



Stormwater Resource Plan for San Mateo County

Matthew Fabry, P.E.
Program Manager, C/CAG



SAN MATEO COUNTYWIDE
**Water Pollution
Prevention Program**

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CMEQ Committee
January 30, 2017

Stormwater Resource Plan (SRP)

- Senate Bill 985 (2014, Pavley) requires Stormwater Resource Plans in order to receive grants for stormwater capture projects
- Goal is to better manage stormwater as a resource to address water supply, flood, and quality concerns
- State Water Resources Control Board adopted guidelines for SRPs in December 2015
- C/CAG took lead to develop countywide SRP, work began in March 2016

- 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.”

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



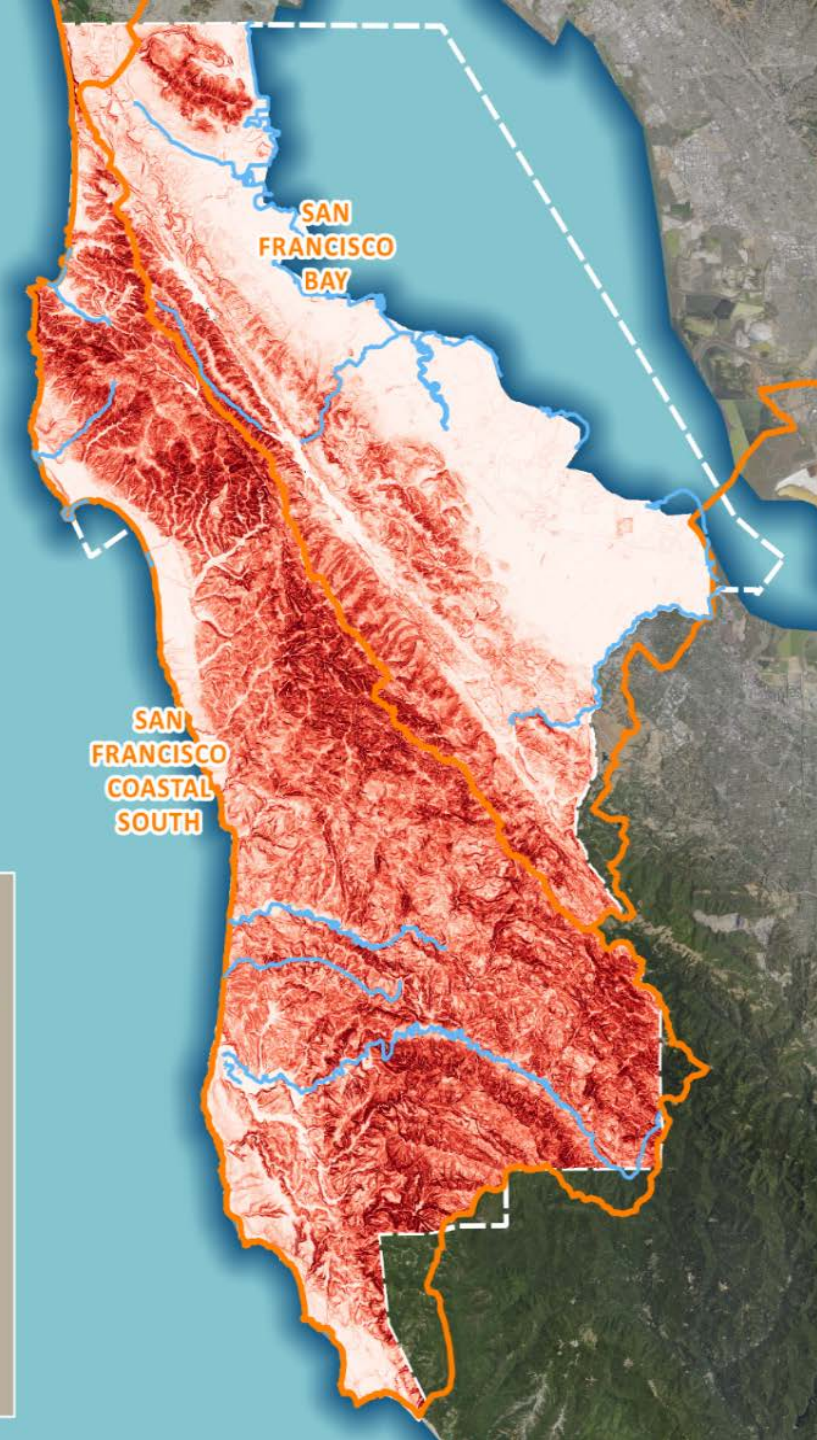
Project Screening & Prioritization Process

