

C/CAG

CITY/COUNTY ASSOCIATION OF GOVERNMENTS OF SAN MATEO COUNTY

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TASK ORDER FORM

Start Date: July 1, 2021

Consultant Name: S. Groner Associates

Contract: Countywide Water Pollution Prevention Program Technical Support

Task Order No.: SGA-07

Task Order Name: Municipal Stormwater NPDES Permit Compliance Assistance

Scope of Work: Public Education and Outreach

Deliverables: See attached scope of work

Budgeted Cost: Per attached Fiscal Year 2021-22 scope of work, not to exceed \$260,000

Completion Date: June 30, 2022

The parties indicated herein agree to execute this Task Order per the scope indicated above. No payment will be made for any work performed prior to the start date of this Task Order. Unless otherwise indicated, receipt of this executed Task Order is your Notice to Proceed with the work specified herein.

C/CAG

SGA

Sandy Wong, Executive Director Date

Date

Purpose

The purpose of the San Mateo County Water Pollution Prevention Program (SMCWPPP), operated through the San Mateo City/County Association of Governments (C/CAG), is to reduce stormwater pollution in local creeks, lagoons, shorelines, and neighborhoods throughout San Mateo County through stormwater pollution prevention infrastructure, stormwater management, community outreach, and public education. SMCWPPP oversees the public information and outreach efforts for all of C/CAG's participating permittees with an aim to educate residents about the causes of stormwater pollution and its adverse effects on local water quality. SMCWPPP empowers residents with environmentally friendly practices and encourages support for and participation in SMCWPPP activities.

Goals

SMCWPPP has three major goals that SGA aims to fulfill in the current contract:

1. Meet all the Public Information and Outreach requirements of the NPDES Municipal Stormwater Permit¹
2. Developing community awareness of the challenges and opportunities of managing stormwater in San Mateo County, with a specific focus on green infrastructure and individual implementation and actions people can take at home to make a difference
3. Position the program as a leader in innovative stormwater pollution prevention solutions and community improvement

Permit Requirements Included

C.7.b, C.7.c, C.7.d, C.7.e, C.9.e. i-iii; C.15.b.iv, C.15.b.v (a,b,d), C.15.b.vi (a,b,c,d)²

Target Pollutants

Priorities: Litter/Trash, Pet Waste, Pesticides (promote integrated pest management),

Others: Household Hazardous Waste, Wash Water

Intervention Methods

Rain barrels, rain gardens, and additional green infrastructure; community cleanups and instructional workshops, HHW activities, etc.

Target Audience

Residents of San Mateo County, businesses, students, elected officials, and other community partners and stakeholders.

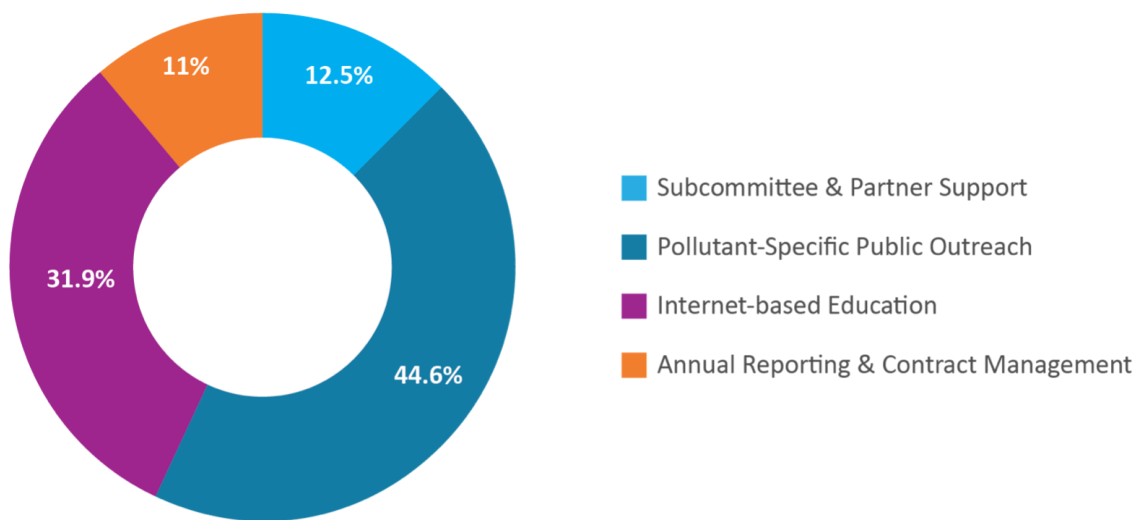
¹ Please note that the MRP 3.0 will only be released and take effect fiscal year 2022/2023. For this fiscal year, we will continue to follow permit requirements for MRP 2.0.

