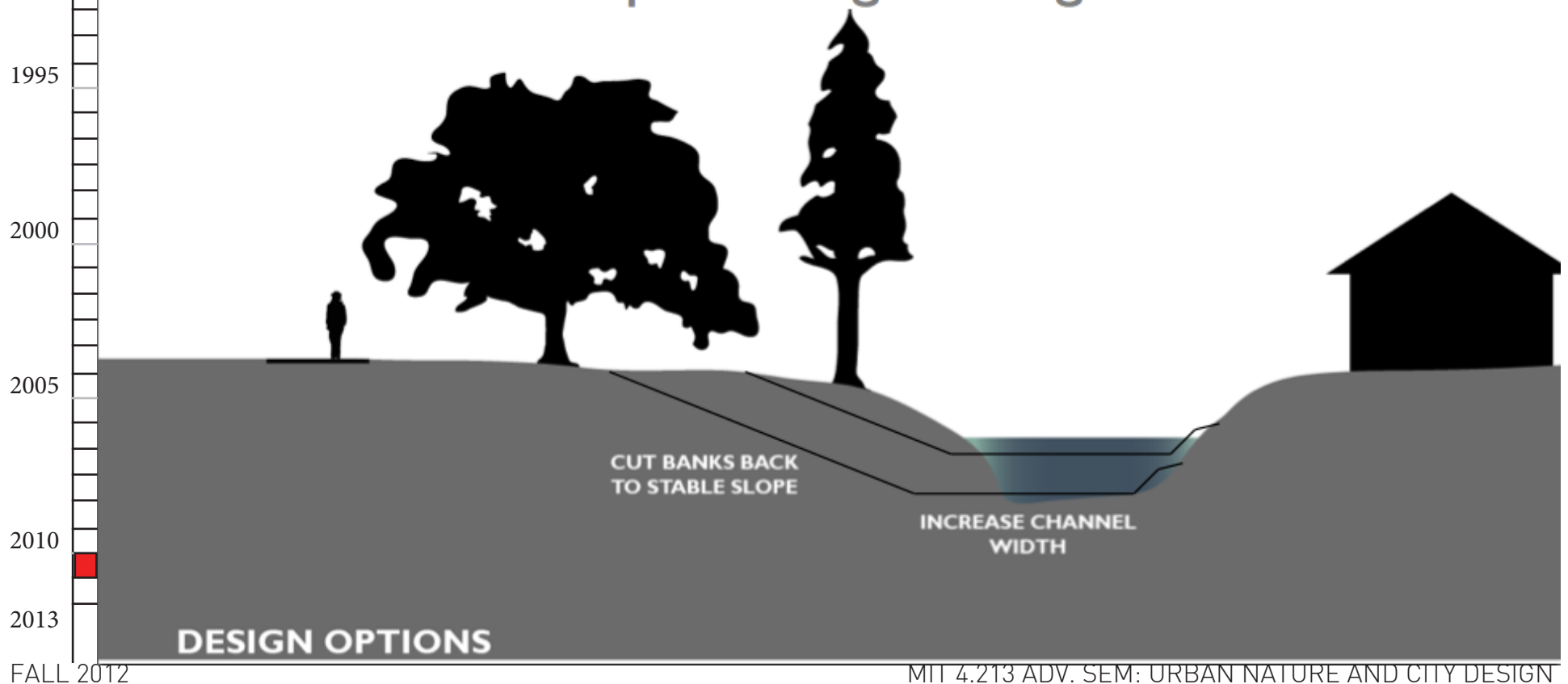
The project includes planting at least 80 new native habitat trees, over 500 new willows, as well as thousands of new native habitat plants.

