San Mateo Countywide Stormwater Resource Plan

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Program Manager, C/CAG

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Water Pollution Prevention Program

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www.flowstobay.org

Public Workshops

January 5,9, & 10, 2017

Workshop Goals

- Provide an overview of the Countywide Stormwater Resource Plan
- Summarize ongoing stormwater planning efforts throughout the county
- Hear questions and feedback from community stakeholders – you can help shape this work!
- Chance to win goodies…

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What is the FlowstoBay Program?

- Countywide Water Pollution Prevention Program
  - Program of City/County Association of Governments
  - Joint Powers Agency of all 21 municipalities in county
- Funds from property tax and vehicle license fees
- Assist cities in meeting regulatory requirements to keep rainwater runoff clean

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Stormwater – What's the Big Deal?

- Urbanization = hard surfaces and pollutants
- Rain washes pollutants away
- Flows into inlets and underground pipes
- Discharge directly to creeks, the Bay, or ocean
- No treatment to remove any pollutants
- Impacts water quality and aquatic life

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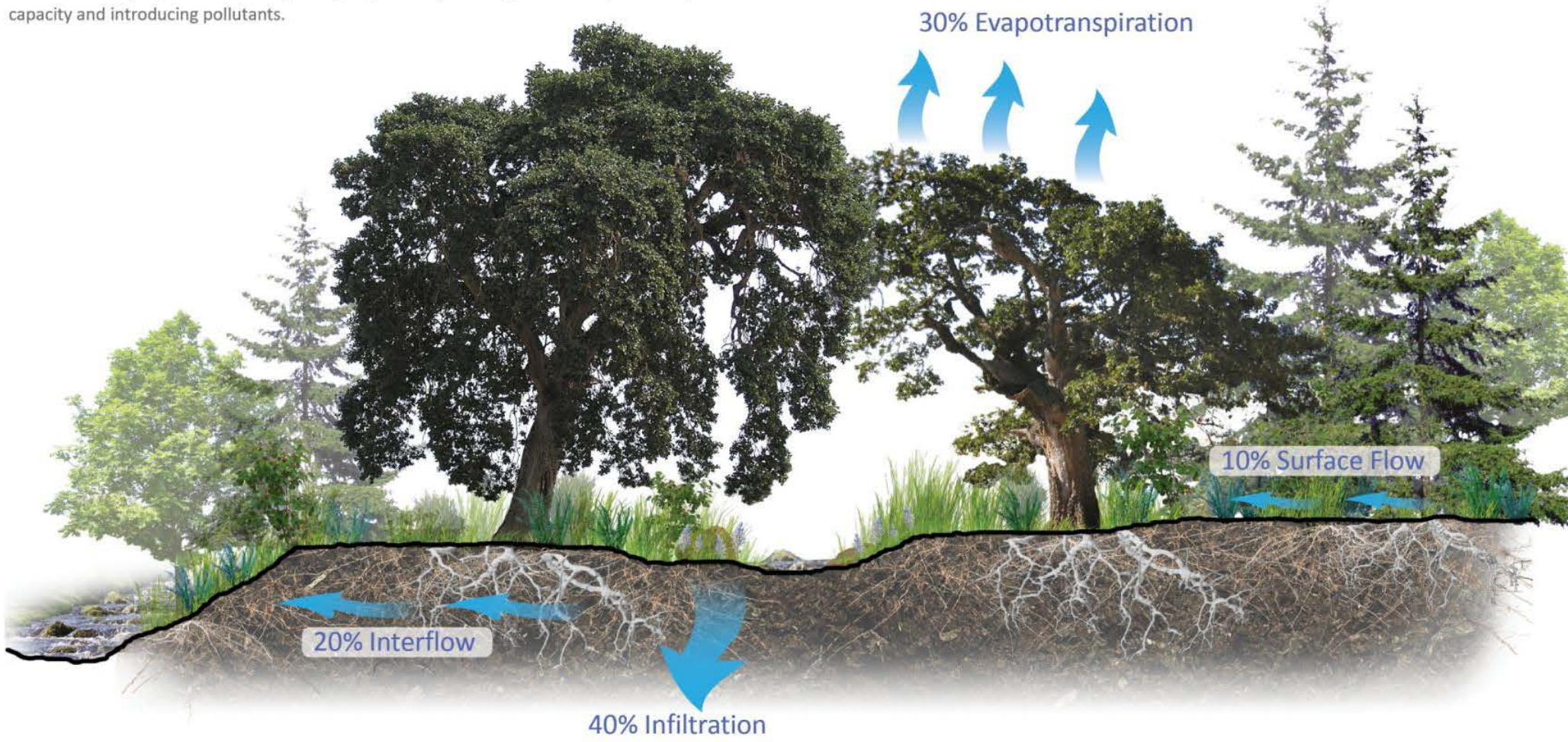
1.2 Pre-Urban Development

A Healthy Landscape

A healthy, undisturbed landscape acts like a sponge by capturing, absorbing, and slowing the flow of water from the moment a raindrop lands on the ground. Urban development, though, has dramatically impacted natural hydrologic systems by reducing the landscape's absorptive capacity and introducing pollutants.



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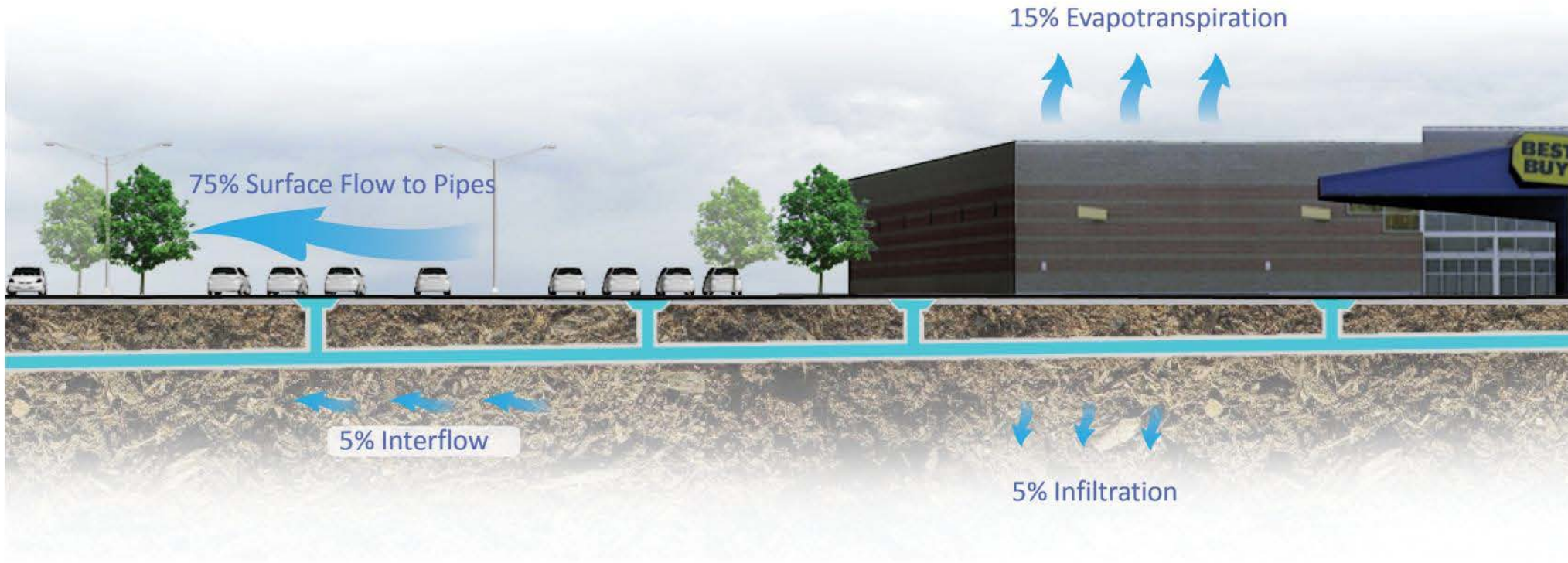
1.3 Urban Development

The Effects of Impervious Area

When the natural landscape is urbanized, impervious surface is created that prevents water from being absorbed at the source. Sediments and pollutants from streets, parking lots, homes, yards, and other sources are washed into pipes and water bodies. Stormwater runoff increases as more and more impervious surface is created. The high volume and velocity of stormwater runoff emptying into creeks and streams may cause flooding and erosion, destroying natural habitat. There is a better approach.



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What Pollutants?

- Trash/Litter
- Pesticides
- Nutrients/Fertilizers
- Mercury
- PCBs
- Construction Materials
- Vehicle-Related
  - Metals
  - Oil/Hydrocarbons
  - Washwater
- Bacteria
  - Pet waste, livestock, sewer, etc.
- Flow

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What Pollutants?

- Trash/Litter
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  - Oil/Hydrocarbons
  - Washwater
- Bacteria
  - Pet waste, livestock, sewer, etc.
- Flow

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Trash

- Impacts aquatic life and aesthetics
- Municipalities required to eliminate impacts from trash by 2022
- Will likely require a combination of controls – filtering devices, enforcement, street sweeping, container management, cleanups, education, etc.

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Mercury & PCBs

- Accumulate in Bay fish – human health hazard
- Mercury – legacy problem, but airborne deposition results in ongoing discharges
- PCBs – used widely, now banned, but still in environment
- Get washed by rainwater into SF Bay

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The Municipal Regional Permit

- Issued and enforced by Regional Water Board
- 76 Municipal permittees
  - Cities/Towns/Counties/Flood Control Districts
  - Covers San Mateo, Santa Clara, Alameda, & Contra Costa Counties
  - Plus Fairfield, Vallejo, & Suisun City
- Five-year terms
- MRP 2.0 adopted November 2015

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The Municipal Regional Permit

- Mercury/PCB reduction requirements
- Trash reduction requirements
- New & Redevelopment controls
- Green Infrastructure Plans
  - Show gradual transformation from “grey to green”
  - Achieve specific mercury/PCB reductions over time
  - Each local agency must adopt by 2019

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Big Picture

- Very challenging and costly problems
- Also facing drought, floods, & climate change
- How do we make drainage systems more sustainable?
- Can we better manage rainfall as a resource and not a waste?

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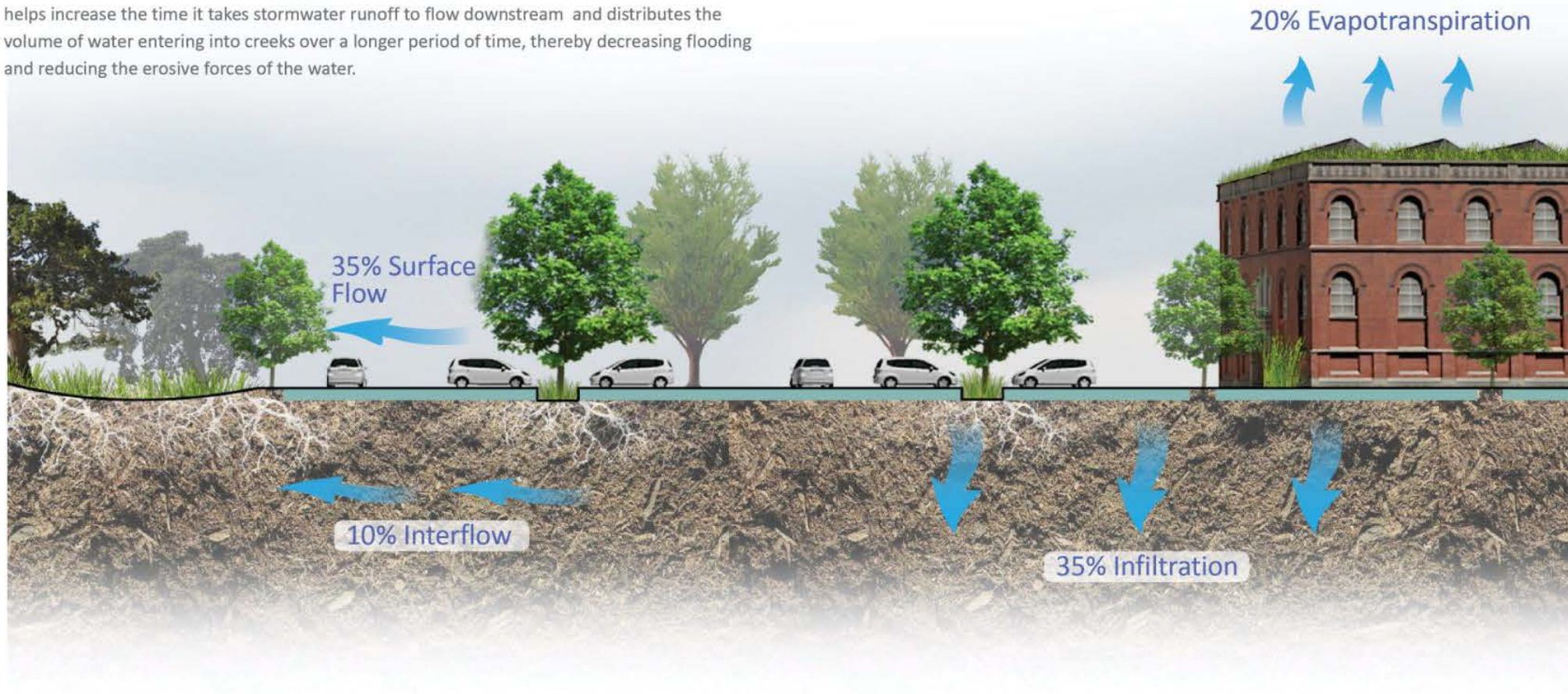
1.4 Balanced Development