² Please note that the C.7.f School-Age Children Outreach has been removed from the SGA scope. This requirement will be met and reported on by the work conducted by C/CAG staff on the Resilient San Carlos Schoolyards project, as well as ongoing coordination with the County Office of Education, including but not limited to the Sustainable Watersheds Teacher Fellowship. SGA will support these efforts as needed.

Total Budget for FY' 2021-2022

The focus for fiscal year 21-22 will be to meet NPDES permit requirements for outreach while also engaging San Mateo County in stormwater pollution prevention and raising the profile of SMCWPPP as an innovative contributor to water pollution prevention efforts.

We will focus on engaging residents to support efforts that prevent damaging pollution affecting local bodies of water, including creeks, the Pacific Ocean and the Bay. We will provide residents with tools and training to easily adopt and integrate green infrastructure and pollution prevention practices into their lives; while also forging critical partnerships with schools, Non-governmental Organizations (NGOs) and Community Based Organizations (CBOs). The total budget allocation for FY' 21-22 is as follows. Allocations include partner and subcontractor fees as well as projected expenses.



Task	Budget FY'21/22
Subcommittee & Partner Support	\$32,500 (12.5%)
Pollutant-Specific Public Outreach	\$116,000 (44.6%)
Internet-based Education	\$83,000 (31.9%)
Annual Reporting & Contract Management	\$28,500 (11%)
Total	\$260,000 (100%)

Task Strategy and Objectives

What follows is an overview of the goals, tasks, deliverables, and budget for each task in the FY'21-22 budget. Our overall strategy for this year is to provide residents with meaningful tools to incorporate green infrastructure and pollution prevention practices at their homes while creating relationships and partnerships with key NGOs, CBOs, and local businesses, who will act as advocates within the community. Our education, activities, and messaging will encourage residents to join SMCWPPP in working to promote clean water practices and highlight the work SMCWPPP is doing throughout the county to prevent stormwater pollution.

Task 1: Subcommittee & Partner Support

SGA will continue to provide support for the C/CAG PIP subcommittee. We will provide support to the individual permittees as requested and participate in Bay Area Stormwater Management Agencies Association (BASMAA) subcommittee PIPP meetings.

Activity Goals

- Provide the C/CAG PIP subcommittee with current progress on the contract and solicit feedback.
- Support outreach activities of permittees.
- Participate in BASMAA PIPP Subcommittee meetings to help facilitate regional efforts including Our Water, Our World initiatives. Participation may include chairing or vice-chairing the group for a time span of 6-12 months.
- Establish partnerships that help maximize the reach and cost-effectiveness of outreach efforts and community events.
- Provide quarterly reports for outreach and public education activities to the C/CAG PIP subcommittee.

Tasks

- Create agendas for bi-annual C/CAG PIP subcommittee meetings and disseminate them to attendees.
- Attend, facilitate, and lead C/CAG PIP subcommittee meetings in person (pending COVID restrictions) and provide a remote meeting option.
- Prepare minutes from the meeting and disseminate them to the C/CAG PIP subcommittee.
- Provide the C/CAG PIP subcommittee with quarterly updates on current outreach efforts, upcoming initiatives, and ways to participate.
- Support individual permittees with outreach material requests.
- Participate in quarterly BASMAA meetings.
- Promote partnership opportunities with social media and other logistical resources on a case-by-case basis.