MAINTENANCE TO BE CARRIED OUT BY DEPARTMENT OF PUBLIC WORKS

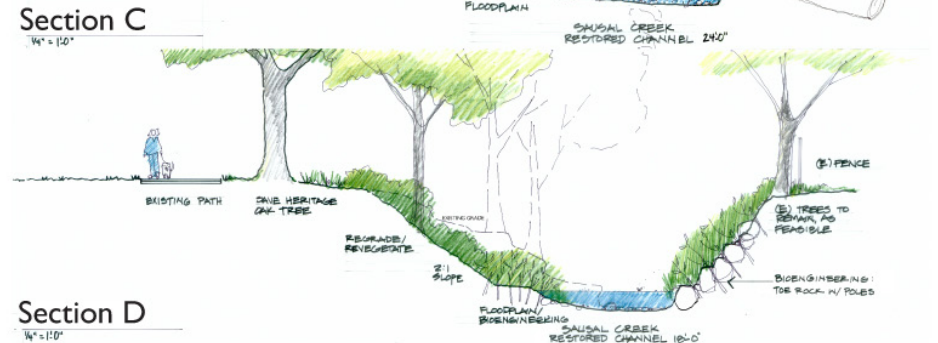
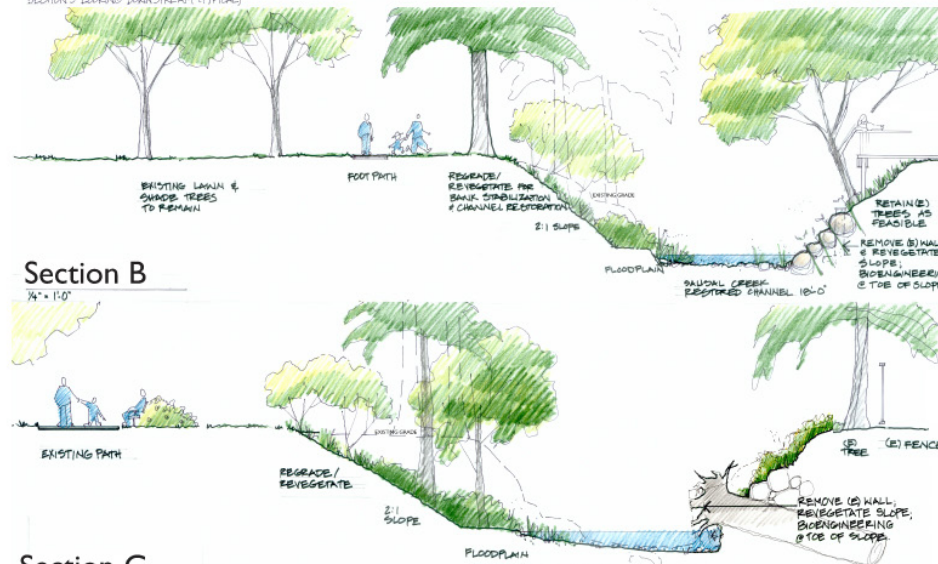


Sausal Creek Design Options

- Primary Objective: Increase the space for the creek while protecting existing infrastructure

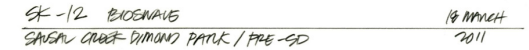


A vertical timeline with years 1980, 1985, 1990, 1995, 2000, 2005, 2010, and 2013. A red square is placed on the line at the 2010 mark. The timeline is labeled 'FALL 2012' at the bottom.

