Designing Resilient Streets through Green Infrastructure

Tuesday, November 18, 2025, 10:00 a.m. - 11:30 a.m.



ATRC Webinar Logistics

- Share your questions throughout the webinar by using the Q&A function.
- Please complete the post-webinar attendee survey.
- The webinar will be recorded and shared with all registered participants along with the slides and resources.



Webinar Objectives

- Understand how green infrastructure can serve as a public health strategy to promote health equity and climate resilience in active transportation planning.
- Learn what green stormwater infrastructure is, its benefits, and how it is being implemented to many Bay Area cities.
- Identify the requirements and collaborative processes for installing green infrastructure in Active Transportation Program (ATP) projects with the California Conservation Corps.







Guest Speakers



Daniel WooClimate Change & Health Equity

Section Manager

CA Department of Public Health



Peter Schultze-Allen
Senior Technical Scientist
EOA, Inc.



Anthony Pham
Program Coordinator
CA Conservation Corps



Sarah Ward
Special Advisor
Environmental & Energy
Consulting





Green Infrastructure for Health, Equity & Climate Resilience

Dan Woo, MPH, MS, LEED AP ND (he/him) | Section Manager Climate Change & Health Equity Section
Office of Health Equity
California Department of Public Health

November 18, 2025

ATRC Webinar: Designing Resilient Streets through Green Infrastructure

HEALTH CARE

PUBLIC HEALTH



Individuals



Populations



Treatment



Prevention



"Downstream"

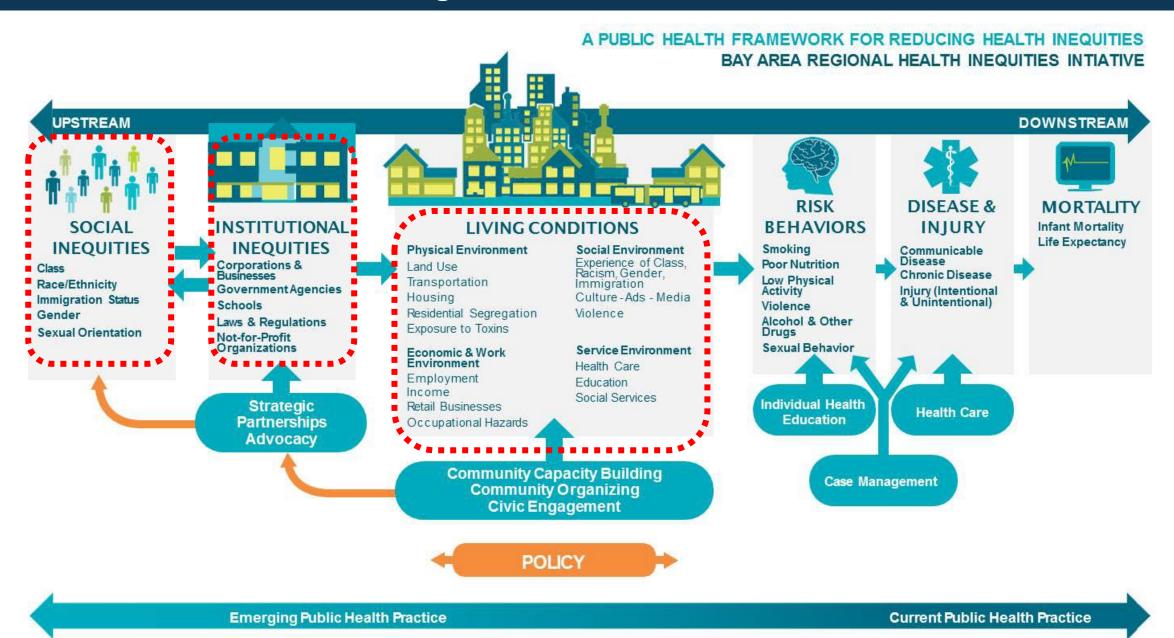


"Upstream"

Public Health: "What society does collectively to assure the <u>conditions</u> for people to be healthy." (Institute of Medicine)



Addressing the Causes of the Causes



Air Pollution & Increasing Allergens

Asthma, allergies, cardiovascular and respiratory diseases

Extreme Heat

Heat-related illness and death, cardiovascular failure

Drought

Water supply impacts, dust storms, Valley Fever

Environmental Degradation

Forced migration, civil conflict, loss of jobs and income

Mental Health Impacts



IMPACTS OF CLIMATE CHANGE

Increasing

GHG

Degraded Living Conditions & Social Inequities

Exacerbation of racial and health inequities and vulnerabilities, loss of employment

Changes In Vector Ecology

Lyme disease, West Nile Virus, hantavirus, malaria, encephalitis

Food System Impacts

Malnutrition, food insecurity, higher food prices, foodborne illness

Severe Weather & Floods

Injuries, fatalities, loss of homes, indoor fungi and mold

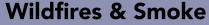
Water Quality Impacts

Harmful algal blooms, campylobacteriosis, cryptosporidiosis, leptospirosis



Weather

Extreme

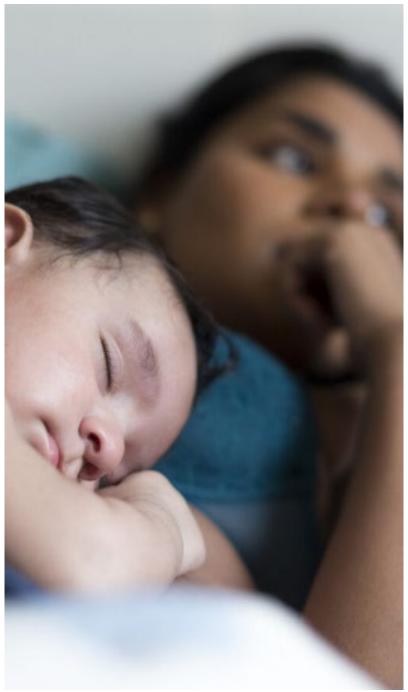


Injuries, fatalities, loss of homes, cardiovascular and respiratory diseases

(Adapted from CDC; J. Patz)