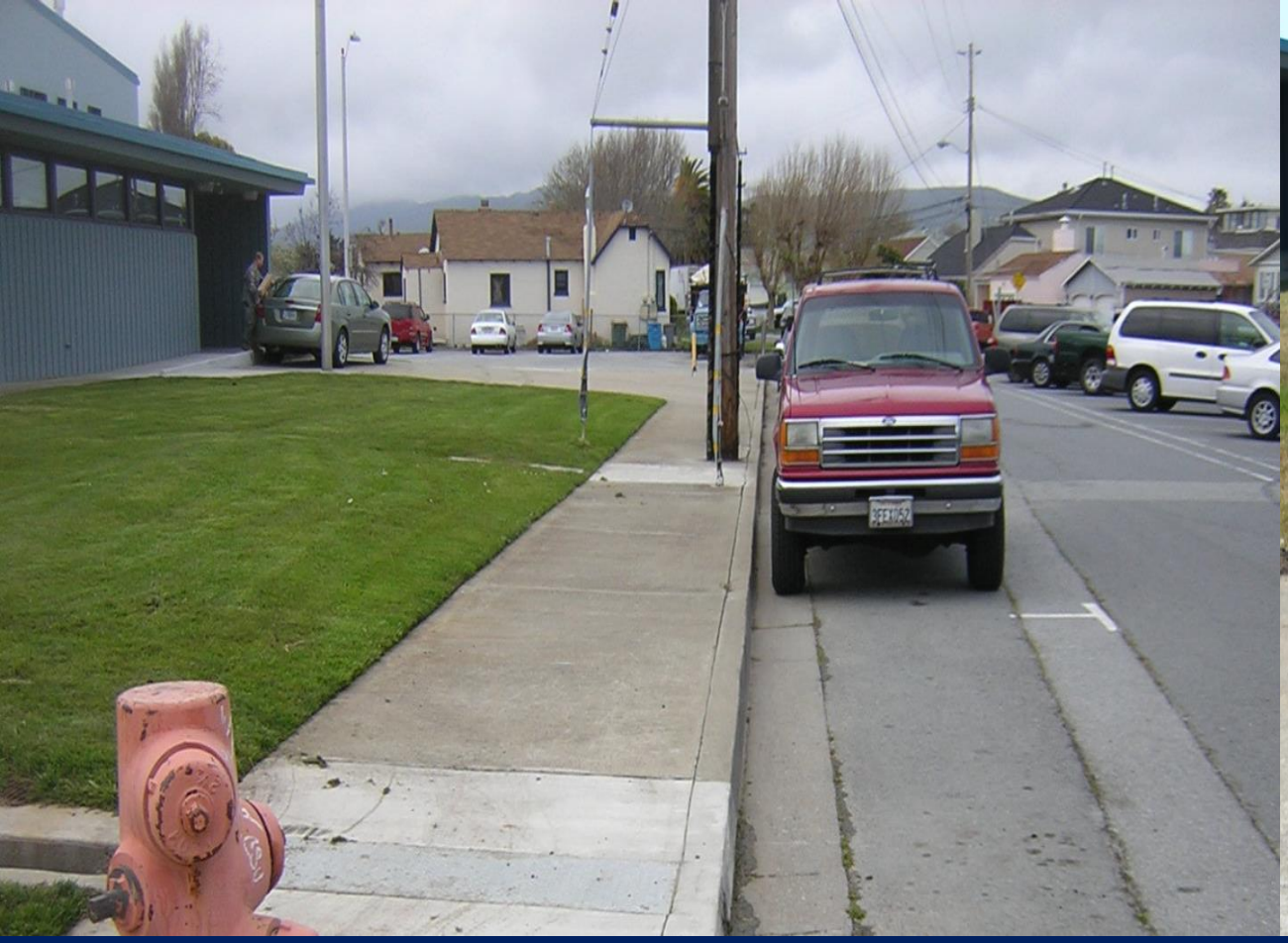
A Greener Approach

Infrastructure can be designed to minimize its impact on natural drainage systems. Our streets and parking lots can help maintain the balance of natural drainage systems by capturing, slowing, and absorbing stormwater, as well as filtering the pollutants that urban development introduces. Green infrastructure such as green streets, green parking lots, and green roofs helps increase the time it takes stormwater runoff to flow downstream and distributes the volume of water entering into creeks over a longer period of time, thereby decreasing flooding and reducing the erosive forces of the water.

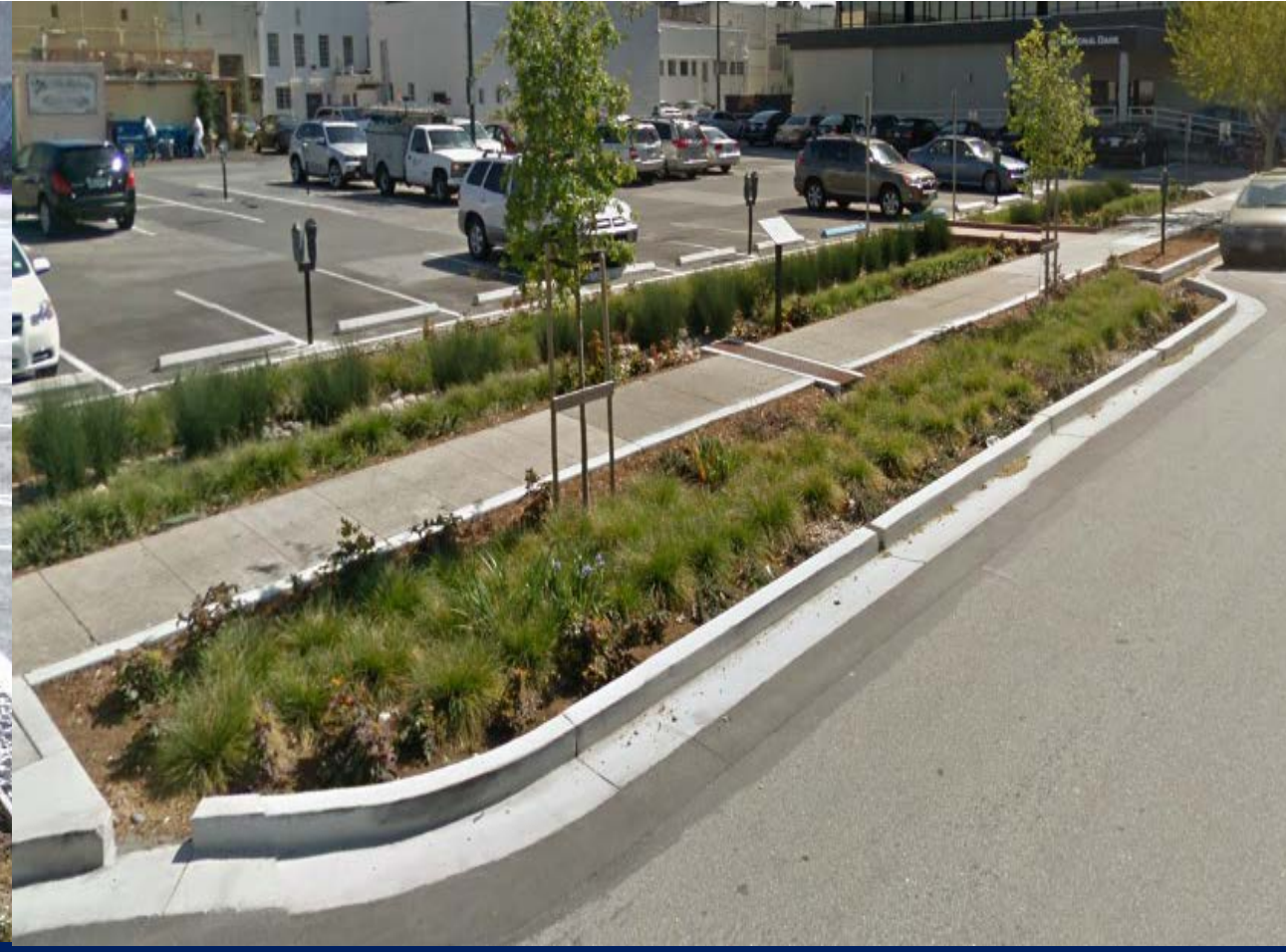


Rain Garden
Brisbane City Hall

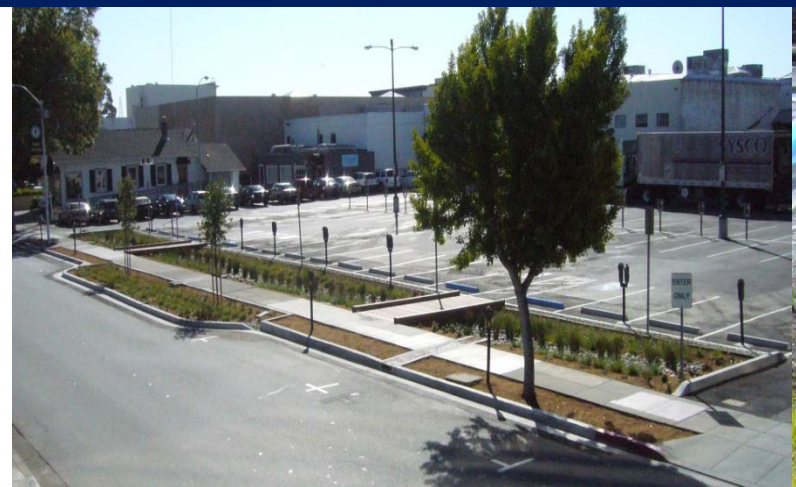
Rain Gardens
Serramonte Library
Daly City

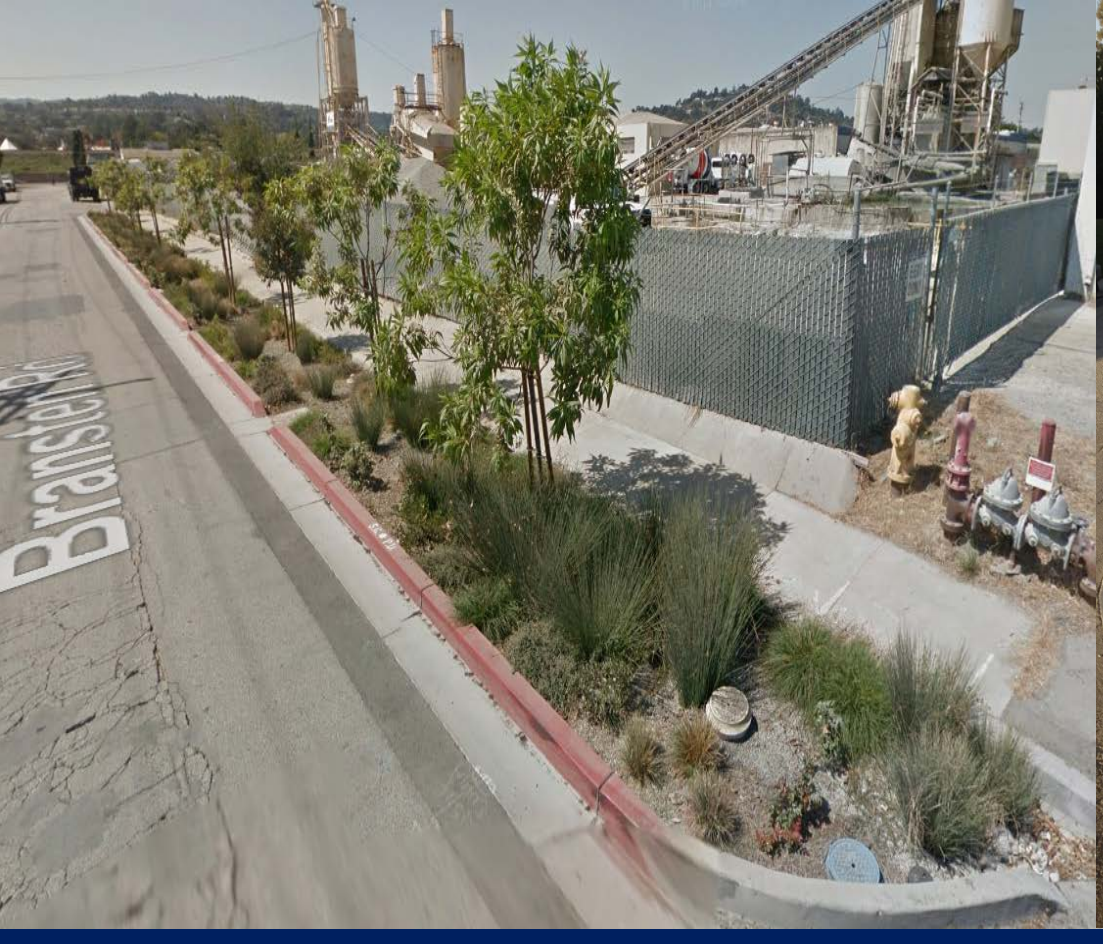


Stormwater Curb Extension
City of San Bruno

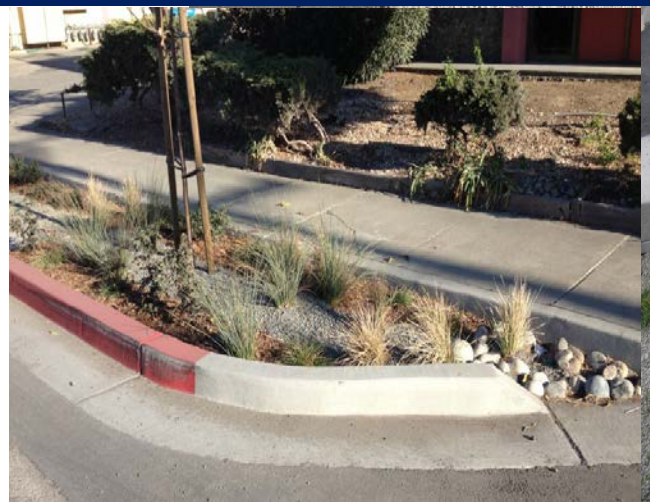


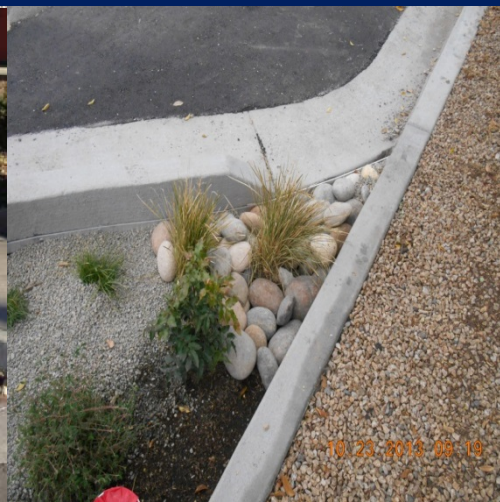
Rain Garden & Curb Extension
Donnelly Avenue
City of Burlingame