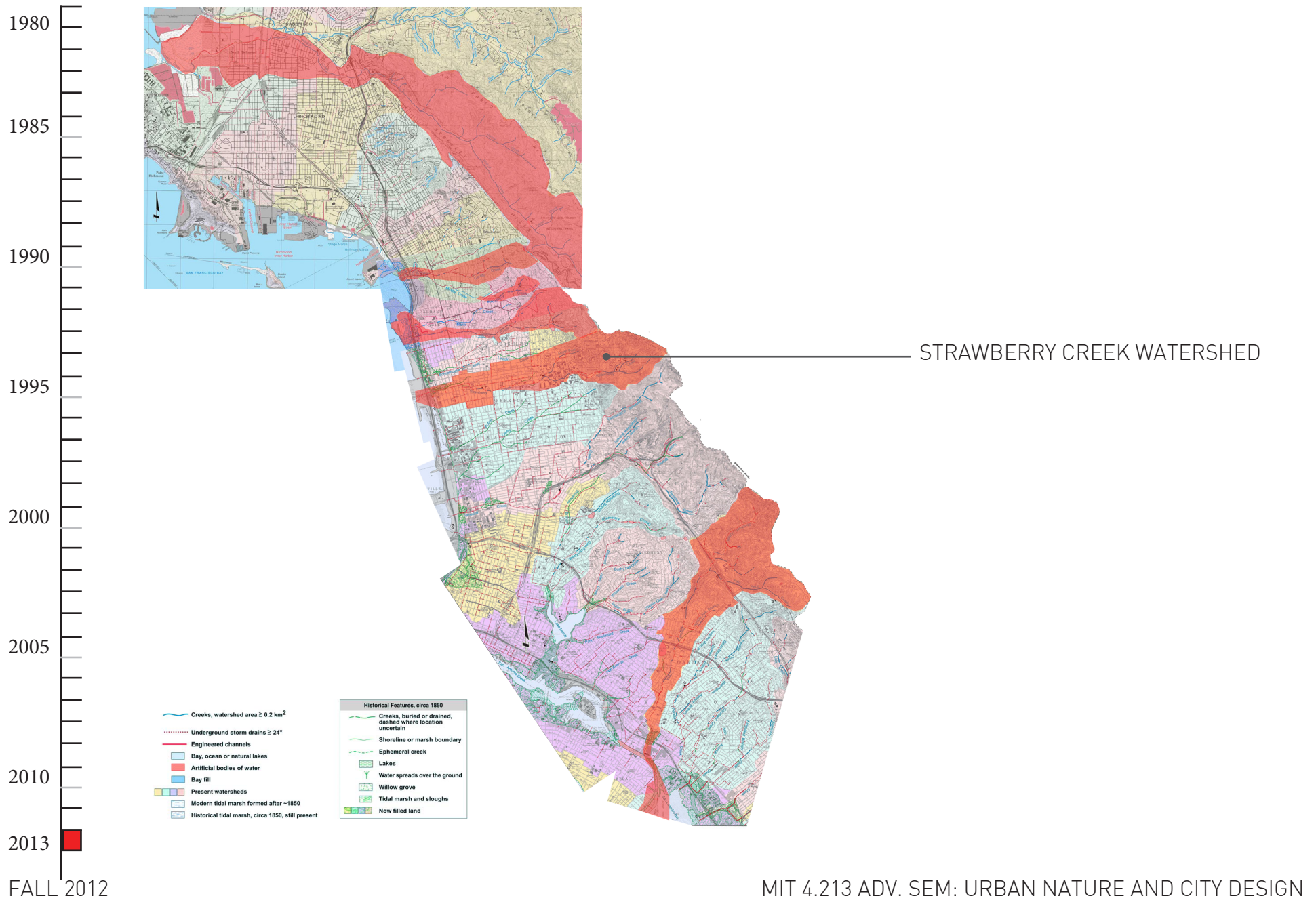


 Scorowater Design Group, LLC
3000 10th Street
Oakland, CA 94612
P: 510.464.2000 F: 510.464.2001

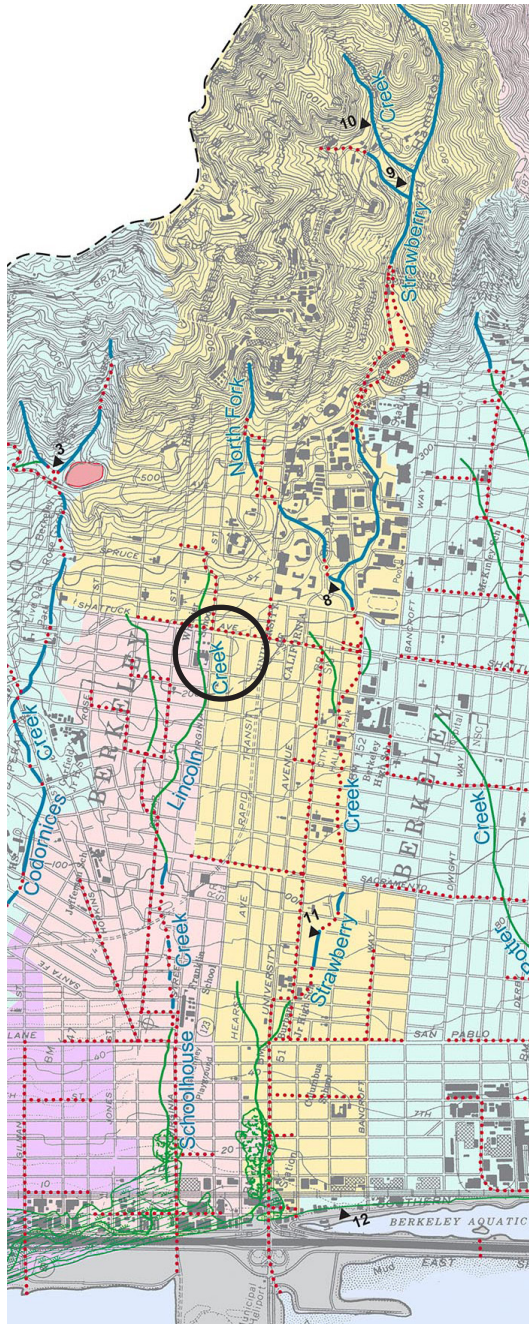
 Sponsored by the City of Oakland
Watershed and Stormwater Management Program