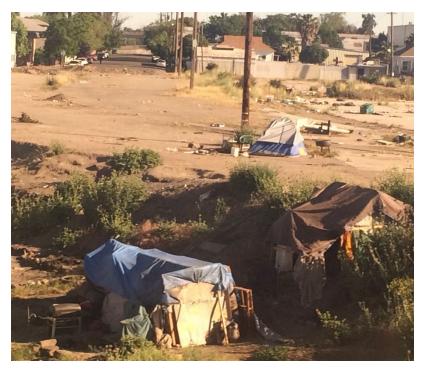






CLIMATE CHANGE IS ALREADY HARMING HUMAN HEALTH.

PEOPLE FACING INEQUITIES HURT FIRST AND WORST.



Operationalizing Equity

Equity = Fair distribution of power and resources

Equity mechanisms:

- Funding
- Higher levels of service
- Facilities
- Capacity building or training
- Jobs
- Decision-making power





Photo: Getty Images

A Low-Carbon, Climate-Resilient Community is...



Urban & Community Greening: Benefits to Health

- Improved mental health
- Enhanced brain development in children
- Improved cognitive function in adults
- Reduced stress and depression

- Improvements in general health
- Reductions in chronic disease (i.e., diabetes, cardiovascular disease)
- Reductions in premature mortality
- Positive association with birth weight



Quantifying the Health Benefits of Active Transportation

Healthy Mobility Options Tool / ITHIM CA: https://skylab.cdph.ca.gov/HealthyMobilityOptionTool-ITHIM

Meeting the California Transportation Plan's 2050 Goal for Increased Walking, Cycling, Rolling, and Transit Use:



7,838 early deaths prevented annually through increased active transportation (walking, cycling, transit)



Reduced burden of chronic **diseases** – heart disease, stroke, diabetes, dementia, cancer (colon, breast), depression



Projected health benefits valued between \$52.5 -1.7 billion per year

	Avoided Deaths		Decrease in Disability Adjusted Life Year (DALYs)	
Pathway	PAF (%)	Count	PAF (%)	Value
Physical Activity	3.3	7,838	3.4	102,642
Air Pollution	< 0.1	15.7	< 0.1	147
Road Traffic Injuries	2.2	88.2	2.2	4,293
Total	1.8	7,941	1.9	107,082
PAF, population attributable fraction; DALY, disability adjusted life year.				

Heat's Impacts on Health

- Leads to dehydration, heatrelated illness and death
- Aggravates chronic health conditions like cardiovascular and respiratory illness, kidney disease
- Correlated with adverse pregnancy and birth outcomes
- Associated with increased mental health distress and suicidality

- Increases the risk for interpersonal and intimate partner violence
- Impairs daily functioning (like driving) due to poor sleep
- Often coincides with air pollution, wildfire smoke, and/or drought conditions, which also worsen health



Hot by Design









HOT

SCHOOLYARDS

On hot, sunny days when schoolyard temperatures soar, surfaces can get hot enough to burn skin.



Hot days lead to unhealthy

temperatures. How can California help schools add shade to playgrounds?

GRASS

ASPHALT

165 F **RUBBER MAT**

Amid extreme heat, some power grids may struggle to keep up with rising energy demand





Cooling Solutions



Smart Land Use

Layout promotes air flow and passive cooling

Enhances community cohesion and vitality



Greening

Reduces urban heat island effect

Improves outdoor air quality



Weatherization

Cools structures more efficiently and affordably

Improves indoor air quality and comfort



Public Transportation

Reduces air pollution and waste heat from cars

Added shade at transit stops and air-conditioning in vehicles



Renewable Energy

Significantly reduces release of heat-trapping pollutants

Distributed energy resources and battery storage



Potential State Funding Opportunities

- Urban Greening Program (CA Natural Resources Agency)
- Urban and Community Forestry Grants (CAL FIRE)









THANK YOU!

Dan Woo | <u>Daniel.Woo@cdph.ca.gov</u> California Department of Public Health











Presentation Outline

What is Green Stormwater Infrastructure (GSI)?

- GSI benefits
- SF Bay Area Stormwater Permit Requirements
- What are Green Streets and Complete Streets?

Green Street Implementation (2005-2025)

- Example projects
- Implementation drivers
- Successes and challenges

Summary and Resources



Source: Lotus Water

What is Green Stormwater Infrastructure (GSI)?

GSI or GI: Systems that use natural processes to protect, improve and manage stormwater runoff, while creating healthier, cooler urban areas