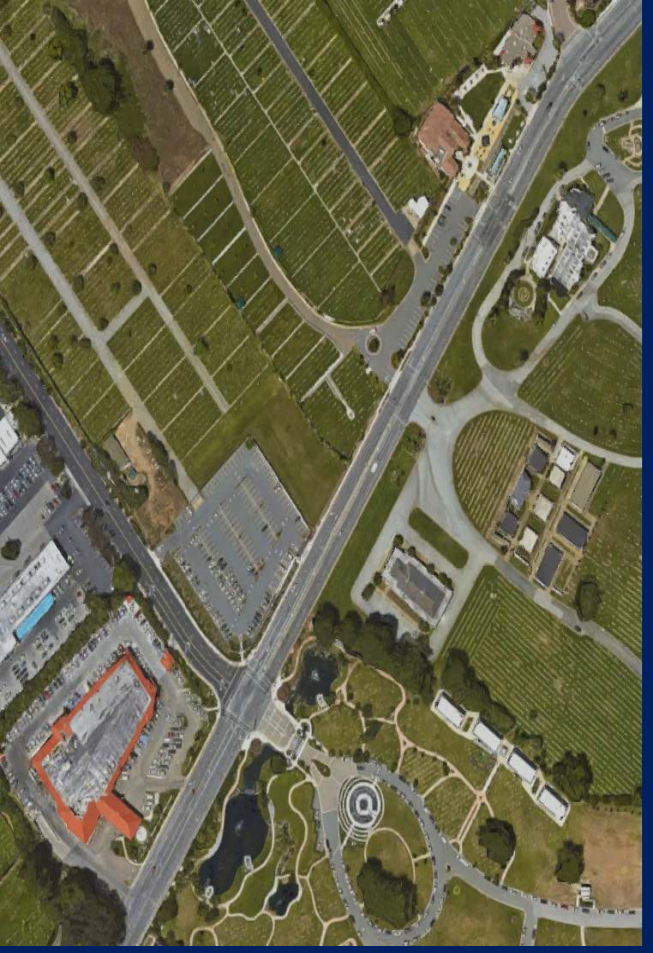


Stormwater Curb Extensions
Bransten Road
City of San Carlos

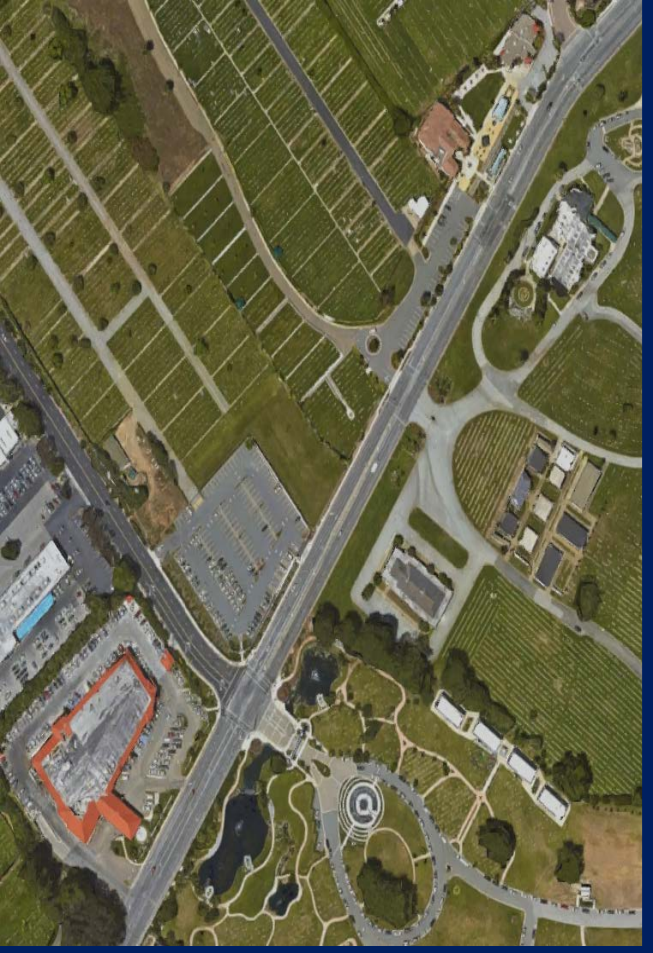




Moss Beach
Carlos Street Green Street &
Fitzgerald Reserve Parking Lot



Hillside Blvd Curb Extensions Town of Colma



Hillside Blvd Curb Extensions Town of Colma

Old County Rd Curb Extensions City of San Carlos

Old County Rd Curb Extensions City of San Carlos

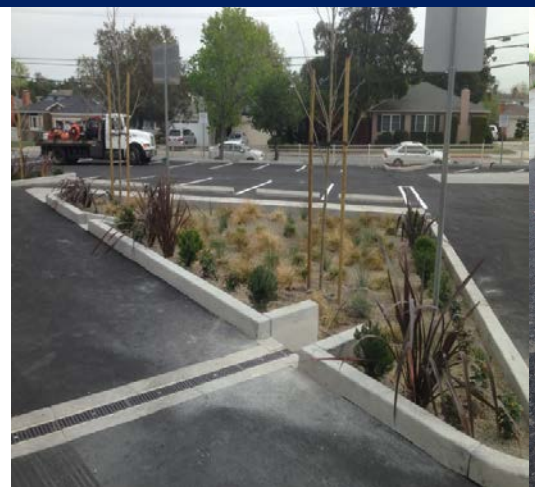
Burlingame Ave Curb Extensions City of Burlingame

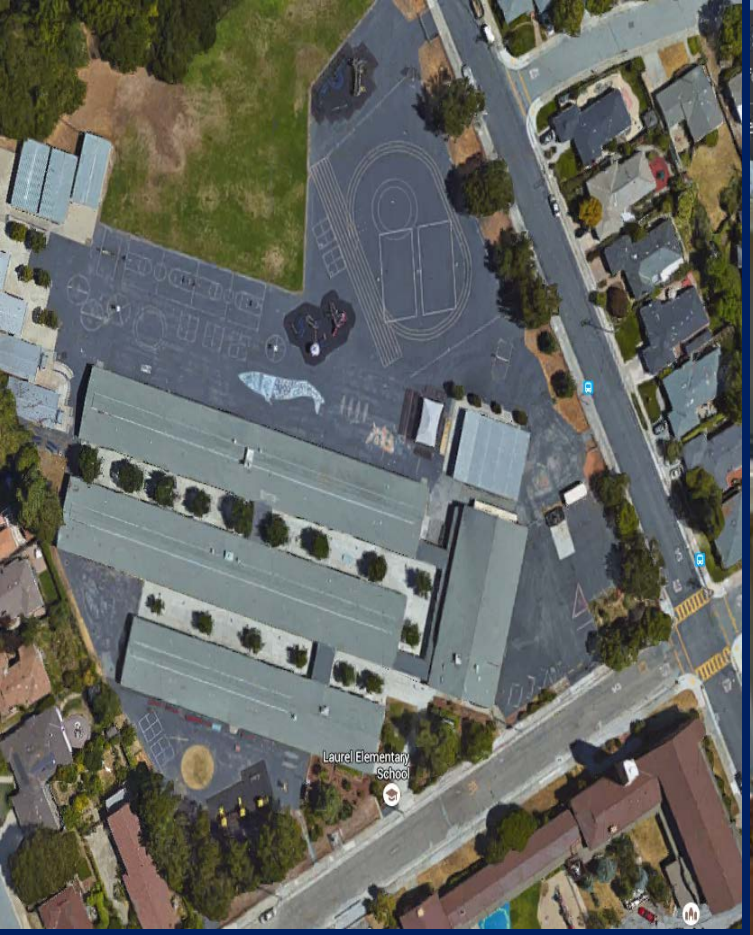
Burlingame Ave Curb Extensions City of Burlingame

Delaware Street Vegetated Swales City of San Mateo

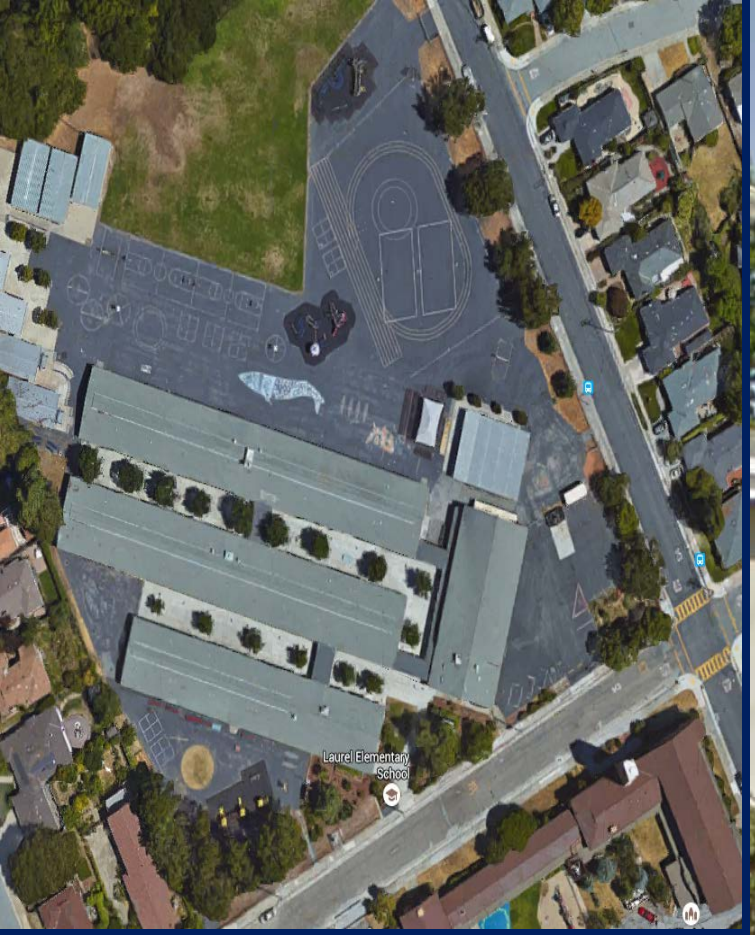
Delaware Street Vegetated Swales City of San Mateo

Laurel Elementary School
Stormwater & Safe Routes to School
City of San Mateo





Laurel Elementary City of San Mateo



Laurel Elementary City of San Mateo

Stormwater Resource Plan (SRP)

- Senate Bill 985 (2014, Pavley) requires Stormwater Resource Plans in order to receive grants for stormwater capture projects
- Separate from Municipal Regional Permit, but related
- Goal is to better utilize rainfall as a resource to address water supply, flood, and quality concerns
- State Water Board issued SRP guidelines in late 2015
- C/CAG initiated countywide SRP in March 2016

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Countywide, Multi-benefit Approach

- The Countywide SRP supports the permit-mandated Green Infrastructure planning and mercury/PCB work required of all cities
- Focus on multi-benefit projects which protect local waters and enhance communities
- Ensures each San Mateo agency can compete for grant funds
- Start with prioritizing opportunities at county level – enables further refinement at local level

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SRP Document Content

Structure follows State Water Board Guidelines

1. Introduction
2. Description of San Mateo County Watersheds
3. Organization, Coordination, Collaboration
4. Methods for Identification and Prioritization
5. Plan Implementation Strategy
6. Education, Outreach, & Public Participation

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Prioritization of Opportunities

- SRPs must identify and prioritize, on a watershed basis, stormwater projects "*in a quantitative manner, using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed*."