FUTURE_STRAWBERRY CREEK AT CENTER STREET



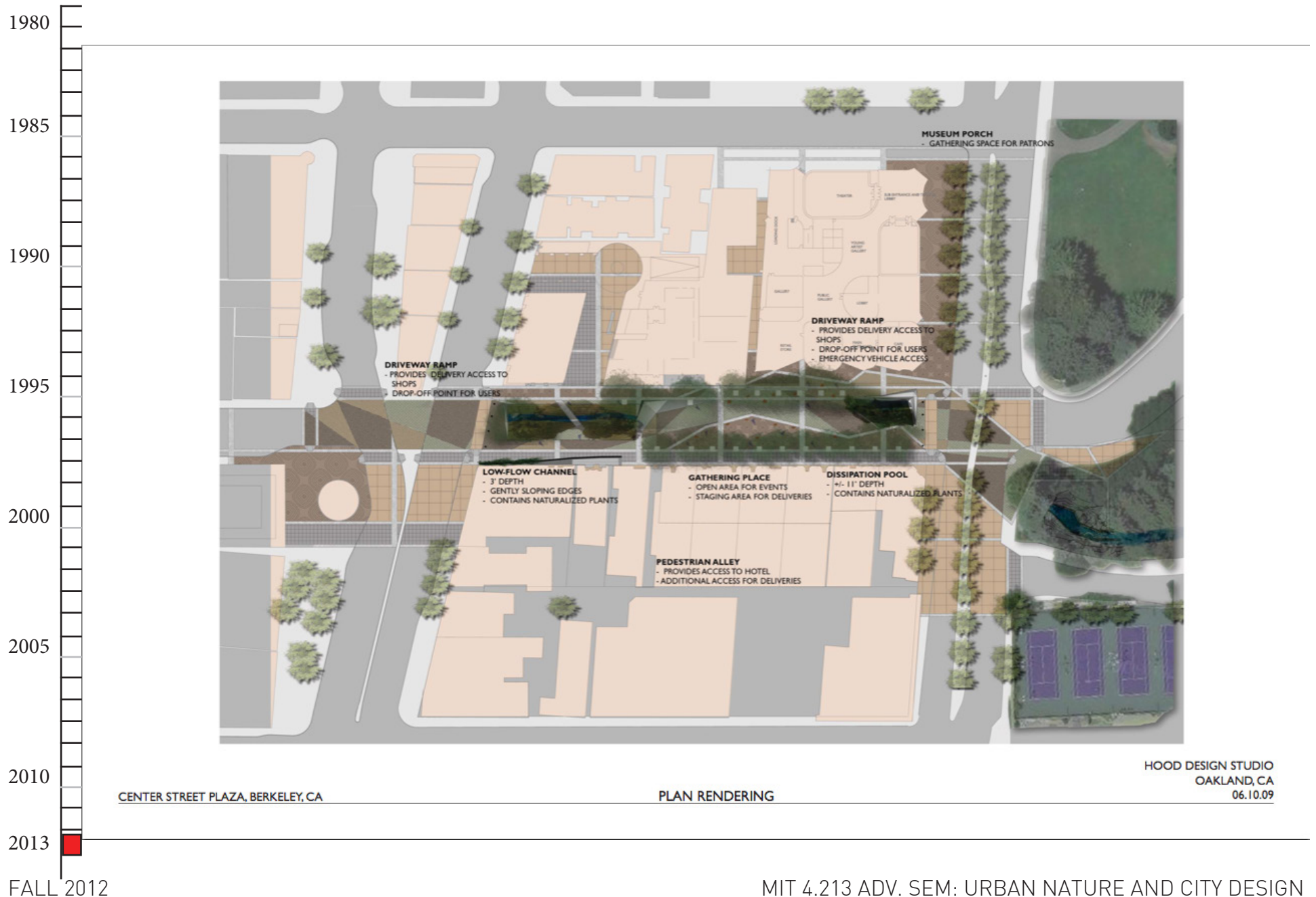
A vertical timeline axis with years 1980, 1985, 1990, 1995, 2000, 2005, 2010, and 2013. A red box highlights the year 2013.