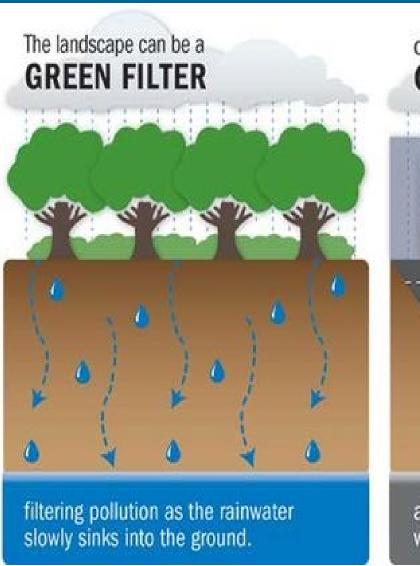


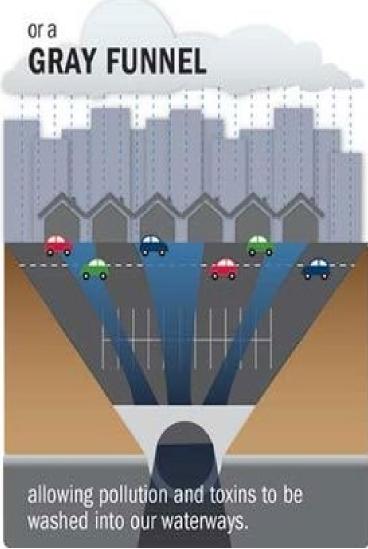




GSI Benefits

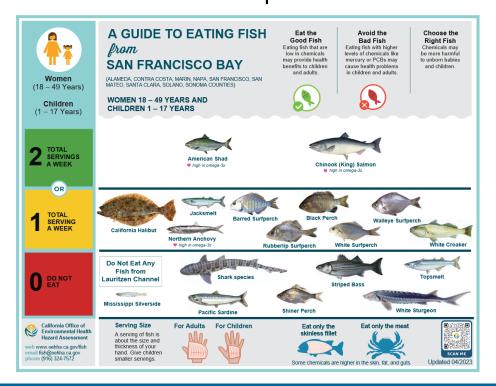
- Flow reduction
- Pollutant reduction
- Reduced local flooding
- Urban greening/shade
- Urban heat reduction
- Climate resiliency
- Increased wildlife habitat
- Cooler buildings
- Cleaner air
- More beautiful streets!

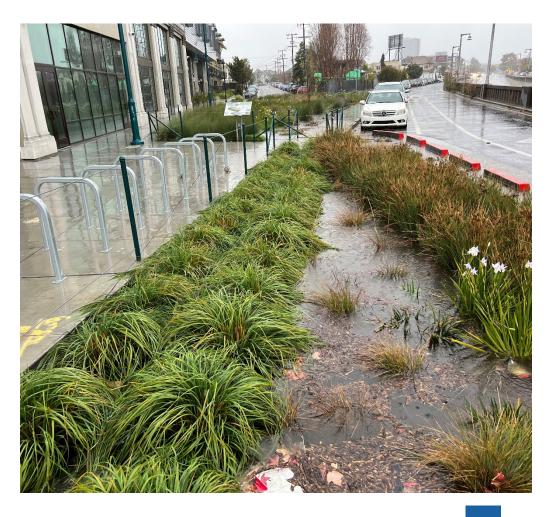




Stormwater Background Water Quality Impacts of Urbanization

Stormwater is now recognized as a valuable resource. The Clean Water Act requires action where there are pollutants.

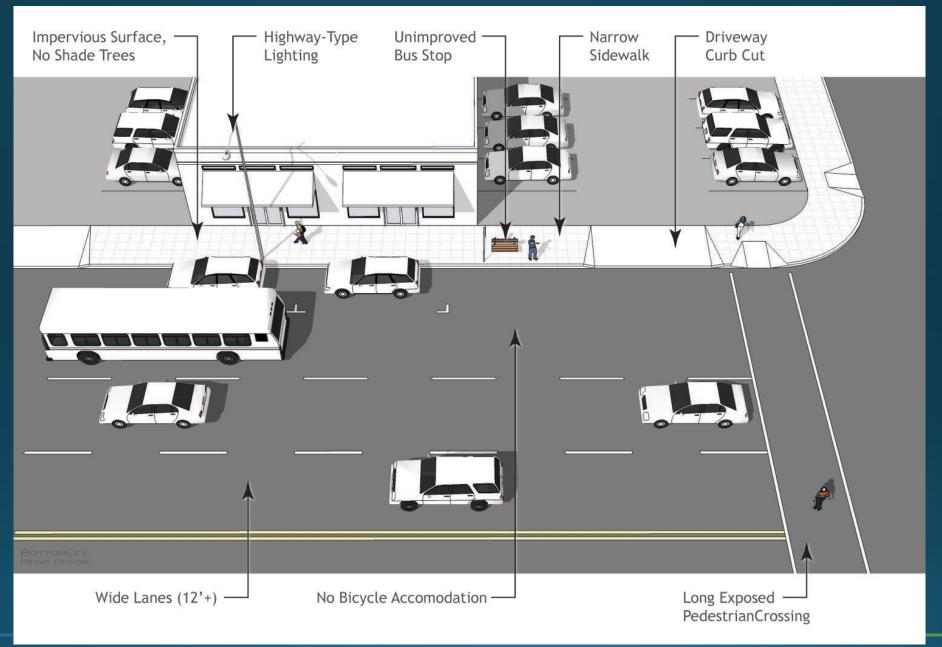




Bay Area Municipal Regional Stormwater Permit Background

- The 3rd municipal regional stormwater permit (MRP 3) was approved in 2022 for 79 permittees in:
 - Alameda, Contra Costa, San Mateo, and Santa Clara Counties, and Fairfield-Suisun and Vallejo
- There are other stormwater permits for San Francisco and North Bay communities
- The MRP requires certain types of roadway projects to implement GSI