1. Identify suitable public parcels and rights-of-way
2. Use Hydrologic Response Units (HRUs) to prioritize projects
 - Land use, impervious cover, hydrologic soil groups, slope
3. Screen and prioritize through a ranking method, with emphasis on projects with multiple benefits



Legend

- 303(d) Listed Waterbodies
- Watershed boundaries
- County line
- Slope (%)
 - < 0.5
 - < 10
 - < 20
 - < 30
 - > 30



Project Types

Regional Projects



Green Streets

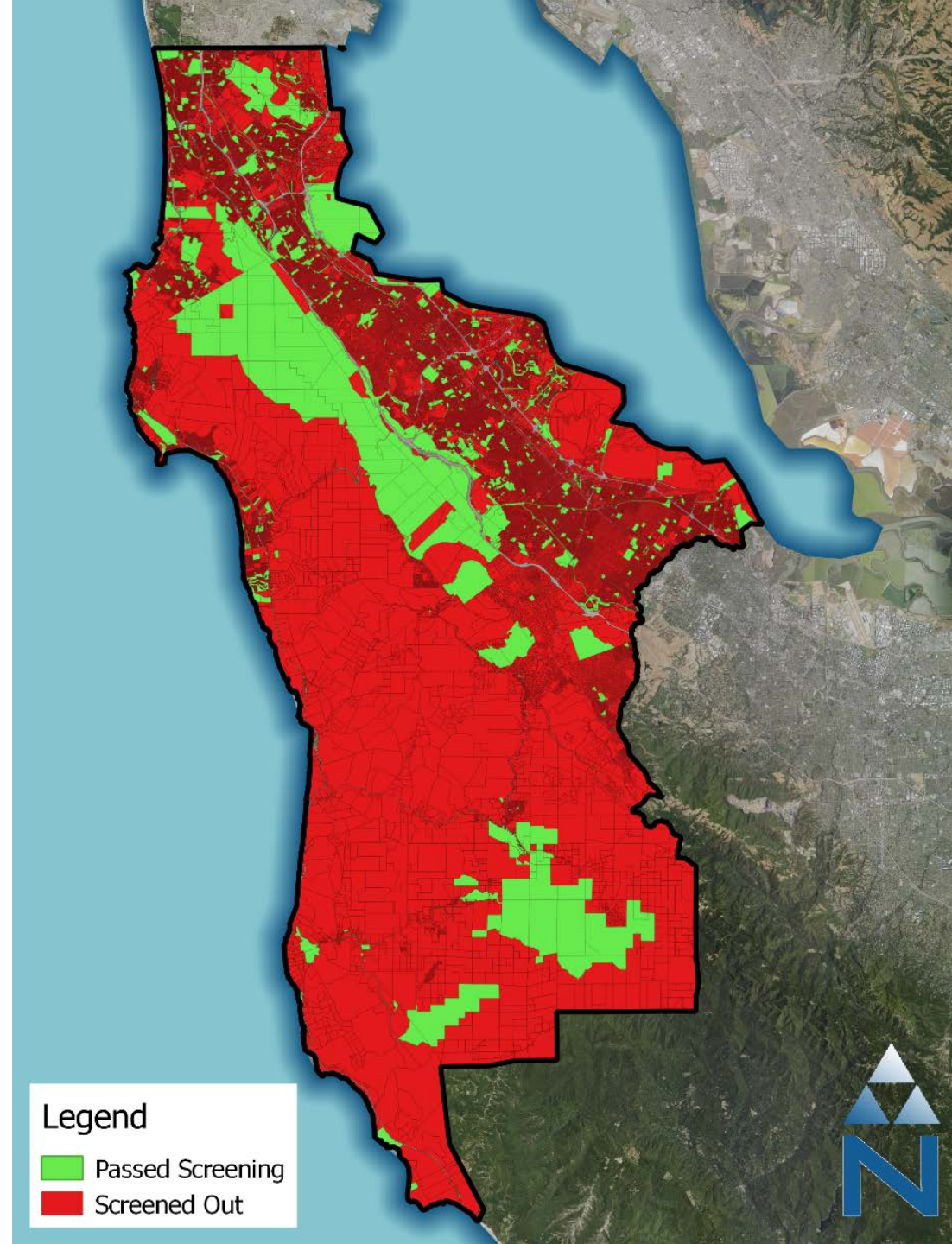
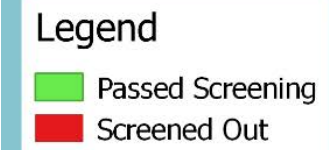