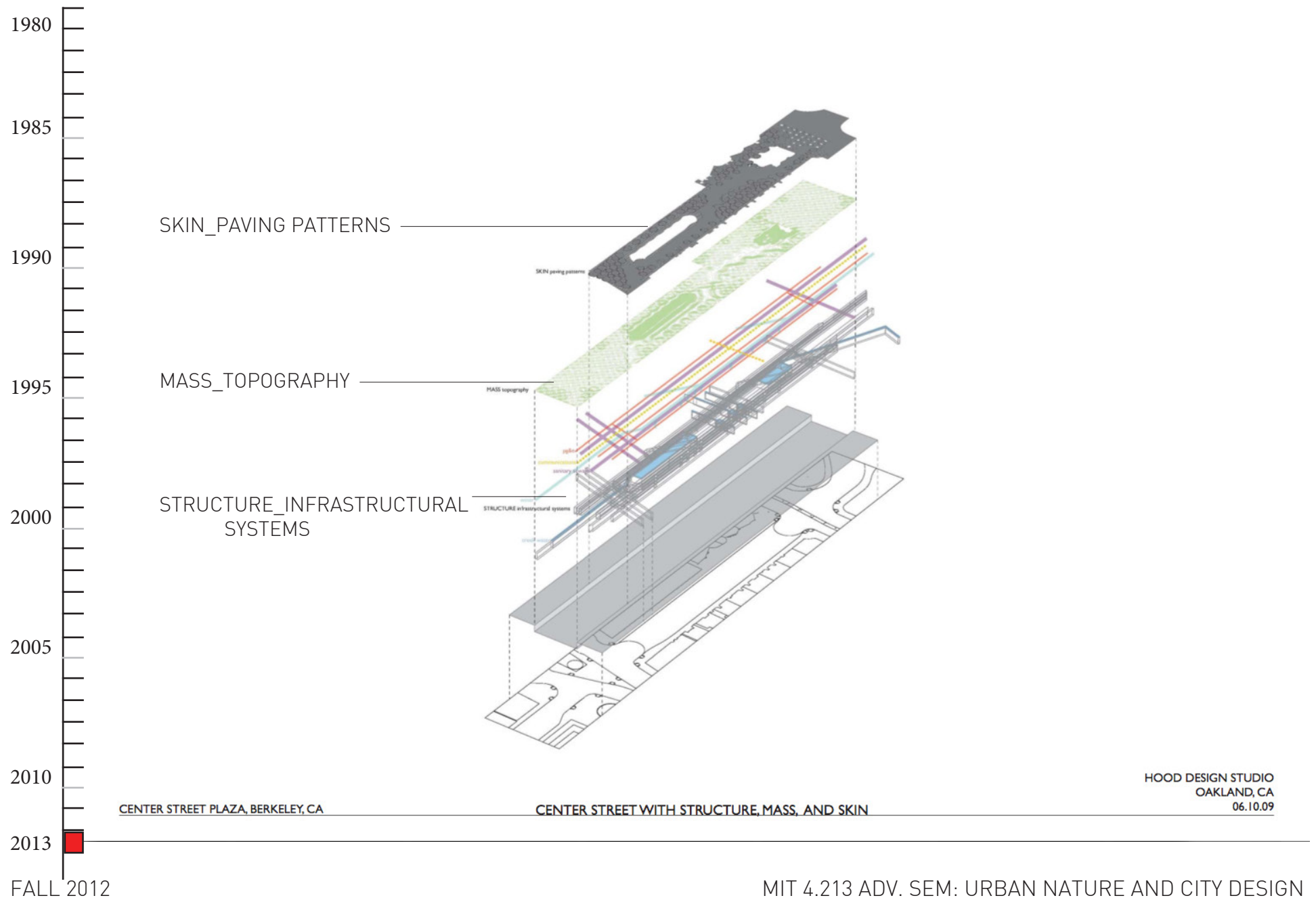
An aerial photograph of the University of Illinois at Chicago campus. A blue line, representing a proposed route, winds through the campus, starting from the top and moving generally southwards. The line passes through various green spaces and buildings. A black circle is drawn on the blue line in the lower-middle section of the image, highlighting a specific location. The surrounding area includes residential neighborhoods and other urban structures.