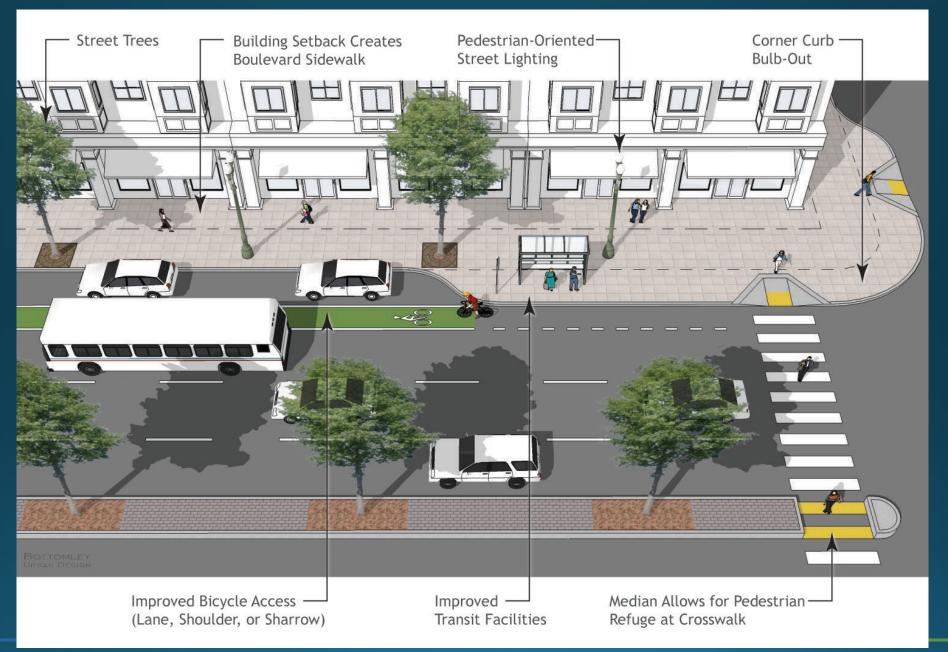








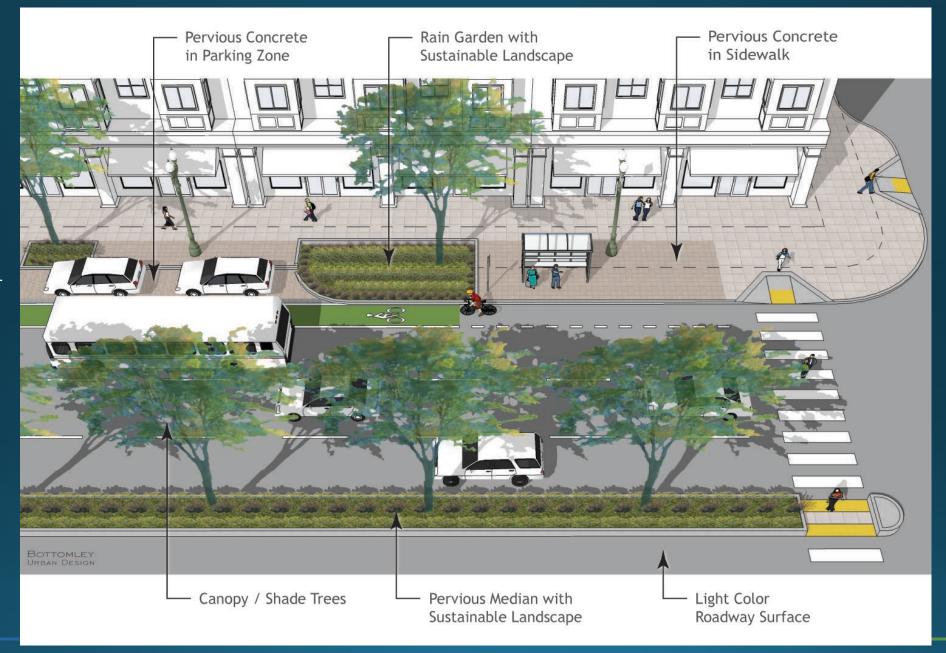












Green and
Complete Street

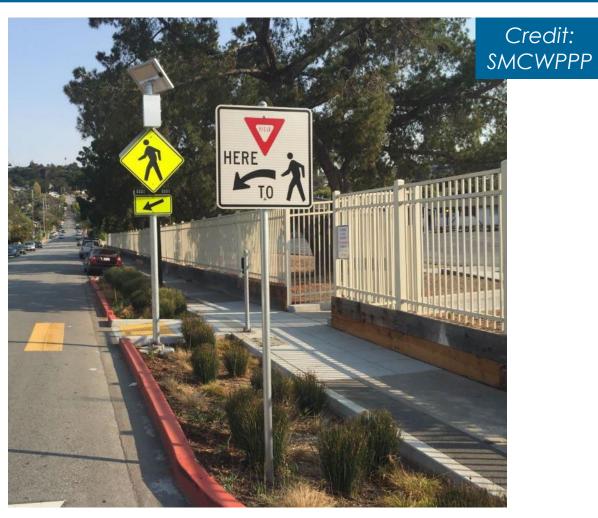




Bioretention in Green & Complete Streets



Stormwater cycletrack (Emeryville)



Stormwater curb extension in Safe Routes to School project (San Mateo)

Pervious Pavement in Roadways

Pervious Interlocking Concrete Pavers (PICP)