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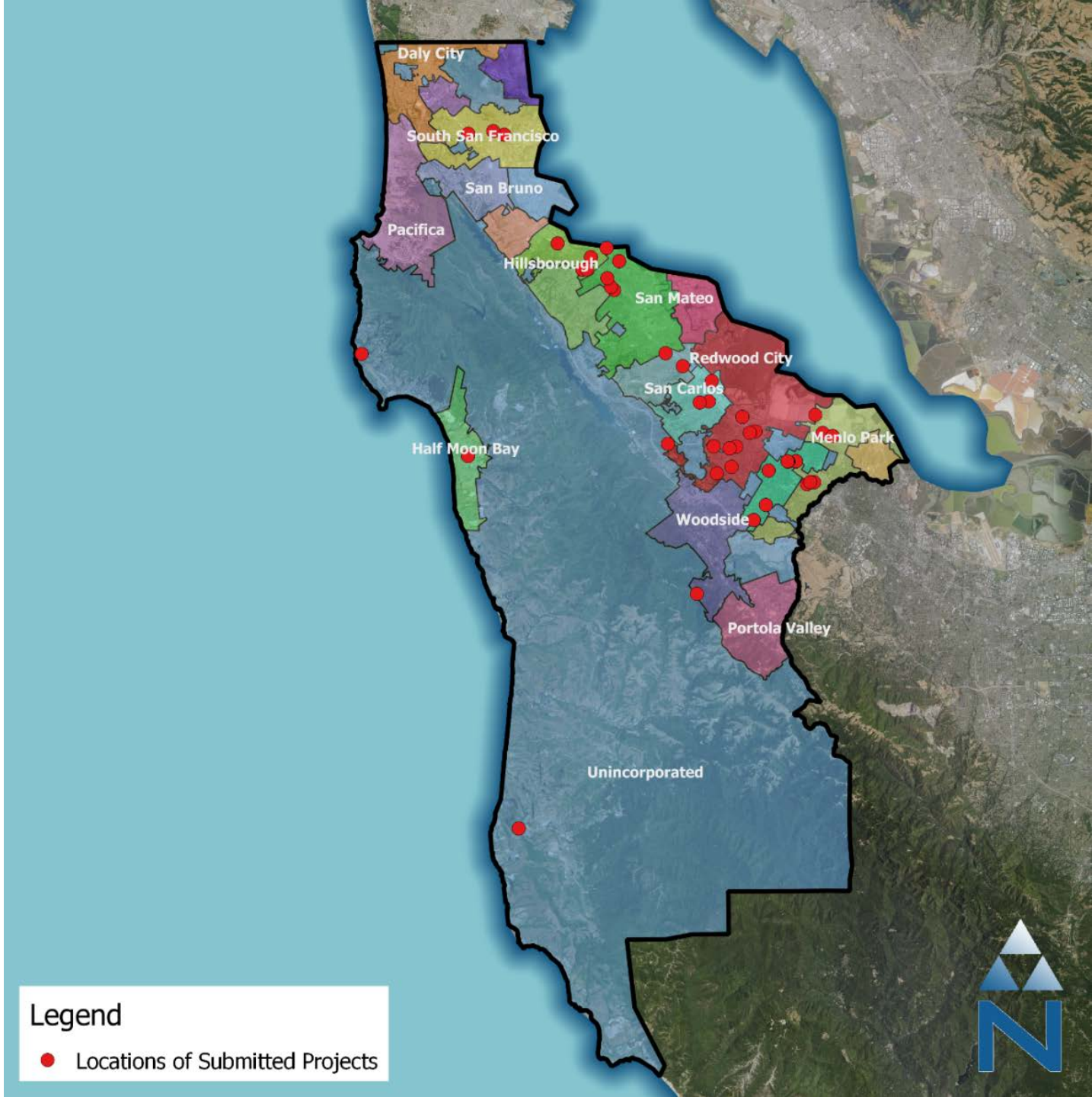
Watershed-Based Approach

- San Francisco Bay & San Francisco Coastal South Watersheds
  - Watershed processes
  - Surface and groundwater quality
  - Water usage
  - Land use characteristics
  - Natural habitats
- Built on previous planning efforts

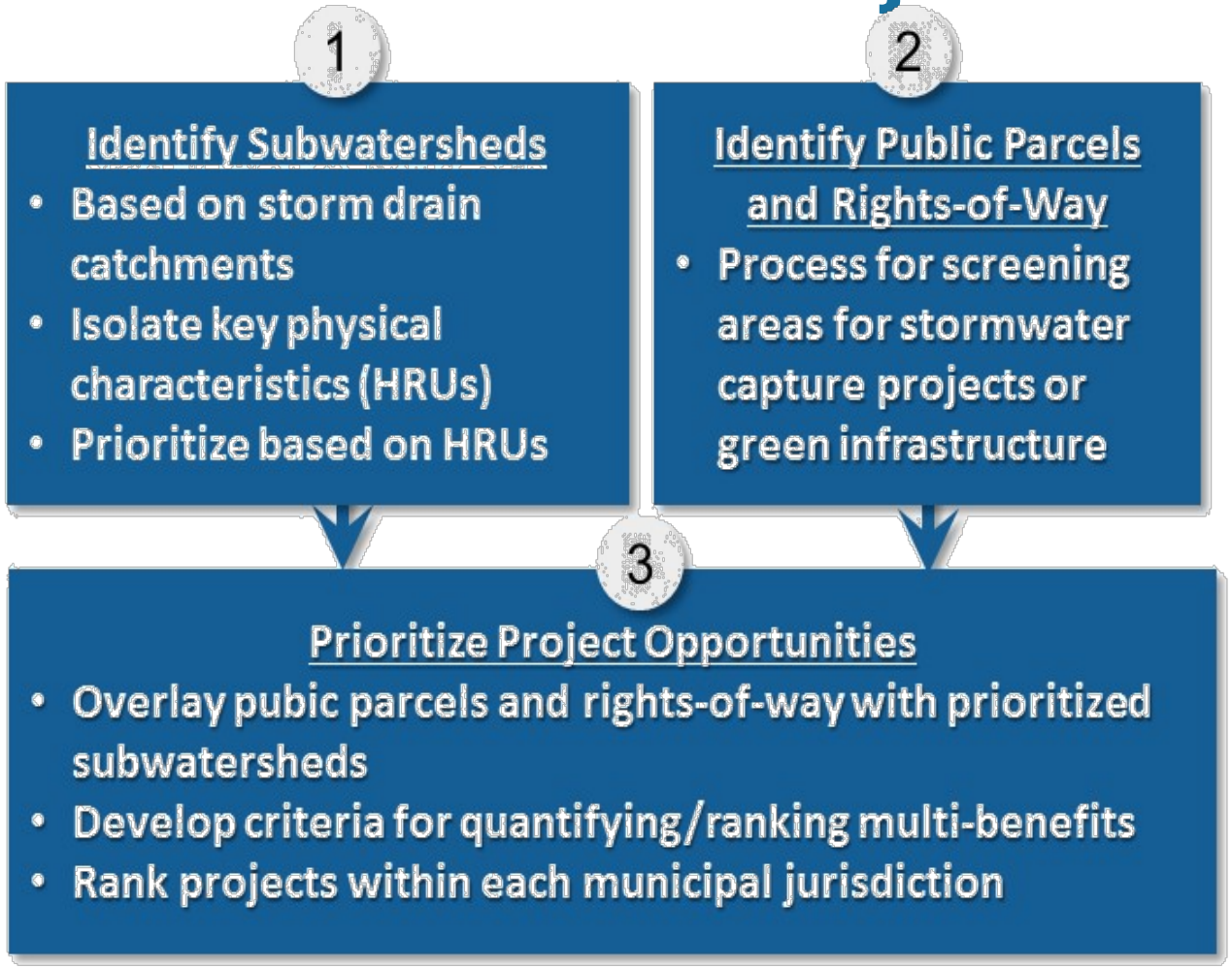
Data Compilation

- GIS data from cities/county
- Project information



Identify and Prioritize Stormwater Projects

- GIS screening of public parcels and rights-of-way
- Prioritization based on:
  - Maximum effectiveness for stormwater control
  - Multiple benefits (groundwater recharge, reuse, enhancement of habitat or open space)



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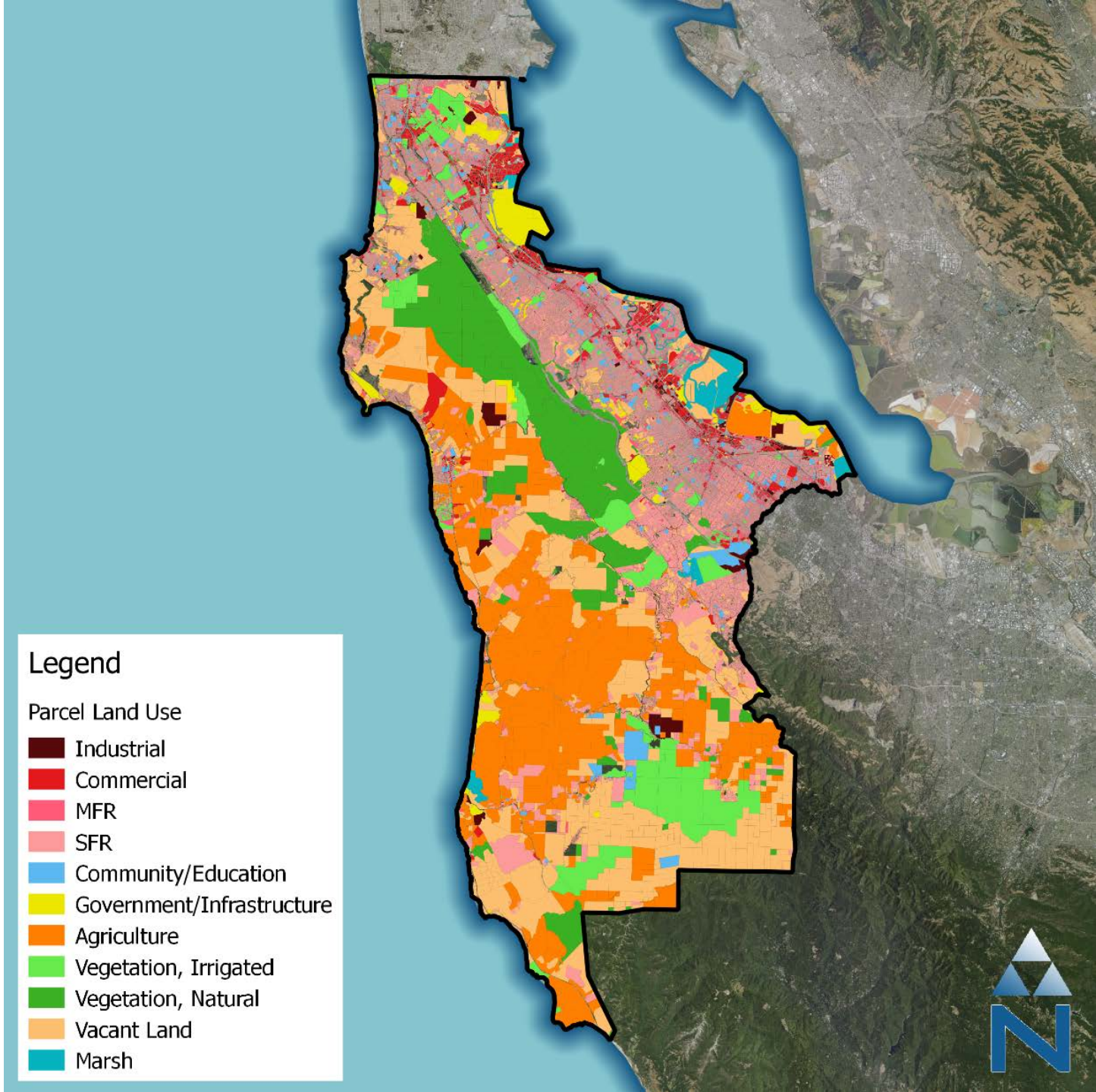
Physical Characteristics