MIT 4.213 ADV. SEM: URBAN NATURE AND CITY DESIGN

FUTURE_STRAWBERRY CREEK AT CENTER STREET



FUTURE_STRAWBERRY CREEK AT CENTER STREET



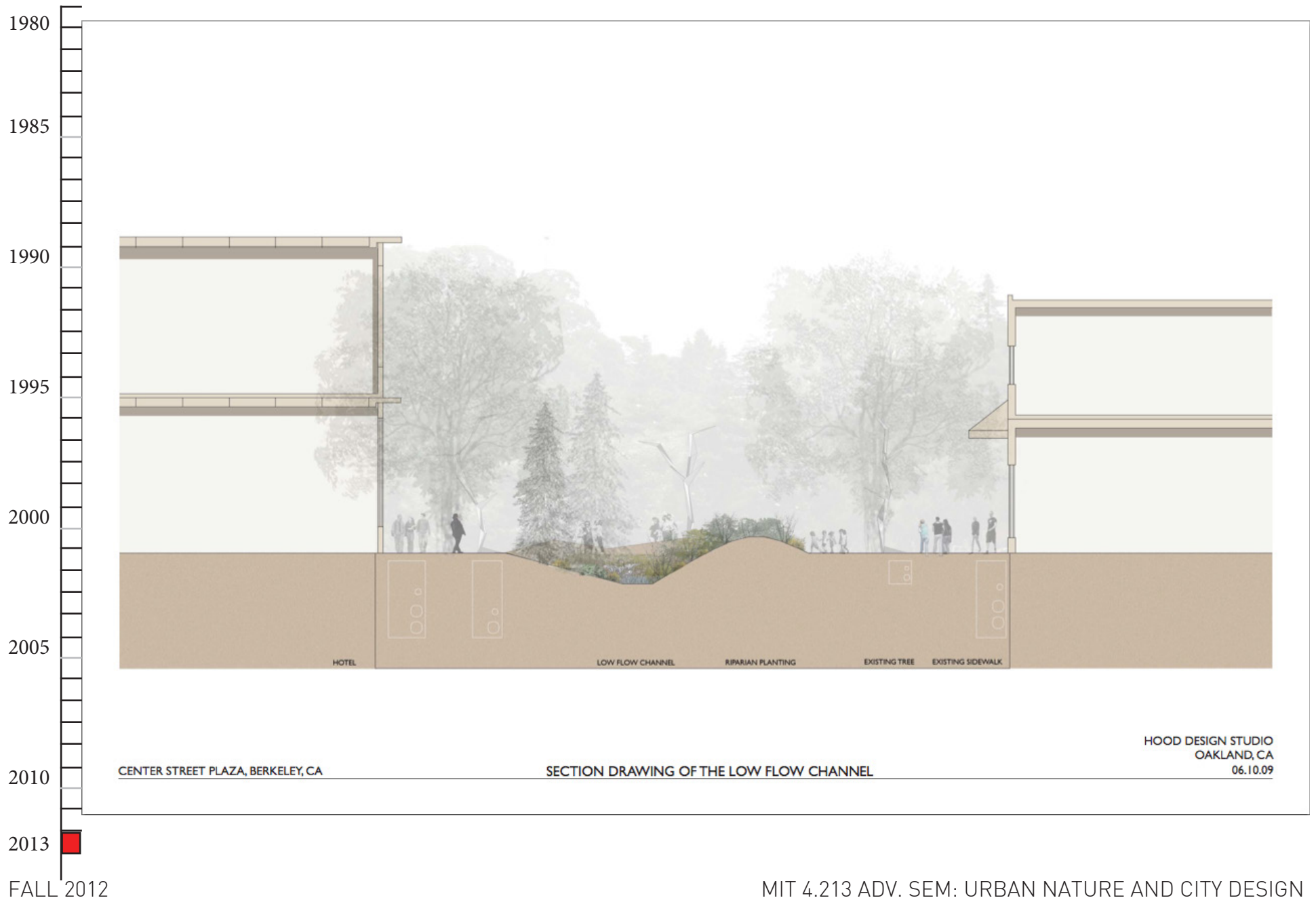
FUTURE_STRAWBERRY CREEK AT CENTER STREET



FUTURE_STRAWBERRY CREEK AT CENTER STREET



FUTURE_STRAWBERRY CREEK AT CENTER STREET



FUTURE_STRAWBERRY CREEK AT CENTER STREET



FUTURE_STRAWBERRY CREEK AT CENTER STREET

RESTORATION OR GARDEN?
WHERE SHOULD THE MONEY GO?

SUMMARY_BOTTOM UP AND TOP DOWN

Start It Up

- Start small. Small projects give a community a feel for the value created and can generate support for doing more later.
- Begin to pursue funding early on. Try to leverage small grants into more funding.
- Do a thorough historical analysis of the site. What's underneath will affect project costs from excavation effort to soil amendments.