Credit: City of Berkeley

Pervious Concrete

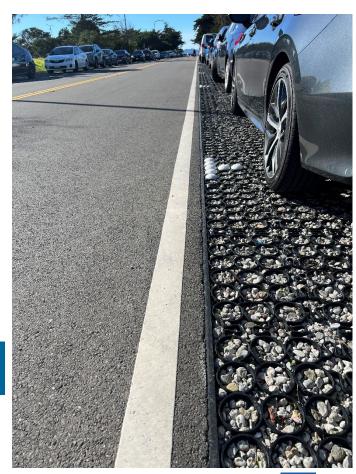


Pervious Pavers



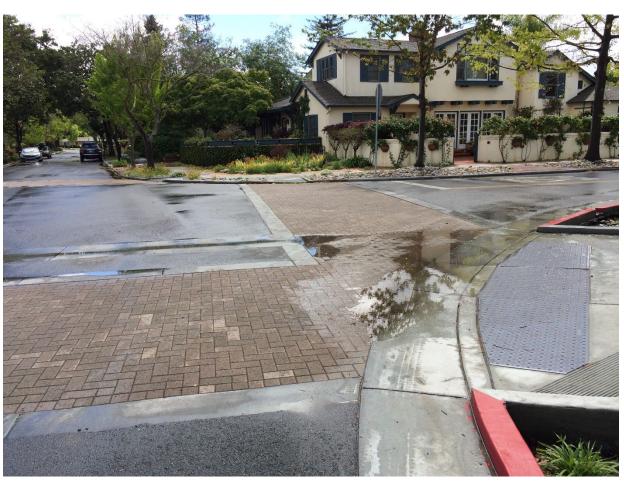
Credit: Architecture & Design

Grid Pavement



Pervious Pavement in Green & Complete Streets

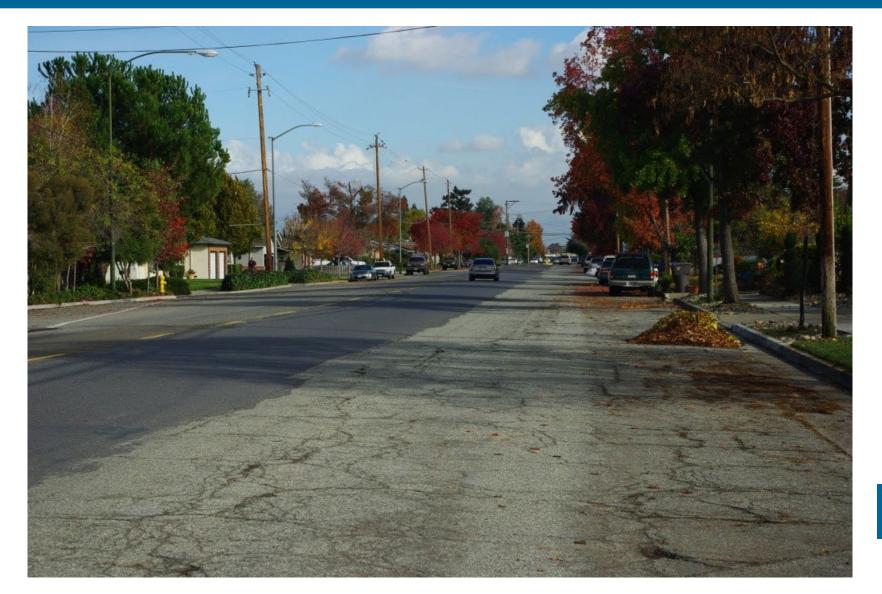




PICP Crosswalk

Pervious Paver Crosswalk

Hacienda Avenue (Campbell) Green and Complete Street Example



Before:

- Road 65-70 ft wide
- Pavement in need of repair
- No bike facility
- Discontinuous sidewalks

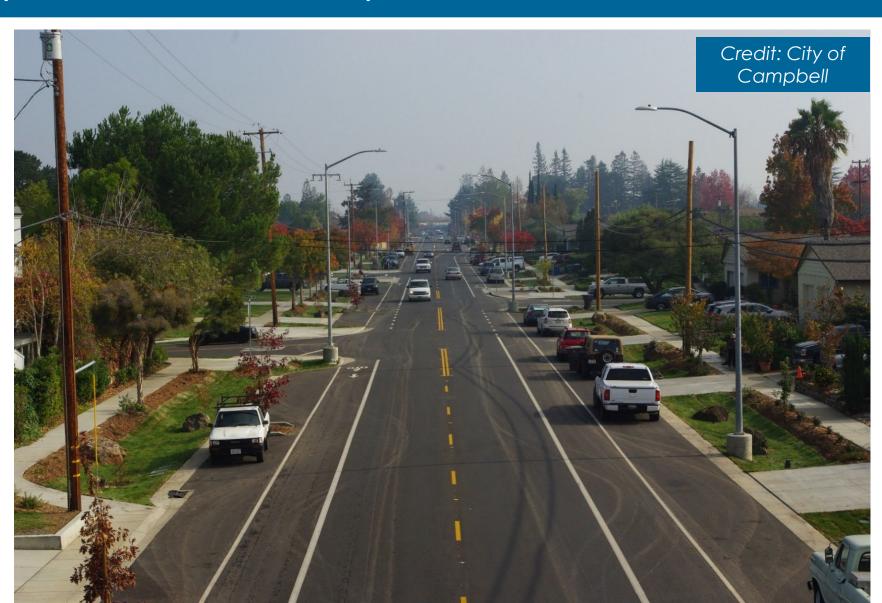
Credit: City of Campbell

Hacienda Avenue (Campbell) Green and Complete Street Example

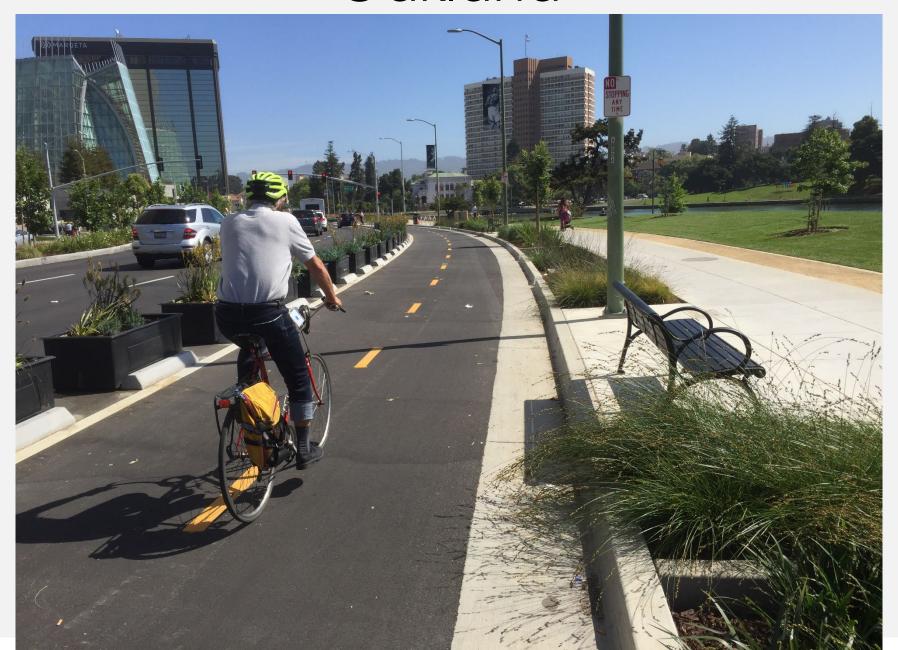
After:

- Reconstructed pavement
- 63 biotreatment areas
- 60 street trees
- Bike lanes
- Traffic-calming bulbouts
- Continuous sidewalks

Funding: City funds, Prop 84 and VTA grants



Oakland



El Cerrito



Implementation Drivers

Stormwater-Quality Related (MRP):

- Some road projects trigger GSI requirements
- Opportunities in capital improvement projects
- GSI implementation targets

Other Programs:

- Transportation combining GSI less expensive
- Urban forestry
- Climate resilience/adaptation urban heat
- Public health walking/biking, air pollution
- Flood resilience/management
- Urban greening/nature



Implementation Successes

Successes:

- Achieving multiple benefits meets municipal goals and public expectations
- Public agencies gaining more experience with GSI construction and maintenance
- Use of urban forestry GSI measures to treat stormwater
- Use of pervious pavement in more applications to reduce maintenance costs
- Training is happening! (ReScape, The Watershed Project, Grassroots Ecology, Conservation Corps)



Implementation Challenges

Challenges:

- Finding <u>opportunities</u> for complete AND green street projects
- Utilities under roadways
- Meeting public expectations for GSI aesthetics at a reasonable cost
- Training staff and contractors on landscape maintenance aesthetics and performance
- Learning from other jurisdictions some staff feel their jurisdiction is unique
- Adapting to a changing climate (hotter and drier) in combination with sandy GSI soil



Construction Funding Challenges

Grants and Transportation Funding:

- Many transportation projects have insufficient funds for GSI
- Funding can have limitations on GSI expenditures
- Regional (larger) projects are more cost-effective

Stormwater Fees:

 California law makes it difficult to enact or raise stormwater fees – it's not classified the same way as sanitary sewer, trash or drinking water fees

Funding for municipal GSI projects is needed

Such as Measure W in the Los Angeles area



Maintenance Funding Challenges

Transportation Projects:

- Grant funding not typically for maintenance
- GSI maintenance can be expensive

Landscaping:

- Landscape maintenance is costly
- GSI vegetation is often new landscaping in roadways
- More GSI equals larger maintenance burden

Public Perception:

 The public is sometimes reluctant to pay for maintenance and wants to see new projects



Bay Area Green Street Summary

Significant Green Street Implementation to-date in the "MRP-Area"

- 200+ green street projects
- Integration with Complete Street projects

Multiple environmental benefits

- Improved water quality
- Urban cooling
- Urban greening and habitat
- Better coordination with complete streets, urban forestry and climate resiliency is yielding more projects



SF Bay Area Bioretention Resources

SCVURPPP GSI Handbook (2019 and 2025)

https://scvurppp.org/2019/09/01/scvurppp-greenstormwater-infrastructure-handbook/

SCVURPPP GSI Vegetation Guide (2023)

https://scvurppp.org/2023/06/30/green-stormwater-infrastructure-vegetation-guide/

City of San José GSI Maintenance Field Guide (2019) www.sanjoseca.gov/home/showdocument?id=40709

SMCWPPP GI Design Guide (2024)

https://www.flowstobay.org/wpcontent/uploads/2024/05/SMCWPPP GIDG-3rd-Edition-2024 web.pdf











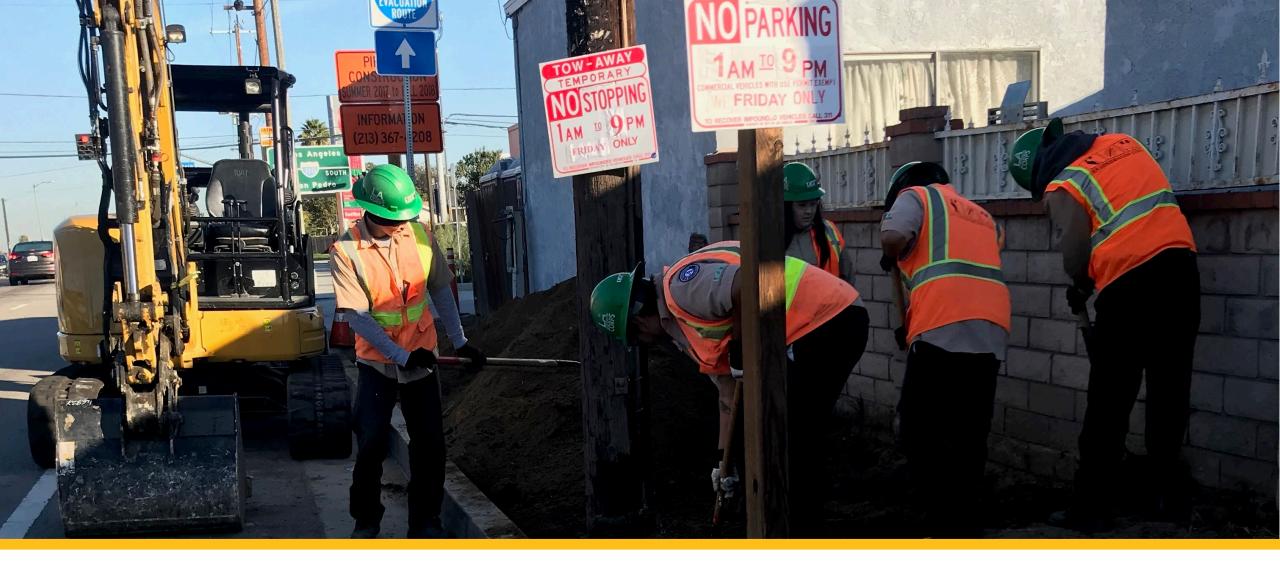
San Francisco GI Maintenance Guide Book (2018) https://sfpuc.sharefile.com/share/view/sb83923c24cb4298a