Parcel land use

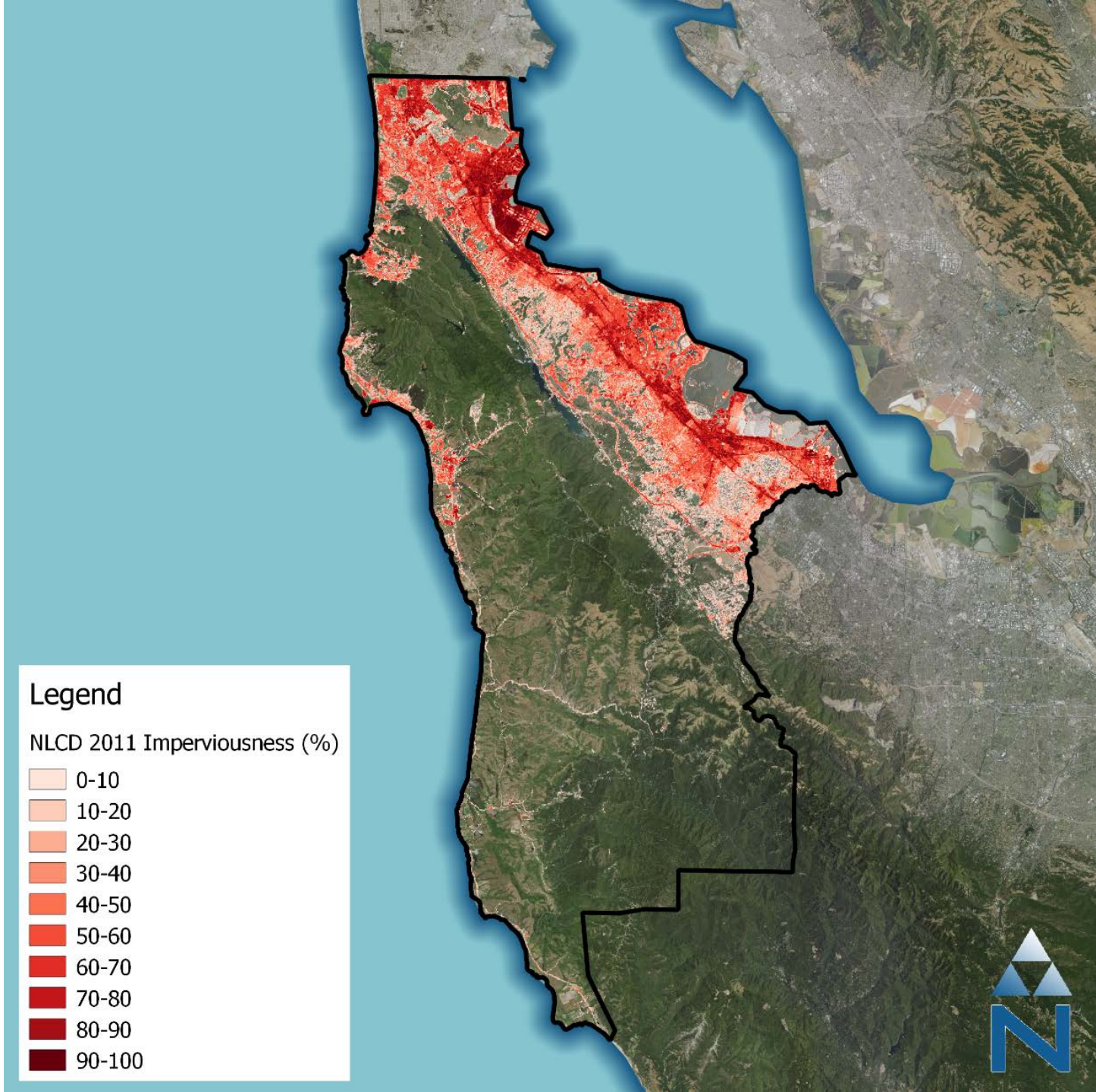
- screen public parcels
- prioritize land uses suitable for each project type



Physical Characteristics

Impervious area

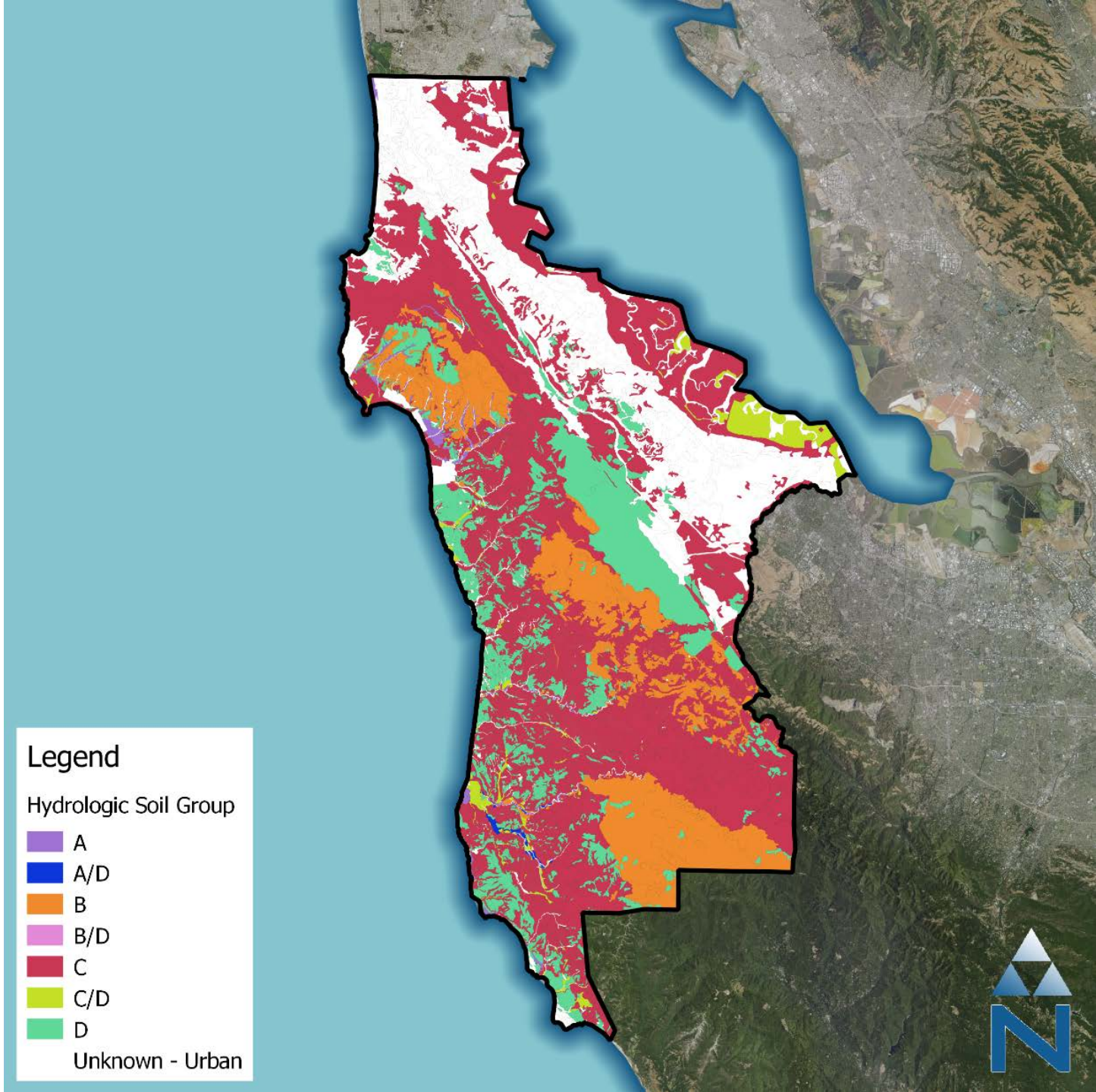
- high impervious area is correlated to large runoff potential
- Priority given to sites with high imperviousness



Physical Characteristics

Hydrologic Soil Group

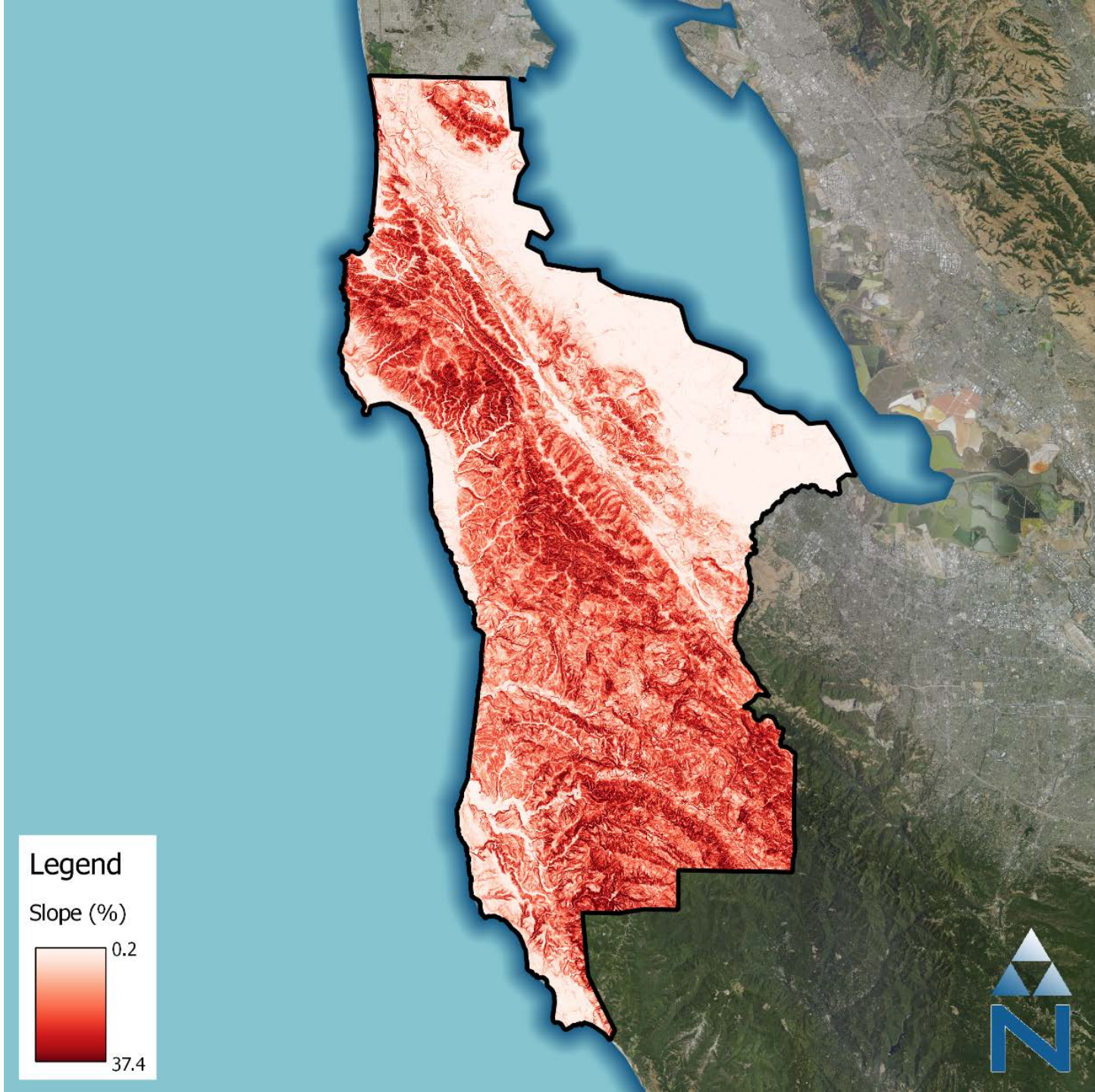
- grouped based on drainage characteristics of soils
- **Group A** represents *well*-drained soils
- **Group D** represents *poorly*-drained soils.



Physical Characteristics

Slope

- mild slopes are more feasible for stormwater capture
- steep slopes present difficulties with implementation and performance