Low Impact Development



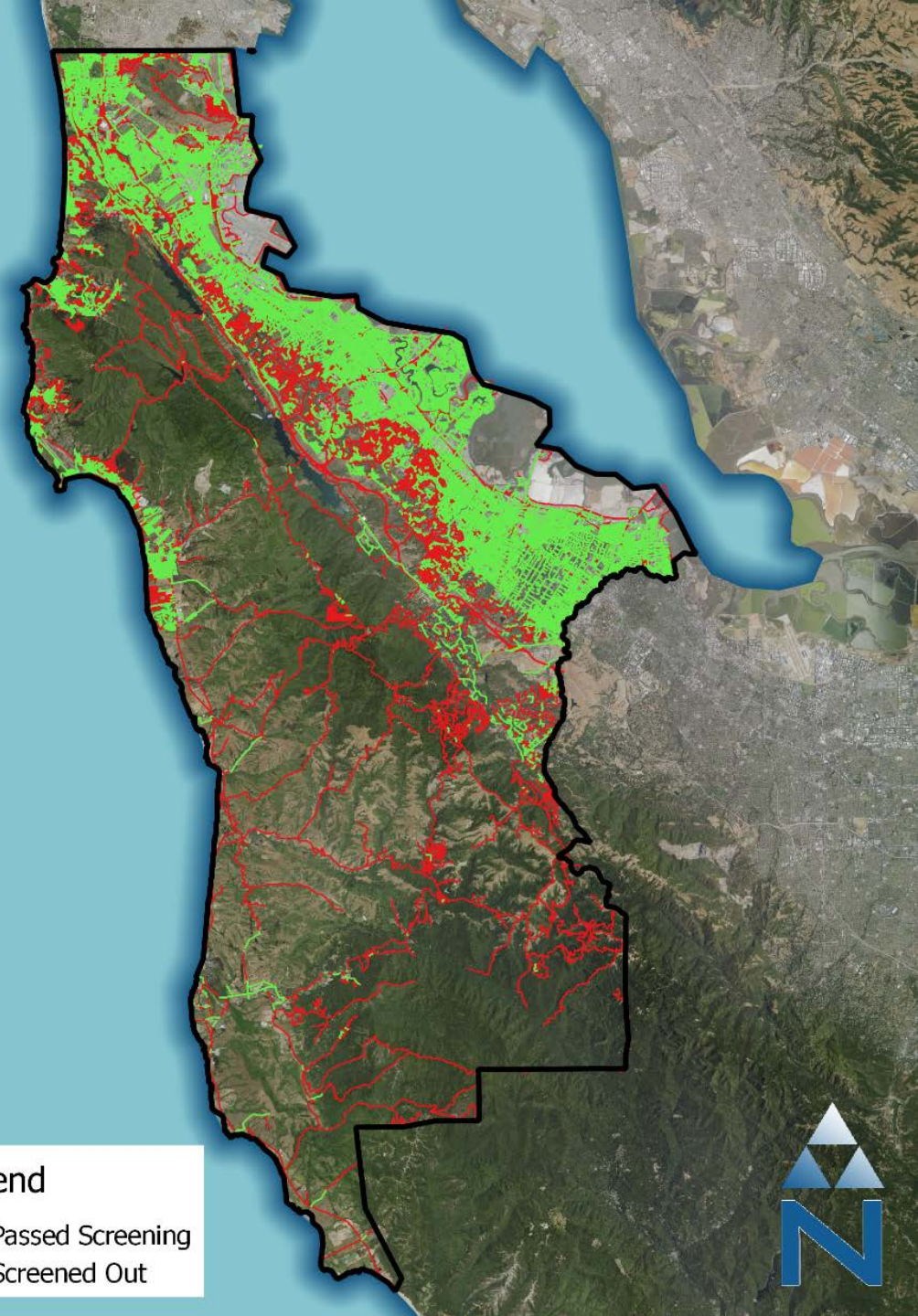
Screening of Sites for Onsite LID/Regional Projects