Contact Information

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Active Transportation Program: Conservation Corps Inclusion





Legislative Language



SB 99 (Chapter 359, Statutes of 2013) directs the ATP projects to include the use of the California Conservation Corps (CCC) and Certified Community Conservation Corps (Local Corps):

Provision: "(10) Use of California Conservation Corps or qualified community conservation corps, as defined in Section 14507.5 of the Public Resources Code, as partners to undertake or construct applicable projects in accordance with Section 1524 of Public Law 112-141."

Legislative Intent to Use Corps: Engage youth participating in workforce development programs, with opportunities to participate in transportation sector career path projects.

Per the Guidelines: "Points will be deducted if an applicant does not seek Corps participation or if an applicant intends not to utilize a Corps in a project where the Corps can participate."





Who are the Conservation Corps of California

Conservation Corps enroll young adults 18-26 to perform important conservation projects throughout California.

Conservation Corps are rigorous programs that combine work, education, leadership, and career development.









California Conservation Corps

- A state department within the Natural Resources Agency
- Modeled after the Civilian Conservation Corps of the 1930's
- 27 sites across the state including seven residential centers



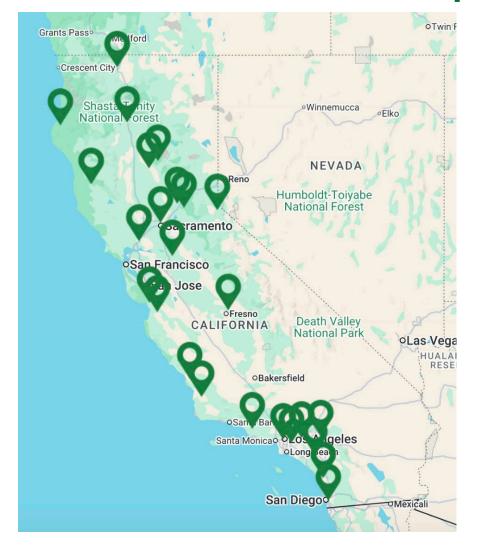


Local Conservation Corps

- 14 state-certified independent non-profit organizations located in communities throughout California
- Enroll young adults 18-26 to perform important conservation projects
- State-certified to meet strict requirements for rigorous programs that combine work, education, leadership, and career development

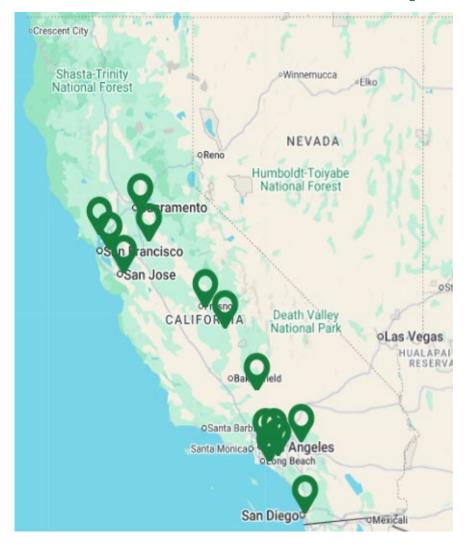


California Conservation Corps





Local Conservation Corps







Project Types





For implementation projects, applicants must consult with the California Conservation Corps and Certified Community Conservation Corps (hereafter collectively referred to as Corps) to determine the feasibility of the Corps' participation in the project or accept a deduction of points on the project's application score.

To avoid a point deduction and to receive preference, please submit your project details through the Corps Consultation webpage at https://ccc.ca.gov/collaborate/consultation/. The Corps will review your project application for feasibility within 14 business days and provide evidence of consultation that should be included in your application.



The Corps cannot guarantee a compliant review process for applicants who submit the required form and attachments fewer than 14 business days before an application deadline.

Planning/Non-Implementation Projects

The process does not apply to planning projects. These include planning proposal applications or proposal applications that do not include a field component. Applicants' use of the Corps will not impact their project scores. If you are unsure if your project requires consultation, please contact the Corps at ATP@CCC.CA.GOV.





Examples Projects

The Corps provides supervised work crews of young adults trained and equipped to work safely on a wide variety of projects. Any work that includes hand labor is feasible.

Examples of work Corpsmembers can perform*

- Repair, remove & replace sidewalks
- Sign installation
- Plant and tree planting
- Tree removal and tree care (includes fuel reduction)
- Maintenance (e.g., clearing trails of downed trees, debris, and vegetation; cleaning out drainage structures; and removing invasive species)
- Bike locker & bike rack installation
- Irrigation
- Drought-tolerant landscaping
- Demolition & deconstruction
- Trail construction
- Urban park construction
- Graffiti removal
- Fencing
- Outreach & Education







^{*}Please note that these lists are not exhaustive





Benefits of Using the Corps

Utilizing the Corps is included in legislation to increase the public benefit of projects by creating workforce development opportunities for young adult Corpsmembers, many of whom live and work in disadvantaged communities and vulnerable populations.

- ➤ The Corps provides comprehensive job training, career development, and educational opportunities to young adults 18-26.
- Natural Resource (Transportation) projects serve as career pathways for young adults to enter specialized fields, including firefighting, forestry, energy conservation, and other environmental fields.
- Corpsmembers often work on projects in their own community, strengthening their connection to the direct benefits of the project.