Project Types

Regional Projects

Green Streets

Low Impact Development

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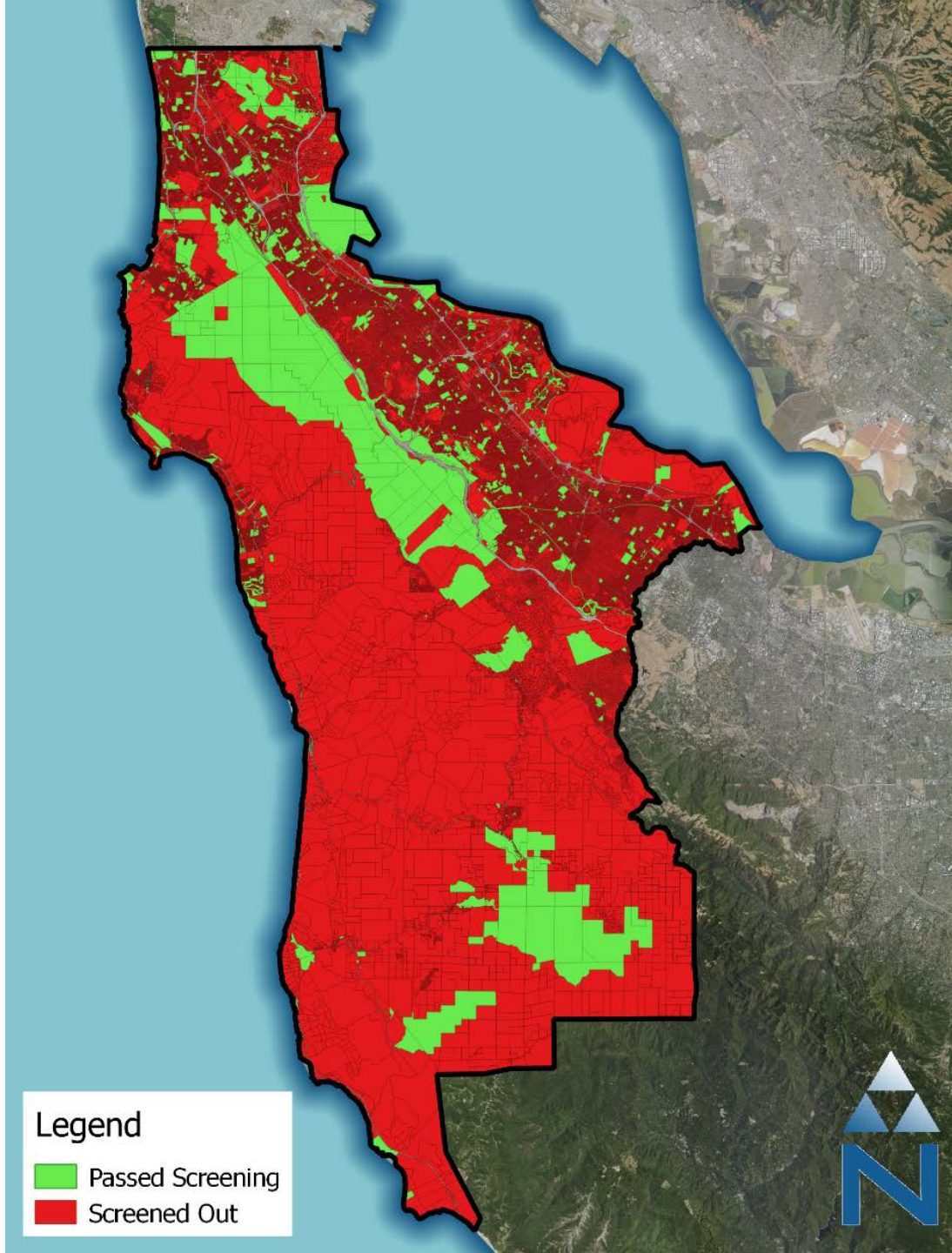
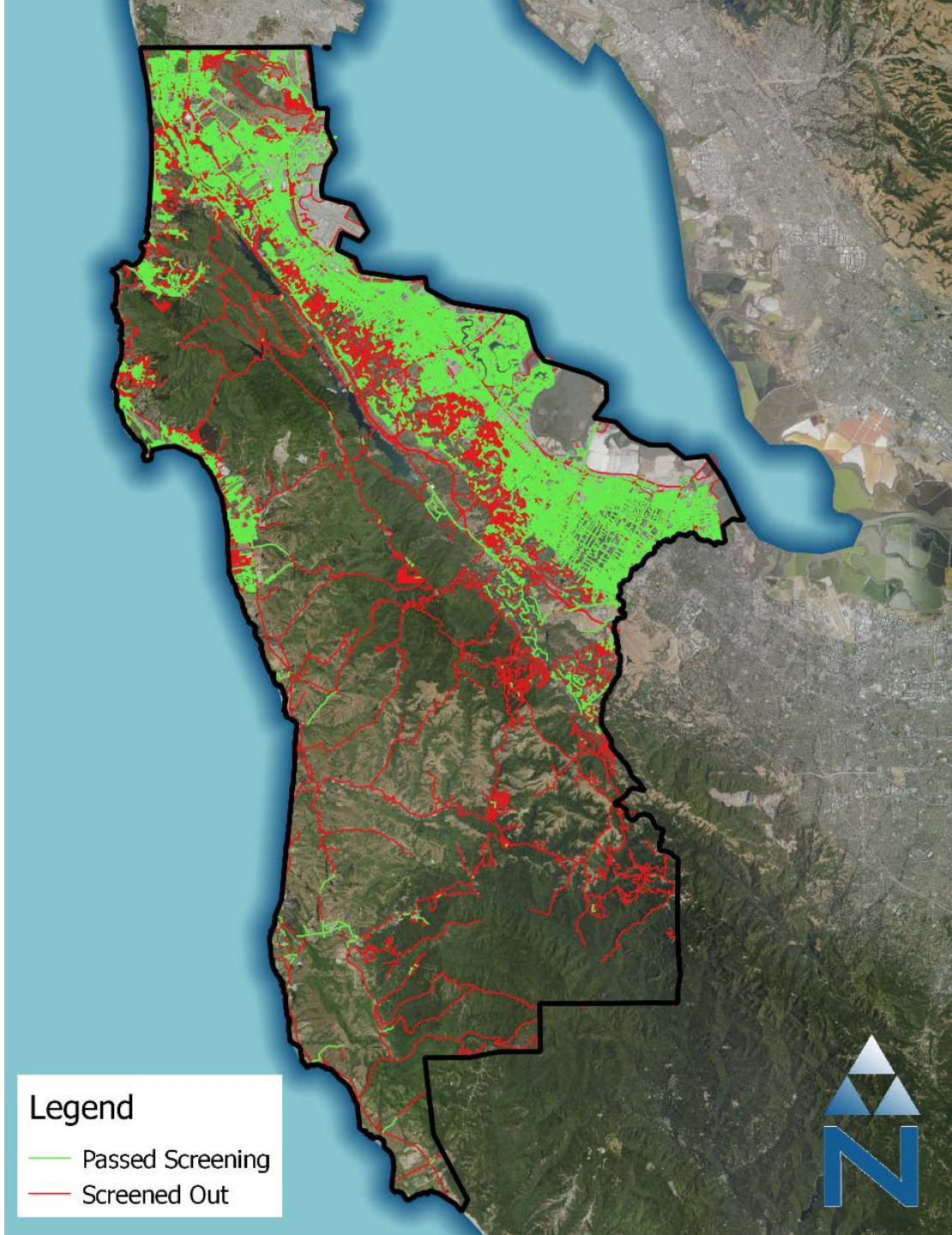
Screening of Sites for Onsite LID/Regional Projects

Screening Factor	Parcel Characteristic	Criteria	Reason
Public Parcels	Ownership	City, County or Town	Identify all public parcels for regional storm and dry weather runoff capture projects or onsite LID retrofits
	Land Use	Park, School, Other (e.g., Golf Course)	
Suitability	Parcel Size	>0.25 acres	Adequate space for regional stormwater and dry weather runoff capture project
		All	Opportunity for onsite green infrastructure retrofit
	Site Slope	< 10 %	Steeper grades present additional design challenges



Green Street Screening

Screening Factor	Street Section Characteristic	Criteria	Reason
Selection	Functional Class	S1400 S1730 S1780	Local neighborhood road, rural road, city street, alley, parking lot roads
Suitability	Ownership	Private	Potential projects are focused on public and right-of-way opportunities
	Road Slope	< 5%	Steep grades present additional design challenges; reduce capture opportunity due to increased runoff velocity



Regional Projects Prioritization Matrix

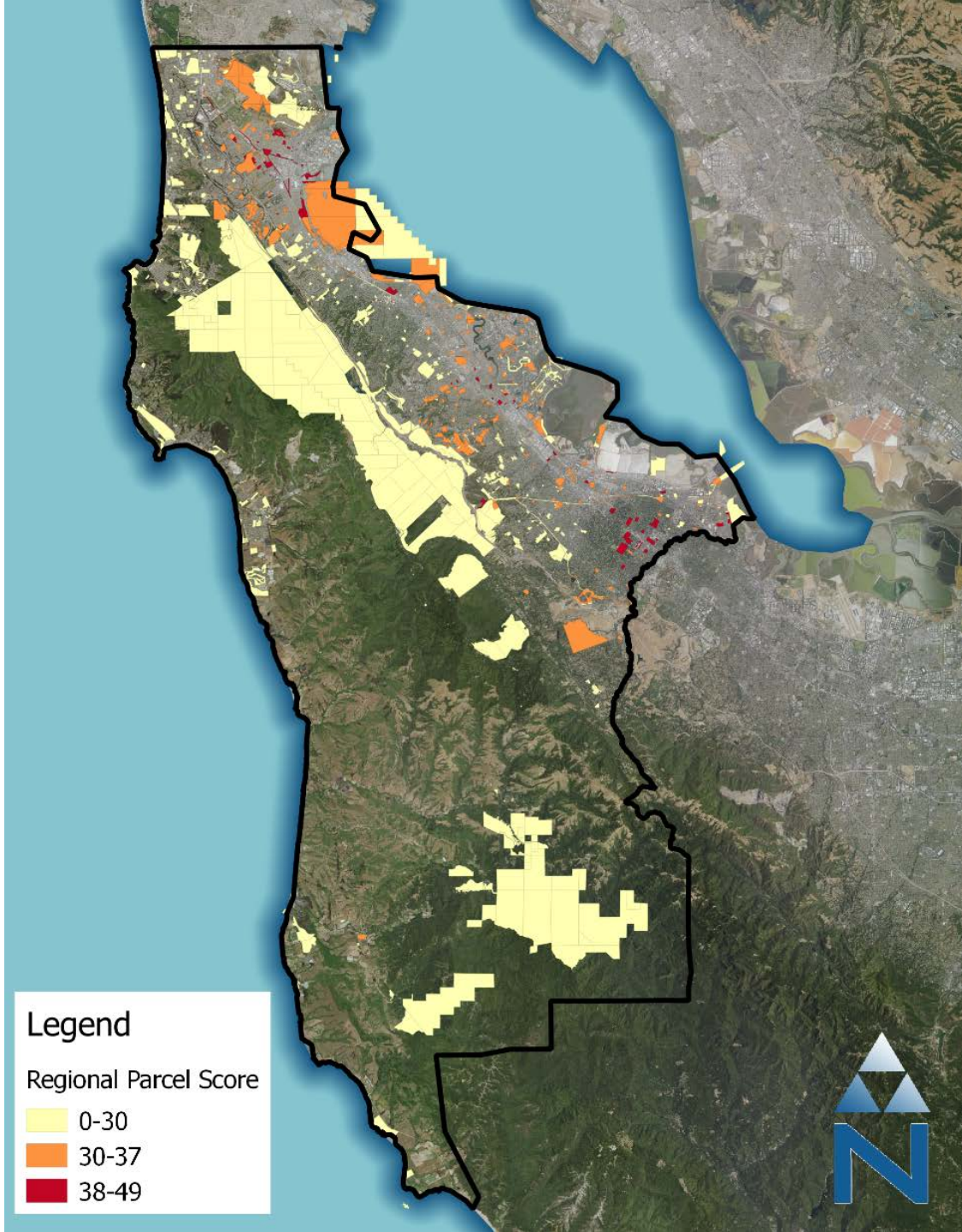
	Points						Weight Factor
	0	1	2	3	4	5	
Parcel Land Use	--	--	Schools/Golf Courses	Public Buildings	Parking Lot	Park / Open Space	--
Impervious Area	X < 40	40 ≤ X < 50	50 ≤ X < 60	60 ≤ X < 70	60 ≤ X < 80	80 ≤ X < 100	--
Parcel Size (acres)	0.25 ≤ X < 0.5	0.5 ≤ X < 1	1 ≤ X < 2	2 ≤ X < 3	3 ≤ X < 4	4 ≤ X	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	5 < X ≤ 10	4 < X ≤ 5	3 < X ≤ 4	2 < X ≤ 3	1 < X ≤ 2	0 < X ≤ 1	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	3 < X	--	1 < X ≤ 3	--	X ≤ 1	2
Contains PCB Risk Areas	None	Potential High Interest	--	High Interest	--	--	--
Currently planned by City or co-located with other City project	No					Yes	2
Drains to TMDL waters	No					Yes	--
Above groundwater aquifer	No		Yes				--
Augments water supply	No	Yes					--
Water quality source control	No	Yes					--
Reestablishes natural hydrology	No	Yes					--
Creates or enhances habitat	No	Yes					--
Community enhancement	No	Yes					--

Regional Projects

Total # of Screened Parcels: 1,841

Low score: 1,091
Medium score: 670
High score: 80

Rank	Score	Jurisdiction	APN	Co-located Project
1	49	Menlo Park	071102400	Parking Plaza 7 Renovation
2	49	Menlo Park	071281160	Parking Plaza 7 Renovation
3	49	Menlo Park	071285160	Parking Plaza 7 Renovation
4	48	Menlo Park	071283140	Parking Plaza 7 Renovation
5	48	Menlo Park	071094180	Parking Plaza 7 Renovation
6	48	Menlo Park	071284100	Parking Plaza 7 Renovation
7	48	Menlo Park	071092290	Parking Plaza 7 Renovation
8	46	Menlo Park	071273160	Parking Plaza 7 Renovation
9	45	South San Francisco	015180180	
10	45	South San Francisco	015180170	
…	…	…	…	