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

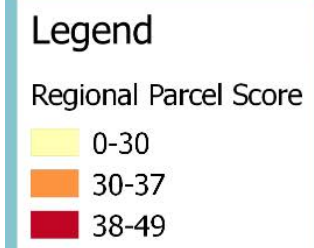
Screening Factor	Street Section Characteristic	Criteria	Reason
Selection	Functional Class	S1400 S1730 S1780	Local neighborhood road, rural road, city street, alley, parking lot roads
Suitability	Ownership	Private	Potential projects are focused on public and right-of-way opportunities
	Road Slope	< 5%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



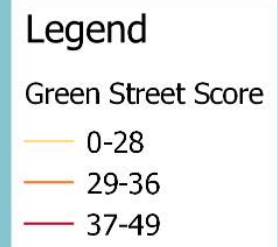
Regional Projects Matrix

	Points						Weight Factor
	0	1	2	3	4	5	
Parcel Land Use	--	--	Schools/Golf Courses	Public Buildings	Parking Lot	Park / Open Space	--
Impervious Area	$X < 40$	$40 \leq X < 50$	$50 \leq X < 60$	$60 \leq X < 70$	$60 \leq X < 80$	$80 \leq X < 100$	--
Parcel Size (acres)	$0.25 \leq X < 0.5$	$0.5 \leq X < 1$	$1 \leq X < 2$	$2 \leq X < 3$	$3 \leq X < 4$	$4 \leq X$	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	$5 < X \leq 10$	$4 < X \leq 5$	$3 < X \leq 4$	$2 < X \leq 3$	$1 < X \leq 2$	$0 < X \leq 1$	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	$3 < X$	--	$1 < X \leq 3$	--	$X \leq 1$	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