Corps Consultation Process

Applicant visits the CCC Consultation webpage & submits project details via web form

Both Corps will review the project for feasibility & notify applicants within 14 business days whether it is feasible for the Corps to participate

Applicant is provided evidence of consultation and Corps determination to include with their grant application

Important Notes:

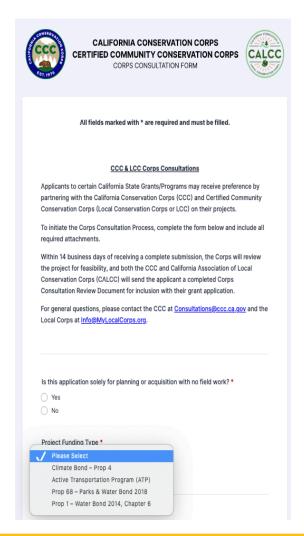
- The Corps do not need to be included in a **bidding** process the ATP PRC takes precedence over competitive bidding regulations for projects funded under the division.
- The Corps are exempt from prevailing wages (California Labor Code section 1720.4(c)).
- Applicants are **strongly encouraged** to reach out to the Corps early in the process while developing project proposals to determine how the Corps can be included and ensure a compliant review process.
- The Corps **cannot** guarantee a compliant review process for applicants who submit the required form and attachments fewer than 14 business days before an application deadline.

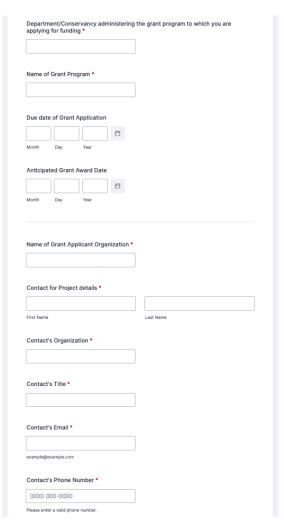


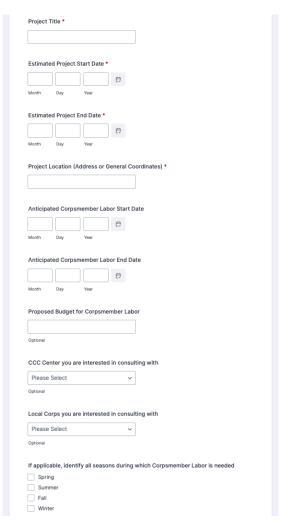


Corps Consultation Request Form

Estimated time to complete the JotForm: 15 minutes with completed project materials to upload







Please attach the following documents below: Project Location Map(s) (required) Site Plan(s) (if available) Any other information that would be helpful for Project Managers to understan your project Project Location Map(s) *
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Scoring with the Corps

Utilizing the Corps is included in legislation to increase the public benefit of projects by creating workforce development opportunities for young adult Corpsmembers, many of whom live and work in disadvantaged communities and vulnerable populations.

- Avoided point deduction on current project application (0 or -5 points)
- Avoided point deduction on future project applications (up to -10 points)
 - Suppose the awardee indicated on an ATP application that they intended to use a Corps but ultimately failed to use/chose not to use Corps after funding was received. In that case, the entity will receive negative points (up to minus 10 points) on the next ATP application.

NOTE: The Corps must be consulted on all other projects, including planning projects and scientific studies with field work such as, but not limited to, baseline studies, invasive plant removal, native plant propagation, mapping, and site maintenance.









What to Do After Receiving an Award?



If your project has been deemed feasible for involvement by the Corps and has received an award, please reach out to the Corps project manager mentioned in your feasibility notice. In your communication, you'll address the following points:

- Confirm the availability of the Corps
- Discuss the details of the project work
- Schedule a call and/or project walkthrough
- Understand the contracting process

If both the CCC and LCC determine that it is feasible for corpsmembers to work on the project, it is the grantee's discretion on which Corps to hire. If there is enough project work for both Corps to complete, the grantee is welcome to hire both Corps. We are always open to collaboration.





Access to Corps Consultation Form and Contact Info.

California Association of Local Conservation Corps:

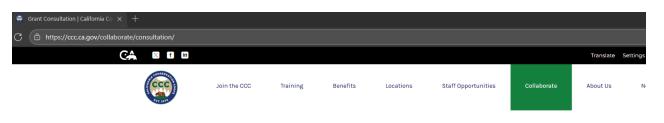
inquiry@atpcommunitycorps.org

California Conservation Corps:

atp@ccc.ca.gov

Access Corps Consultation Form:

https://ccc.ca.gov/collaborate/consultation/



CONNECT WITH US

Consultation Process To initiate the grant consultation process, read the instructions and complete the form below CONSULTATION INSTRUCTIONS CORPS CONSULTATION FORM

VIEW GRANT INFORMATION

Active Transportation Program

Contact

ATP@ccc.ca.gov

Funds from California's <u>Active Transportation Program</u> can be used to increase biking, walking, and other active modes of transportation. ATP grant applicants receive preference by consulting with the CCC and <u>certified local corps</u> while developing their project proposals. To get started, fill out CCC's Grant Consultation Form and email us with any specific questions!

ATP Guidance for Greening Projects

- 2025 Active Transportation Program Guidelines -Appendix C, page 47
- Work with CA Conservation Corps (CCC)
- Types projects CCC can assist with:

- Irrigation Landscaping Tree planting
- Reach out to your Caltrans <u>District ATP Coordinator</u> for other types of greening installation ideas or if you have questions.



Greening in ATP Grants



Corcoran

ATP Cycle 6, 40 trees



Los Angeles

ATP Cycle 6, 270 trees





Q & A time





CDPH ATRC NI Technical Assistance Staff



Alicia Ramos Districts: 1, 2, 4, 5, 6, 9, 10 Alicia.Ramos@cdph.ca.gov



Marianne Hernandez Districts: 3, 7, 8, 11, 12 Marianne.Hernandez@cdph.ca.gov



Thank You