Reach Out

Get the community involved right away. Make sure residents understand what is involved, and be sure this is something they want. Outreach is very important. How it is done can determine the community reaction. Make the process very inclusive. Most of the neighbors can, and must, buy in. Design and construction get a lot of emphasis, but working with the community is a big part of the total effort involved. The Urban Creek Council's Carole Schemmerling advises, "Get as much information out there as possible in whatever ways you can do it. Tell people: here are the benefits, here are problems people perceive might occur, and here is the reality of other, completed projects. They have to have the pros and cons, and every situation is different." Work hard to develop a constituency for the project. Fostering supportive neighbors and users pays off politically and economically (in the form of volunteer labor and site stewards). Get schools involved. Schemmerling again: "Kids will be in the creek right away anyway, and involving them creates an incentive to do it right." Get lots of press coverage. Organize tours, host receptions, and so on. Get the word out and solicit ideas and concerns. Handle the concerns early. Enlist community help in planning and maintaining the project. Hold a community design "charrette"—an intensive workshop to develop objectives and design ideas. Organize planting and clean-up days. To stem vandalism, seek to involve kids and youths: they are less likely to pull the new willows for sword fights if they planted them.

Collaborate

- Work diligently with affected landowners. Note their concerns and adjust designs to allay fears and produce value for them.
- Link the project into a larger-area development scheme or master plan. This is especially helpful in more urban areas, where the expense and politics of right-of-way acquisition necessitate broad support. Also, a larger project with multiple benefits may be easier to fund than a more narrowly-focused one.
- Take a watershed approach. Look upstream and downstream for potential allies, like people affected by flooding or erosion problems that daylighting may help address. Don't take no for an answer. Work with local agencies and politicians to help them recognize the value being created.
- Obtain the enthusiastic support of one or more influential politicians. This can make everything else come much more easily.

SUMMARY_BOTTOM UP AND TOP DOWN

Seek Assistance

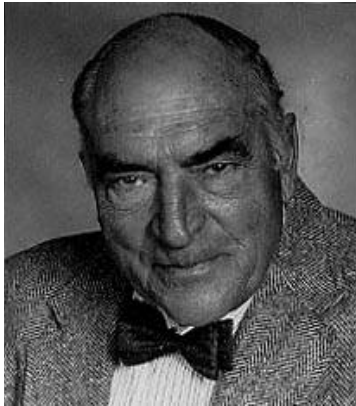
- Design the channel carefully, with competent technical help. The last thing daylighting proponents need is to have a project blow out, so it's imperative to get the hydraulics right.
- Look for solutions that reduce technical or construction complexities. For example, find ways to do appropriate parts of the restoration work using volunteers and the local conservation corps. This cuts costs, creates jobs, and connects local people to the local environment and restoration well. Engineers who haven't done this sort of work may not fully appreciate the differences between the hydraulics of rigid channels and living streams, or the biologic and aesthetic issues. Earthmoving contractors must have a feel for what the designers want, and an ability to make field adjustments as required by the supervising engineer or designer.
- Pull together a competent team. It takes many types of expertise to pull off projects like these. Find a qualified generalist to pull it all together— someone with broad enough training or experience to understand the approaches, language, and data of all the various experts participating in the project, and with the requisite intuition to envision the desired outcome and steer the project toward it.
- Plan the logistics of construction carefully, especially if the seasonal window for earthmoving and planting is narrow due to wet weather or other conditions. Have everyone lined up to go.

Maintenance

- Prepare for strong follow-up. Most daylighting projects need continued planting and maintenance in their early years. It may be necessary to try many different plantings to see which work best with the site's soils, hydrology, etc. Plant and replant what can survive until a vegetative canopy gets established.
- Develop a budget for the first two to three years of follow-up. Ideally this should be incorporated into the overall project budget and funded before construction begins. This budget should include monitoring and evaluation of channel and bank stability and re-vegetation dynamics; training and supervision of volunteers and any paid maintenance personnel; tools; and an allowance for additional plants and other materials.
- Educate neighbors and users about the beauty and value of native species. People often expect more conventional landscaping.
- Educate them as well about the successional stages of the restoration. Landscape architect Gary Mason notes that a project will go from infancy to adolescence to maturity, with a different look and feel at each stage. The project will look like a mess as it's being done, then in the first years, shrubs and weeds will predominate. These are necessary for stabilizing the soil, and are part of the evolution toward a vegetative canopy, but they may prevent people from seeing or accessing the creek for a time.
- Document everything! Says Carole Schemmerling, "There is nothing so powerful as pictures of the culvert coming out, of the first fish, the first crayfish, the first bird's nest along the new stream."
- Take plenty of time. Be in it for the long haul. Successful daylighting projects are an incremental learning process.