Deliverables

- Host 2 C/CAG PIP subcommittee meetings (Sept/Oct and Mar/Apr timeframe)
- Draft 2 meeting minutes from C/CAG PIP subcommittee meetings
- Draft 4 quarterly updates and disseminate to C/CAG PIP subcommittee
- Provide individual permittee support, as requested
- Attend 4 BASMAA meetings

Task 1: Subcommittee & PIP Member Support Budget Breakdown

Subcommittee and Partner Support	Budget
PIP meeting coordination	\$7,000
PIP member support and updates	\$13,500
Collateral materials	\$12,000
Total	\$32,500

Task 2: Pollutant Specific Public Outreach

Permit requirements met: C.7.b., C.7.d, C.7.e., C.9.e ii (1-3)

Green Streets Stewards Pilot Program Continuation

In FY' 21-22, we would like to build off the efforts started in FY' 20-21 for the Green Streets Stewards (GSS) Pilot Program started in Half Moon Bay in partnership with the UC Master Gardeners. The goal of this program is to pilot a foundational program to support current and ongoing GSI facility maintenance needs across different jurisdictions while also engaging and educating residents, students, and community groups on the function and value of green stormwater infrastructure (GSI).

This program would be led by the staff of UC Cooperative Extension of San Mateo/San Francisco Counties, an SGA Marketing subcontractor. SGA Marketing would help support the program with marketing and promotional efforts as well through collateral. The program's proposal for FY' 21-22 is included as attachment A to this scope of work. The timeline and deliverables are summarized below for reference.

Timeline

- July 2021 – September 2021: initial training for UC Master Gardeners, GSI Basics (1)
- August 2021: additional Green Infrastructure Gardeners groups constituted (2)
- Sept 2021 – May 2022: Bioswale Blitz – three to five UCMG bioswale events (5)
- September 2021: initial training for 4-H youth, GSI Basics (6)
- June 2022: end-of-project year report (7)

Deliverables

The deliverables are marked in italics. Deliverables 3 and 4 have been completed for the 2020-2021 project year; and they will be re-worked and improved as needed (e.g., elements 4f and 4g).

1. *GSI Basics Training*: The recorded training presentation and materials (including pre/post evaluation materials) on stormwater in cities, GSI, regulations, etc. This can be used to train other groups, such as community volunteers, or 4-H, or corporate volunteer programs. The training presentation and materials will be hosted on the flowstobay.org website.
2. *Green Infrastructure Gardeners (GIGs)*: A group of trained UC Master Gardeners (minimum of 3 volunteers) who will extend the information to other UC Master Gardeners in San Mateo County and to their clientele – home gardeners – in the regular course of other UCMG activities. The GIG will also train 4-H members to become ambassadors of the pilot program, to allow for the possibility for the program to scale up and grow the stewardship base over time.

3. *Bioswale Blitz Element 1*: the Bioswale Blitz Protocol. The protocol describes the activities that comprise the Bioswale Blitz (stewardship, science, outreach) in some detail, especially the stewardship and the outreach elements. The Protocol also includes a Survey123 data entry form to be used by GIGs to collect data.
4. *Bioswale Blitz Element 2*: community science protocols. For this pilot year, we will develop preliminary protocols for the following (a) Trash and debris survey, (b) Photo-documentation of vegetation, (c) Tree assessment (DBH and estimated height; canopy opacity, vitality, quality), (d) GSI soil texture assessment, (e) Comparative soil moisture assessment, (f) GSI soil compaction assessment, (g) GSI soil infiltration assessment. The protocols for (f) and (g) will initially be focused on the GSI substrates but will be developed as comparative protocols in 2021-2022 (GSI vs. urban soils).
5. *Bioswale Blitz Element 3*: the bioswale blitz event where MGs maintain the GSI, perform community science, and educate passersby on the importance of GSI and the need to maintain local GSI facilities. Master Gardeners will carry out three events during the project year, either on a single GSI facility or on multiple GSI facilities. The details (location, timing, frequency) will again depend on collaboration with individual cities.
6. *GSI Basics Training for 4-H*: We will conduct a second training for 4-H youth members, to create interest and awareness among the 4-H program, in preparation for future 4-H Bioswale Blitz events. With expanded funding: 4-H members will adopt a bioswale (a different swale from that adopted by the UCMGs).
7. *Second year report*: we will prepare an end-of-project report on June 30, 2022 (2-3 pages, detailing the results to date, and including a summary of the community science activities)

Rain Barrel and Rain Garden Rebate Campaign and Hands-on Community Installations

SGA will partner with BAWSCA and participating member agencies to help promote programs for the installation of rain barrels as well as the new rain garden rebate pilot as a subset of the Lawn Be Gone! rebate. SGA will work to (a) update program collateral and messaging; (b) update the flowstobay.org website; (c) support member agencies' promotion of the rebate; (d) launch targeted advertising campaigns to promote the rebates; and (e) integrate details of the rebates into virtual and in-person outreach events.