LID Projects Prioritization Matrix

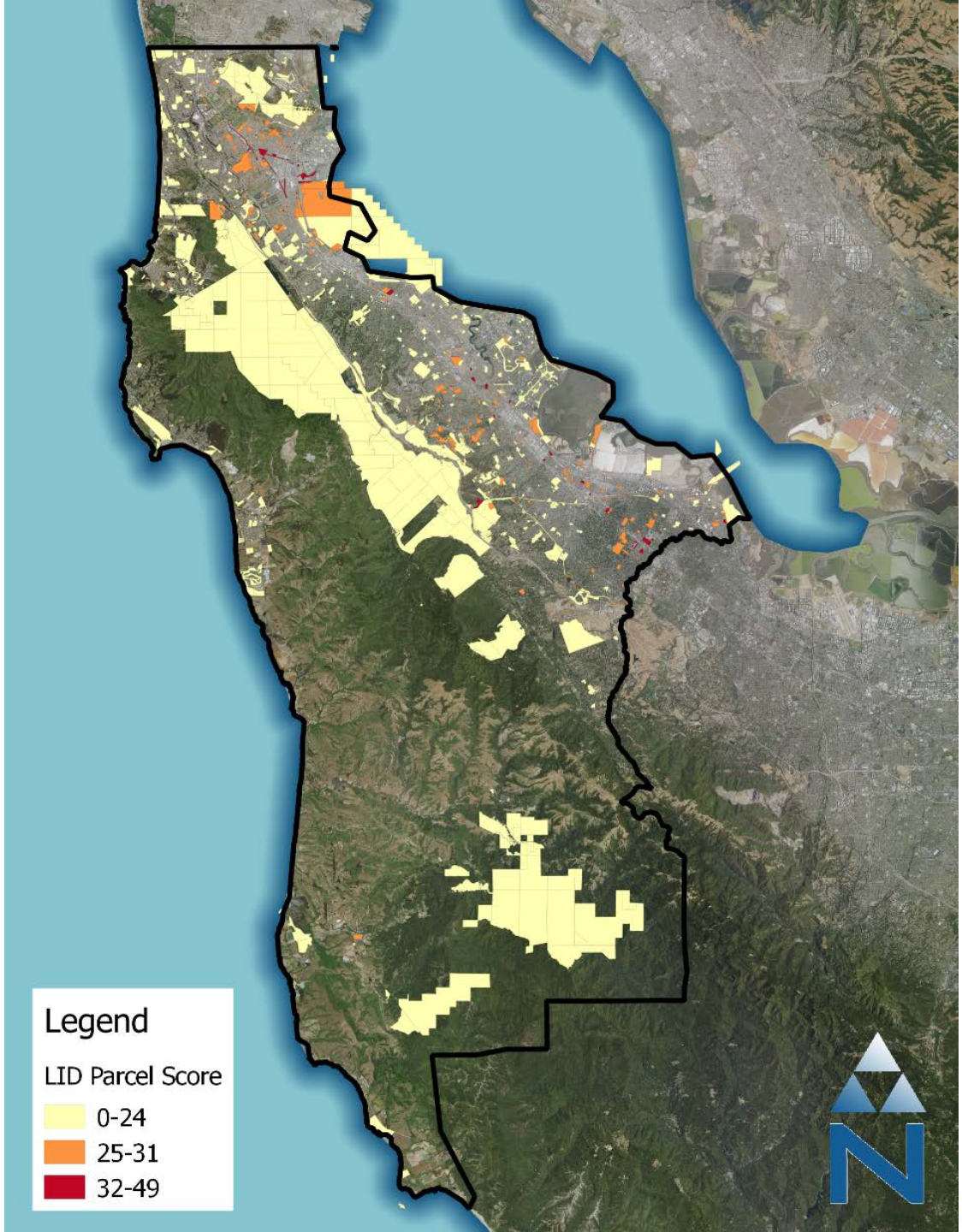
	Points						Weight Factor
	0	1	2	3	4	5	
Parcel Land Use	--	--	Schools/Golf Courses	Park / Open Space	Parking Lot	Public Buildings	--
Impervious Area	X < 40	40 ≤ X < 50	50 ≤ X < 60	60 ≤ X < 70	60 ≤ X < 80	80 ≤ X < 100	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	5 < X ≤ 10	4 < X ≤ 5	3 < X ≤ 4	2 < X ≤ 3	1 < X ≤ 2	0 < X ≤ 1	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	3 < X	--	1 < X ≤ 3	--	X ≤ 1	2
Contains PCB Risk Areas	None	Potential High Interest	--	High Interest	--	--	--
Currently planned by City or co-located with other City project	No					Yes	2
Drains to TMDL waters	No					Yes	--
Above groundwater aquifer	No		Yes				--
Augments water supply	No	Yes					--
Water quality source control	No	Yes					--
Reestablishes natural hydrology	No	Yes					--
Creates or enhances habitat	No	Yes					--
Community enhancement	No	Yes					--

LID Projects

Total # of Screened Parcels: 2,688

Low score: 1,888
Medium score: 738
High score: 62

Rank	Score	Jurisdiction	APN	Co-located Project
1	47	Menlo Park	71283140	Parking Plaza 7 Renovation
2	47	Menlo Park	71273160	Parking Plaza 7 Renovation
3	47	Menlo Park	71102400	Parking Plaza 7 Renovation
4	47	Menlo Park	71284100	Parking Plaza 7 Renovation
5	47	Menlo Park	71281160	Parking Plaza 7 Renovation
6	47	Menlo Park	71285160	Parking Plaza 7 Renovation
7	46	Menlo Park	71094180	Parking Plaza 7 Renovation
8	46	Menlo Park	71092290	Parking Plaza 7 Renovation
9	39	South San Francisco	15135210	
10	38	San Bruno	14283070	
…	…	…	…	



Green Streets Prioritization Matrix

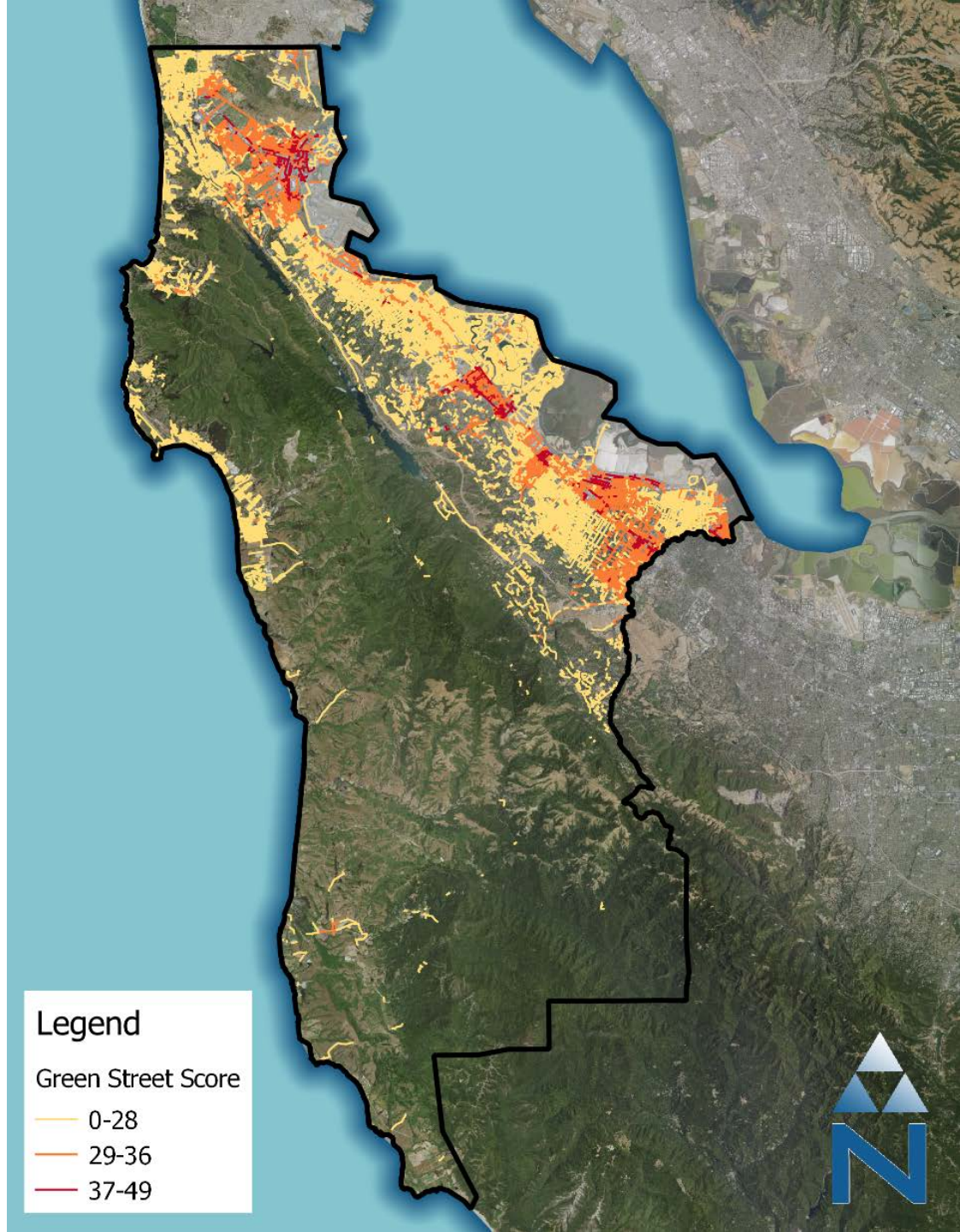
	Points						Weight Factor
	0	1	2	3	4	5	
Street Type	Highway	--	Arterial	Collector	Alley	Local	--
Imperviousness (%)	X < 40	40 ≤ X < 50	50 ≤ X < 60	60 ≤ X < 70	60 ≤ X < 80	80 ≤ X < 100	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	--	4 < X ≤ 5	3 < X ≤ 4	2 < X ≤ 3	1 < X ≤ 2	0 < X ≤ 1	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	3 < X	--	1 < X ≤ 3	--	X ≤ 1	2
Contains PCB Risk Areas	None	Potential High Interest	--	High Interest	--	--	--
Currently planned by City or co-located with other City project	No					Yes	2
“Safe Routes to School” program	No					Yes	2
Drains to TMDL waters	No					Yes	--
Above groundwater aquifer	No		Yes				--
Augments water supply	No	Yes					--
Water quality source control	No	Yes					--
Reestablishes natural hydrology	No	Yes					--
Creates or enhances habitat	No	Yes					--
Community enhancement	No	Yes					--

Green Streets

Total # of Screened ROW segments: 16,366
Median Segment Length: 320 ft

Low score: 11,086
Medium score: 4,547
High score: 733

Rank	Score	Street Name	TIGER Census Roads ID (STNA_ID)	Length (ft)
1	49	Airport Blvd	322632	374
2	49	Santa Cruz Ave	1717	225
3	48	Grand Ave	269532	235
4	48	Airport Blvd	322632	370
5	48	Chestnut St	284618	145
6	47	Alma St	235064	798
7	47	E Grand Ave	327309	228
8	47	Meadow Ct	3011441	135
9	47	San Miguel Way	3010534	303
10	47	San Miguel Way	3010534	419
…	…	…	…	…



San Mateo County Project Prioritization

English

Info and Tools

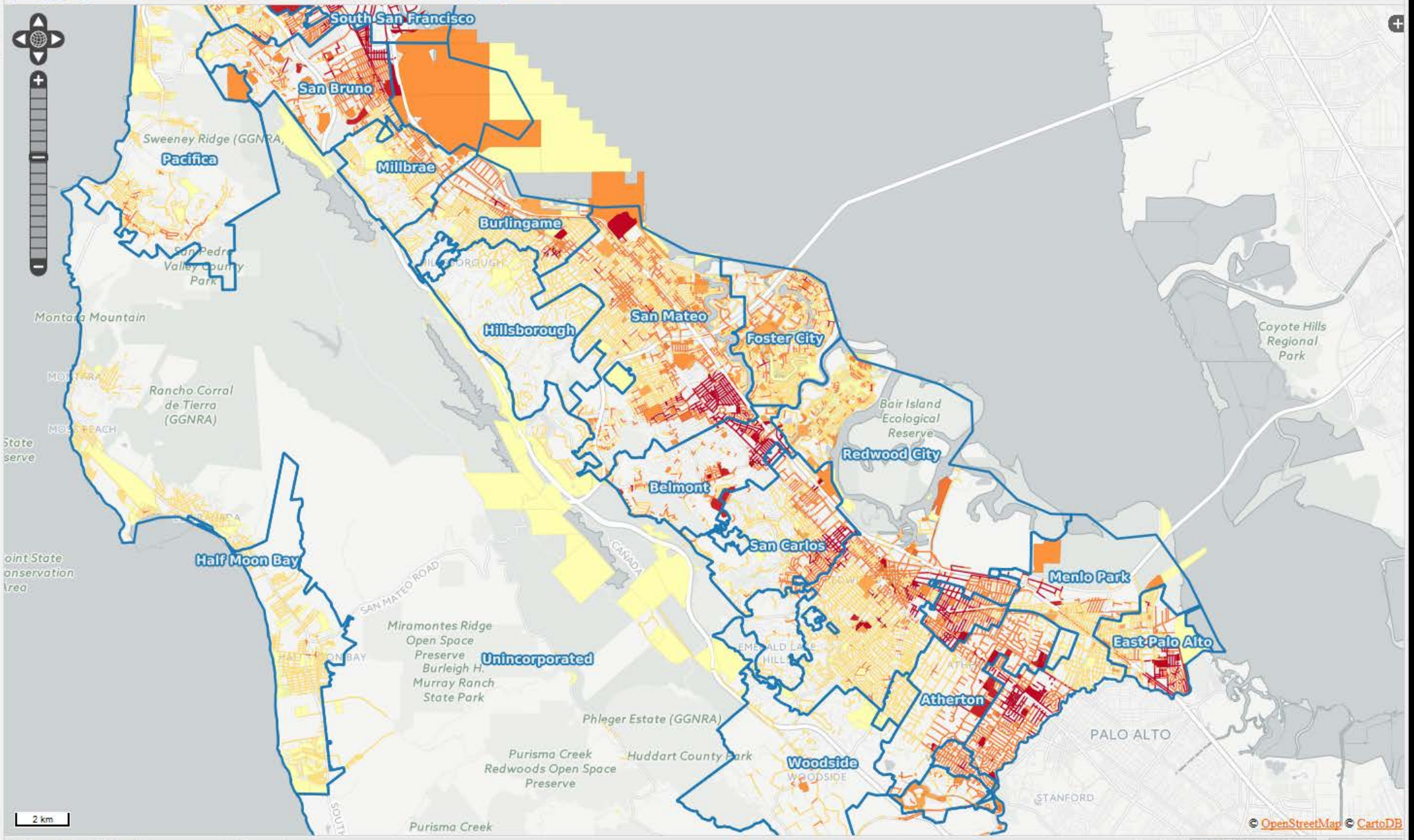
Map

Map Layers

- San Mateo County Project Prioritizati
  - Jurisdiction
  - Regional Projects prioritized
  - LID Projects prioritized
  - Green Streets prioritized
- Background Layers
  - Light Theme (CartoDB)
  - Dark Theme (CartoDB)
  - Open Street Map
  - Google Satellite
  - Google Map

Layer order

Object identification: Active Layer



Mode: navigation. Shift/rectangle or mouse wheel for zooming.