SUMMARY_BOTTOM UP AND TOP DOWN

NETWORKED SUPPORT CHAIN



SCIENTIFIC VISIONARY



POLICY DRIVER



IMPLEMENTATION



STEWARDSHIP



INNOVATION

SUMMARY_BOTTOM UP UP AND TOP DOWN

OR, ACTIVISM



URBAN DE-PAVING

+



CANADIAN TREE PLANTING
AKA REFORESTATION

SUMMARY_BOTTOM UP AND TOP DOWN

HOW DO WE START THE NEXT MOVEMENT?

Bibliography:

Charbonneau, Robert B, and Vincent H Resh. "Strawberry Creek on the University of California, Berkeley campus : a case history of urban stream restoration." Aquatic conservation : marine and freshwater ecosystems. 2 (1992).

Hood, Walter, "6.10.09 Late Communication Center Street Hood Design Final Presentation Planning 11x17" Oakland, California. Hood Design Studio, 2009

"How to Depave." Depave. From Parking Lots to Paradise. N.p., n.d. Web. 20 Oct. 2012. <<http://depave.org/learn/resources/>>.

"Integrating Stormwater into Built Environment" Environmental Services, City of Portland . N.p., n.d. Web. 29 Oct. 2012. <<http://www.portlandonline.com/bes/index.cfm?c=50367>>

Kao, Yi-liang, and Candy Ma. Evaluation of the Codornices Creek restoration project, 1996.

Mortimer, Katherine, and Berkeley (Calif.). Parks and Waterfront Dept. Draft initial study for the Codornices schematic plan and Harrison Street playing fields and Codornices Creek improvement project. Berkeley, Calif.: City of Berkeley, Parks and Waterfront, 1999.

Pinkham, Richard. Daylighting: New Life for Buried Streams. Old Snowmass, Co.: Rocky Mountain Institute, 2000. Print.

"Public and Private Partnership Transforms Alley in Hayes Valley into Livable Public Space." City and County of San Francisco Department of Public Works :. N.p., 25 Oct. 2010. Web. 29 Oct. 2012. <<http://www.sfdpw.org/index.aspx?page=1354>>.

Register, Richard, "Ecocities : Rebuilding Cities in Balance with Nature"
Gabriola, BC : New Society Publishers, c2006

Register, Richard, "Ecocity Berkeley : building cities for a healthy future"
Berkeley, California. : North Atlantic Books, c1987

"Resources" Depave. From Parking Lots to Paradise. N.p., n.d. Web. 29 Oct. 2012. <<http://depave.org/learn/resources/>>.

"Restoration Design Group: RDG." Restoration Design Group: RDG. N.p., n.d. Web. 1 Dec. 2012. <<http://www.restorationdesigngroup.com/>>.

Riley, Ann L, Drew Goetting, Joshua Bradt, and Waterways Restoration Institute. Restoration design for Strawberry Creek from the Oxford Street culvert to the upstream culvert at the eucalyptus grove on the North Fork. Berkeley, Calif.: Waterways Restoration Institute, 1998.

Bibliography Continued:

Riley, Ann L. Restoring Streams in Cities: A Guide for Planners, Policymakers, and Citizens. Washington, D.C.: Island, 1997. Print.

Smith, Brooke R. "Water Resources Collections and Archives." Assessing the Feasibility of Creek Daylighting in San Francisco, Part I: A Synthesis of Lessons Learned from Existing Urban Daylighting Projects [eScholarship]. Brooke Ray Smith, 7 Dec. 2007. Web. 29 Oct. 2012. <<http://escholarship.org/uc/item/4m48c7x7>>

Stevens, Phil. Telephone interview. November 28, 2012

"Stormwater Management Best Practices." EPA. Environmental Protection Agency, n.d. Web. 29 Oct. 2012. <http://www.epa.gov/oaintrnt/stormwater/best_practices.htm>.

Schwartz, Susan. Telephone interview, November 28, 2012

Urban Creeks Council, and William M. Kier Associates. "Codornices Creek watershed restoration action plan, phase 2 final monitoring report", 2008.

Waterways Restoration Institute. Final Strawberry Creek report : hydraulic geometry, hydrology, pipe hydraulics and natural channel restoration design. Berkeley, CA (1250 Addison St., #107, Berkeley 94702): The Institute, 1999.

"Wildcat Creek Restoration Action Plan" version 1.3 april 26, 2010, prepared by The Urban Creeks Council for the Wildcat-San Pablo Watershed Council