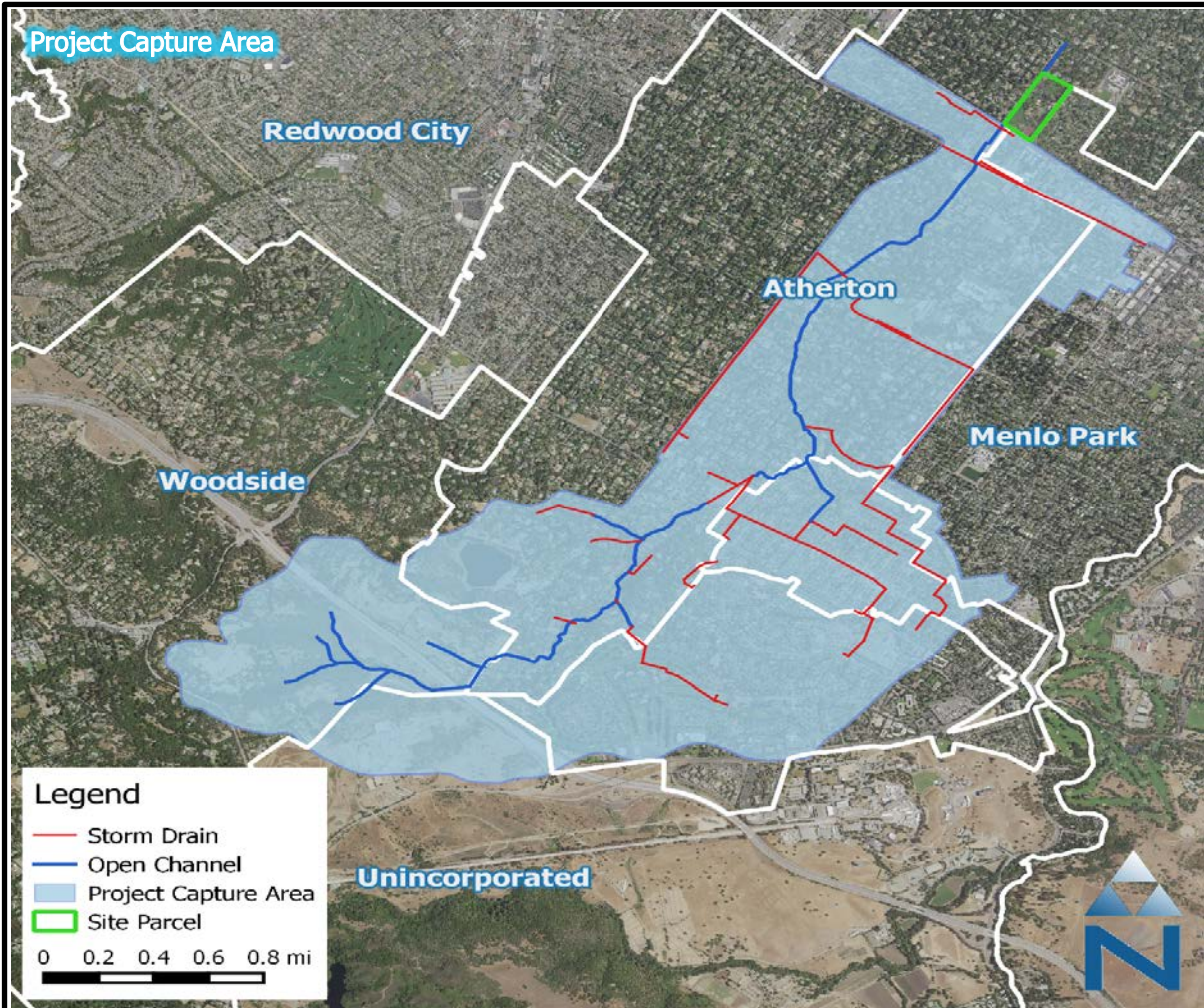


Green Streets



Project Concepts

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



Site Description:

This project concept consists of an offline subsurface infiltration chamber at Holbrook-Palmer Park, owned and operated by the Town of Atherton. This is an ideal site for a regional stormwater capture project because of its proximity to Atherton Creek and the potential to treat a large multi-jurisdictional area. The project would capture flows and associated pollutant loadings from a large portion of the upper Atherton Creek watershed, encompassing sections of the Towns of Atherton and Woodside, City of Menlo Park, and Unincorporated San Mateo County. The project would help to address known flooding issues in the lower reaches of the creek. The project would also contribute to reductions of high-priority pollutants discharged to San Francisco Bay (including TMDLs that require reductions of mercury and PCB loads), augment water supply by recharging the Santa Clara Valley groundwater basin, and provide community enhancement through integration with the recreational facilities of the park. With the incorporation of a hydrodynamic separator for pretreatment of diverted water from the creek, the project also provides the reduction of trash transported through the creek to the San Francisco Bay.