Coordinate: -13605540,4527935 1: 144448

Project Concepts

- C/CAG developed 22 project concepts for its member agencies
- Combination of regional, green street, and onsite projects
- Intent is to support future grant proposals

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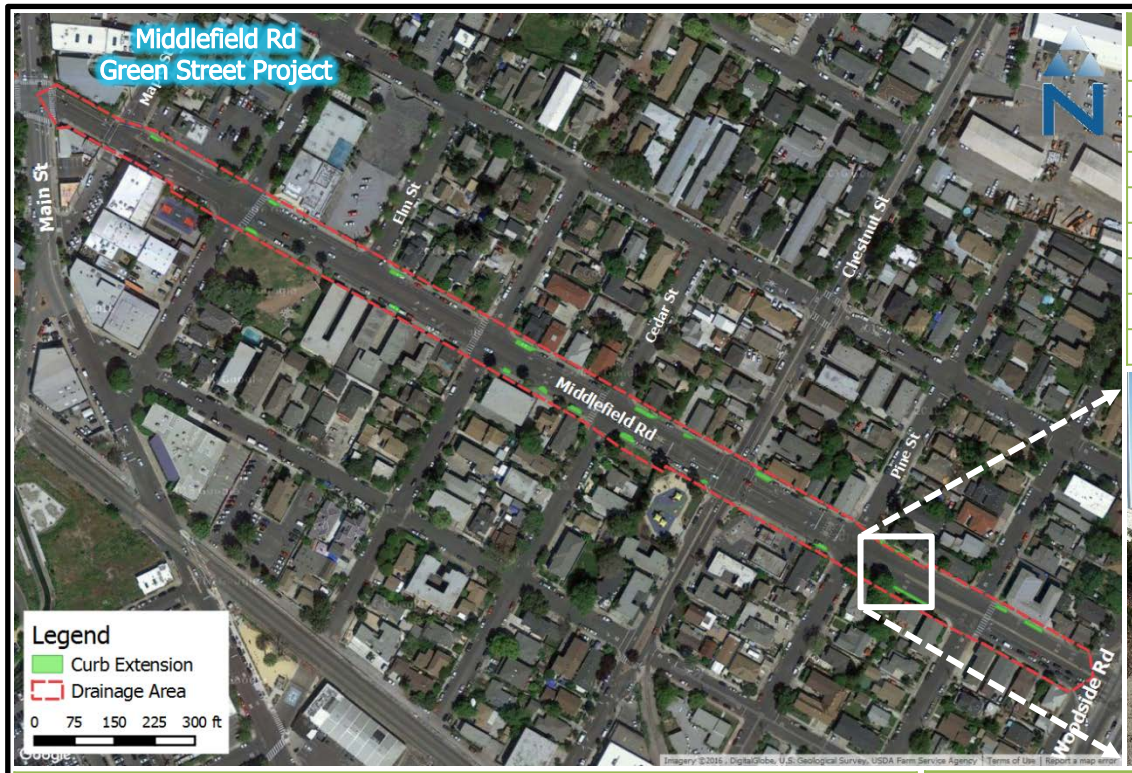

Site Information

Jurisdiction	City of Redwood City
Street Name	Middlefield Rd
Bounding Streets	Main St / Woodside Rd
Street Typology	Arterial
Co-Located Project	Middlefield Streetscape Project
Capture Area (acres)	4.16
Impervious Area (%)	90
85th Percentile Rainfall (in)	0.85
Generated Runoff (ac-ft)	0.27


Curb Extension on an Arterial Street

Site Description:

The proposed project consists of green street improvements along Middlefield Road between Main Street and Woodside Road. The street segment is approximately 2,250 feet long. Middlefield Road is an arterial street that is relatively narrow. Limited space is divided between bike lanes, multiple lanes each direction, turn lanes, and parking lanes. This presents a challenge with siting green infrastructure without sacrificing some usage of the roadway. Curb extensions are recommended as the primary treatment type. Segments of the street that feature two lanes may be reduced to single lanes to allow adequate area for improvements. Center medians can be removed to provide additional area. Curb extensions can also be placed at crosswalks to improve pedestrian safety while increasing stormwater capture capacity. Where lanes cannot be reduced, some parking may need to be removed.

The proposed improvements would capture 100% of the 85th percentile runoff volume (0.27 ac-ft) while providing flood risk mitigation, community enhancement, increased property values, safer pedestrian routes, and other multiple benefits.

green infrastructure shown in the map are preliminary and subject to further site assessment and design. Percent imperviousness is based on best professional judgement. All design assumptions/parameters and cost estimates must be re-evaluated during the detailed design process.

Design Summary

Green Infrastructure Type	Design Width (ft)	Design Length (ft)	Capture Volume (ac-ft)
Bioretention (Curb Extension)	8	780	0.270

Cost Estimate

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Excavation/Hauling	1,160	CY	$50.00	$58,000
Bioretention	6,240	SF	$25.00	$156,000
Curbs and Gutters	780	LF	$17.25	$14,000
			CONSTRUCTION SUBTOTAL	$228,000
Planning (20%), Mobilization (10%), Design (30%), Contingency (25%)				$194,000
			TOTAL COST	**$422,000**

Concept for a Green Street Retrofit for Stormwater Capture

Site: Middlefield Road (City of Redwood City)

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PARADIGM ENVIRONMENTAL

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Stormwater Grants

- State Water Board stormwater grant program (Prop 1)
- C/CAG supported Redwood City and San Mateo proposals
- Five projects total: four green street, one parking lot
- State Board recommended funding for both proposals (~$1.2 million total)
- Daly City also recommended to receive $10 million
- Award announcement starts 90-day clock to finalize and submit SRP to the State

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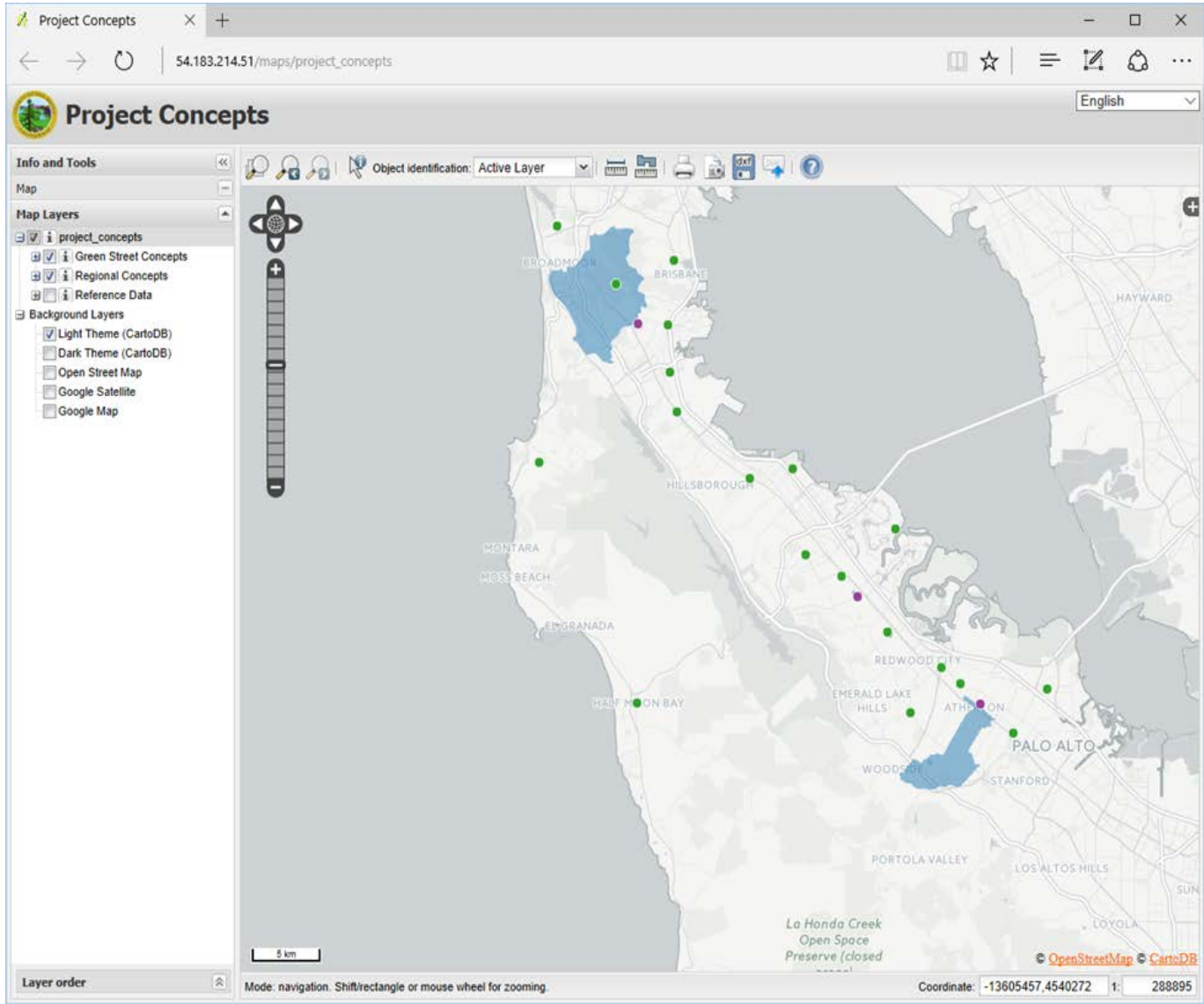
Implementation Strategy

- Discussion on resources to implement SRP
- Linkages to:
  - IRWMP
  - GI planning
  - Mercury/PCB reductions
- Timelines
- Institutional structure
- Adaptive management
- Performance measures



Storm Water Capture M

54.183.214.51:5000

Storm Water Capture Model

Version 0.1
(updated 6/30/2016)

BMP Type

24-hour Rainfall Depth (in.)

0.50"

Drainage Area (ac.)

acres

Percent Impervious (0-1.0)

0.0 - 1.0

BMP Footprint (sq. ft.)

square feet

Ponding Depth (ft.)

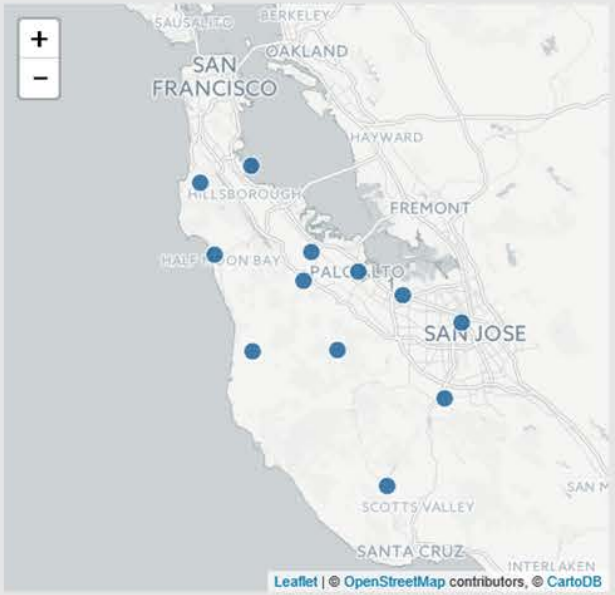
feet

Constant Infiltration (in./hr.)

in./hr.

Calculate

Sumary	Value	Units
Runoff Volume	--	acre-feet
Volume Capture	--	acre-feet
Percent Capture	--	%



Use this map to reference rainfall gage statistics near your project site. The 85th %-tile, 24-hour rainfall depth estimates were developed using NCDC Global Historical Climatology Network (GHCN) data from Water Years 1981 through 2015.

Review and Approval Process

- Oct/Nov 2016 – Cities reviewed Admin Draft
- Dec 8 – C/CAG Board approved release for public comment through January 13
- Early Jan – Three public workshops to provide public input
- Jan 19 - Stormwater Committee, review of comments
- Feb 9 – C/CAG Board to consider adoption
- March 1 – Submit to State Water Board and IRWMP

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Next Steps

- We want to hear from you – incorporate comments before final draft goes to the C/CAG Board in February
- All agencies in SM County are developing local Green Infrastructure Plans – encourage ongoing engagement
- More detailed countywide modeling is being done to further support stormwater management and pollution reduction
- SRP will continue to be a living document – not the last chance to engage

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Resources

- Website – www.flowstobay.org
  - SRP information (flowstobay.org/2016srp)
  - At home
  - In your garden
  - At school
  - At work
  - Take action
- Social Media – Facebook & Twitter: @flowstobay
- Rain Barrel Rebate Program – up to $100 rebates
- Our Water Our World – less toxic pest controls

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Clean Water. Healthy Community.
www.flowstobay.org

QUESTIONS?

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