Although not specifically included within this project concept, the project also provides the opportunity for future integration of Low Impact Development (LID) within parking lots of the park to provide further community enhancement and opportunities for public education of LID and other project components.

DISCLAIMER: All elements of this conceptual design are planning-level, based on desktop analysis. All assumptions and parameters must be re-evaluated during the detailed design process. Costs estimates are based on available data. Actual costs will vary.

Drainage Characteristics

Capture Area (acres)	2,875
Impervious Area (%)	19
Dominant Land Use	Residential
Jurisdictions	Atherton, Menlo Park, Woodside Unincorporated San Mateo County

Legend

- Storm Drain
- Open Channel
- Project Capture Area
- Site Parcel

0 0.2 0.4 0.6 0.8 mi

Site Information

Land Owner	Town of Atherton
Street Address	150 Watkins Ave, Atherton, CA 94027
Latitude/Longitude	37° 27' 44.9" N / 122° 11' 34.8" W
Watershed	Atherton Creek

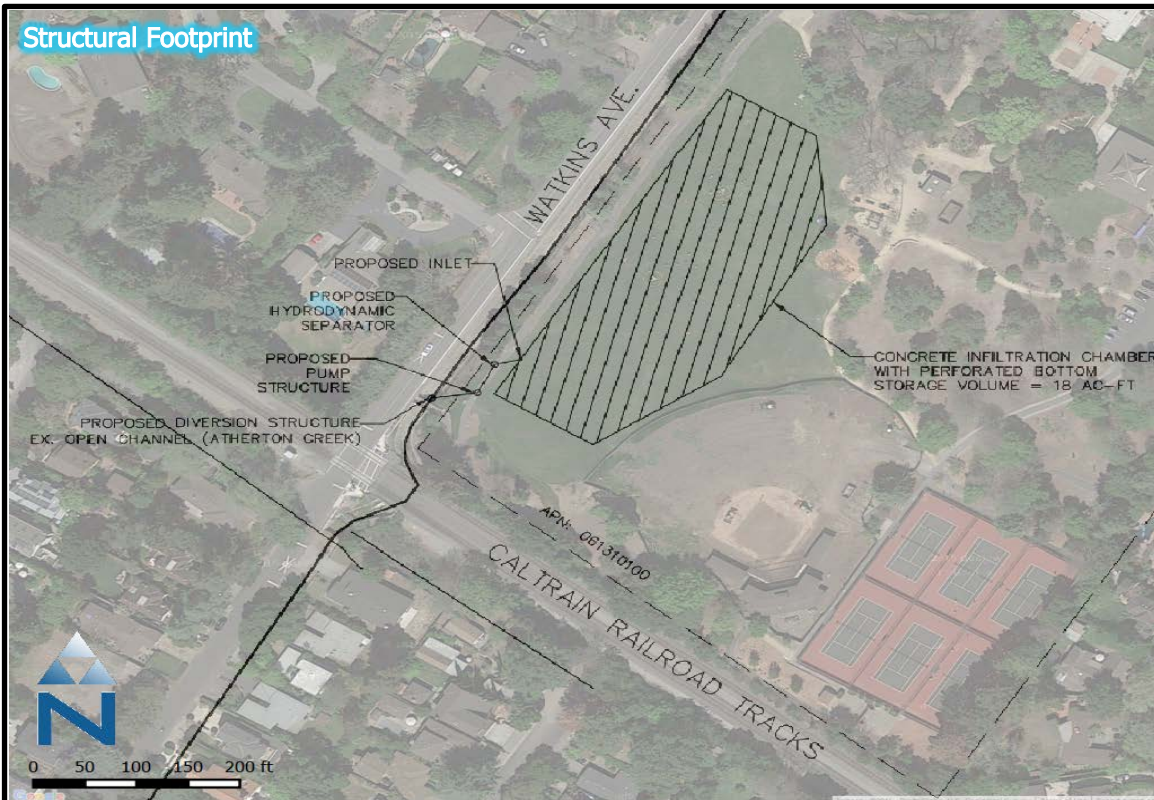


Holbrook-Palmer Park Sports Field

Concept for a Multi-jurisdictional Regional Stormwater Capture Project
Site: Holbrook-Palmer Park (Town of Atherton)



Structural Footprint



Example concrete infiltration chamber



Example Hydrodynamic Separator

Design Criteria

Precipitation, 85 th percentile, 24-hr storm (in)	0.86
Runoff Volume, 85 th percentile, 24-hr storm (ac-ft)	65.90
Peak Discharge, 85 th percentile, 24-hr storm (cfs)	72
Infiltration Rate (in/hr)	0.5

Project Characteristics

Stormwater Capture Process	Subsurface Infiltration Chamber
Footprint (acres)	1.5
Design Height (ft)	12
Depth of Excavation (ft)	15
Pumping Requirements	Dependent on Geotechnical Investigation
Design Volume (ac-ft)	18
24-hr Infiltration Volume (ac-ft)	1.5
Total Treatment Volume (ac-ft) ¹	19.5
Percent Treated ²	30%

Cost Estimate

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Excavation/Removal	36,300	CY	\$50.00	\$1,815,000
Rubber Dam System	1	LS	\$80,000.00	\$80,000
Diversion Structure	1	LS	\$150,000.00	\$150,000
Hydrodynamic Separator	1	LS	\$120,000.00	\$120,000
Pump Structure	1	LS	\$1,500,000.00	\$1,500,000
Diversion Pipe (24" RCP)	120	LF	\$200.00	\$24,000
Infiltration Structure	29,040	CY	\$300.00	\$8,712,000
Restoration	65,340	SF	\$2.00	\$131,000
CONSTRUCTION SUBTOTAL				\$12,532,000
Mobilization (10% construction)				\$1,253,000
Contingency (25% construction)				\$3,133,000
Design (10% total)				\$1,692,000
TOTAL COST				\$18,610,000

Project Description:

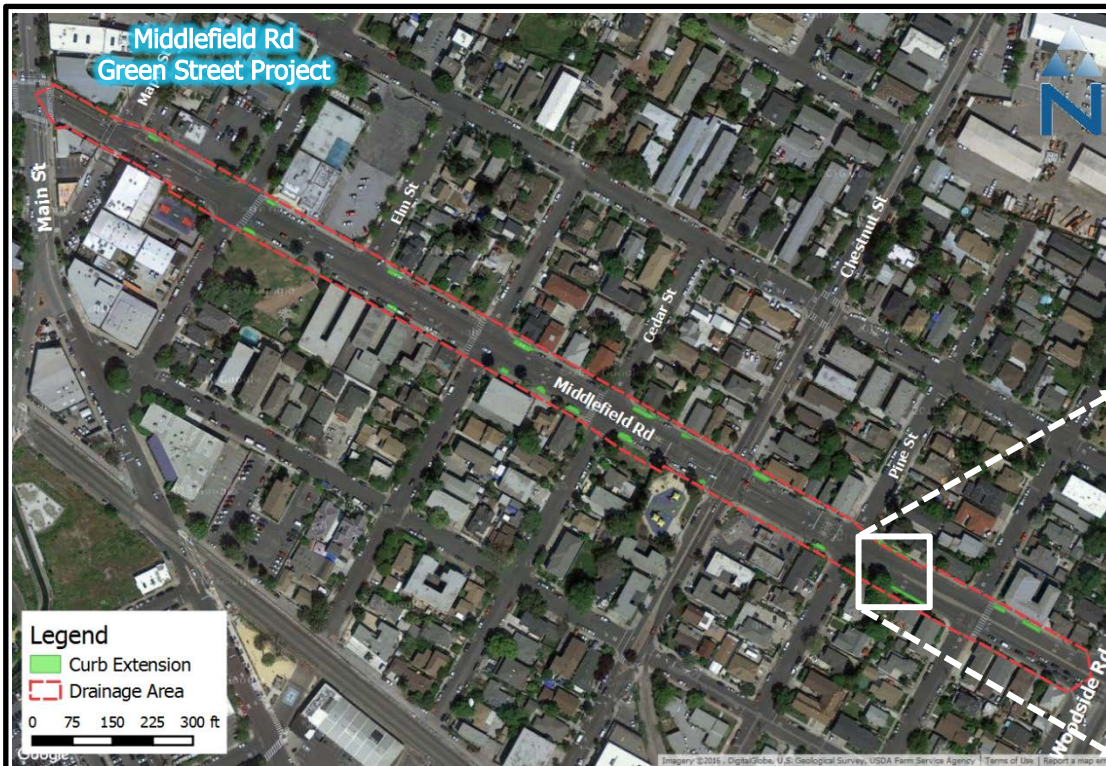
A subsurface infiltration chamber will be considered in the sports field of Holbrook-Palmer Park. The project site is in the south-west corner of the park and will be located just outside of the newly-renovated baseball field. Stormwater will be diverted directly from the channelized segment of Atherton Creek that borders the park along Watkins Avenue. Runoff would first be directed to a pretreatment unit (e.g. hydrodynamic separator) before being routed to the chamber. This will assist in removing trash and sediments from the creek while also reducing maintenance requirements of the chamber. The proposed design would allow for the treatment of 30% of the 85th percentile, 24-hr runoff volume (19.5 of 65.90 ac-ft) for the Atherton Creek watershed. As these volumes are completely removed via storage and infiltration, this provides an equivalent 30% reduction of pollutant loads for the storm event. While no major enhancements are planned for the sports field in the Holbrook-Palmer Park Master Plan (2015), the Master Plan noted that the field could be regraded to improve the playing surface. This project would provide the opportunity to coordinate with the field regrading effort once the chamber is installed.

¹ – sum of the Design Volume and 24-hr Infiltration Volume

² – percentage of the 85th percentile, 24-hr storm Runoff Volume that is treated

Concept for a Multi-jurisdictional Regional Stormwater Capture Project Site: Holbrook-Palmer Park (Town of Atherton)





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
85 th Percentile Rainfall (in)	0.85
Generated Runoff (ac-ft)	0.27



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)



Stormwater Grants

- Round 1 of Proposition 1 stormwater implementation grants closed in early July
- C/CAG supported Redwood City and San Mateo proposals
- State Board recommended funding for both proposals (~\$1.2 million total)
- Five projects total: four green street, one parking lot
- Daly City also recommended to receive \$10 million
- Award announcement starts 90-day clock

Review and Approval Process

- Oct/Nov – Member agency review of Admin Draft
- Dec 8 – C/CAG Board approved releasing for public review
- Early Jan – Public workshops
- Jan 19 - Stormwater Committee
- Jan 30 – CMEQ Committee
- Feb 9 – C/CAG Board to consider adoption
- March 1 – Submit to State Water Board and IRWMP

Public Comment Period

- Open from Dec 14 through Jan 13
- Three workshops
 - 1/5 Menlo Park
 - 1/9 Millbrae
 - 1/10 Pacifica
- GIS web viewer
- Online comment form



Summary of Comments Received

- 53 Total Comments from 23 different agencies and individuals

Comment Category	Number of Comments
General typographical edits/ suggested wording	22
Specific Concept/Project Input	17
Prioritization Scoring Process & Screening Criteria	10
Outreach / Public Engagement Process	4
Future Planning & Updates, Costs	3
Additions/edits to maps & tables	2
Project submission / IRWMP Process	1
Database / Data Storage	1

Agency Type	Number of Comments
Public*	31
Water Board	8
San Mateo Resource Conservation District	7
County Environmental Health	1
Private Industry	4
City Government**	2

* Residents of Palo Alto, Menlo Park, Milbrae, El Granada, Pacifica

** Daly City, Redwood City (Community Development Dept.)



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QUESTIONS?

Matthew Fabry, Program Manager

mfabry@smcgov.org

650-599-1419