Promotion of this effort will include social media platforms, digital advertising, e-newsletter messaging, the flowstobay.org website, and in-person and/or virtual workshops (pending COVID provision). To further engage communities, advance pilot project implementation, and promote the rebates, SGA will coordinate with its independent subcontractor, Chris Corvetti. SGA will seek out and prioritize school campus locations for community installation workshops. Similarly, Kevin Perry of Urban Rain Design (C/CAG on-call consultant) will assist in an in-person rain garden installation workshop (location TBD). We will also work with an expert to have an online webinar that explains the Lawn Be Gone rebate program requirements, including the rain garden component, and provides additional guidance on planning and implementing a rain garden as part of a lawn replacement.

SGA also hopes to pilot a municipal rain barrel distribution program in association with [Rainwater Solutions](#), a partner supplier that [North Coast County Water District](#) already utilizes. The purpose of this pilot is to understand if there is community interest at scale for lower-cost rain barrels that can be pre-purchased and picked up at a central location within the county. This program would be based on a pre-order system and the goal would be to get a minimum of 100 rain barrels ordered to achieve a discounted rate and grow participation in the program.

Throughout this entire rain barrel and rain garden campaign, SGA will continue to find and share stories of rain barrel and rain garden community champions to help instill a new behavioral norm of owning and using rain barrels and rain gardens.

Pesticide-Specific Outreach

Outreach will also include building our Point of Purchase (POP) program to promote Integrated Pest Management (IPM) as part of our pesticides campaign. SGA will utilize an IPM advocate to conduct store-specific outreach and conduct IPM online workshops. Through a partnership with the San Mateo and San Francisco Master Gardeners, we will have 10 in-store tabling events targeting consumers of pesticides (pending COVID provisions). Additionally, we will perform outreach to residents who may be hiring pest control operators and educate them on non-toxic alternatives and locating a green pest control operator via digital marketing efforts.

Resilient San Carlos Schoolyards and San Mateo Environmental Literacy Program Support

SGA will provide support to the consultants overseeing the Resilient San Carlos Schoolyard project as deemed necessary and appropriate by the SMCWPPP program managers. This may include building out a section of the flowstobay.org website to house the program information, assistance with program collateral, outreach, or promotion. SGA will also coordinate with C/CAG staff and the County Office of Education on the Teacher Fellowship program as needed.

Activity Goals

- Continue efforts with the Green Streets Stewards Pilot Program in partnership with the UC Master Gardeners, City of Half Moon Bay, and the City of Pacifica.
- Increase awareness of stormwater runoff pollution prevention messaging.
- Educate residents on green infrastructure.
- Promote Integrated Pest Management.
- Support and promote the Rain Barrel Rebate and revamped stackable rebate planned by BAWSCA.
- Support the Resilient San Carlos Schoolyards project and collaboration with the County Office of Education Environmental Literacy Program as needed.

Tasks

- Coordinate with US Master Gardeners to execute the Green Streets Stewardship Pilot as noted in Attachment A.
- Collaborate with the Master Gardeners to conduct IPM outreach in partner stores.
- Educate residents on eco-friendly pest control operators and practices.
- Conduct a digital campaign to support rebate programs.
- Conduct a campaign to understand to support a pre-order rain barrel distribution program.
- Locate a partner for rain barrel distribution site
- Coordinate, facilitate, promote community rain barrel/cistern installation workshops
- Coordinate, facilitate, promote community rain garden installation workshop
- Develop and produce materials to support pollutant-specific outreach.
- Promote rain barrel rebates to residents.
- Support Resilient San Carlos Schoolyards project and County Office of Education Environmental Literacy Program as needed.

Deliverables

- Ongoing support for participating GSS pilot jurisdictions and partner organizations
- Quarterly POP outreach to 10 stores in San Mateo County
- 10 POP tabling events in San Mateo County hardware/gardening stores

- 4 in-person community rain barrel/cistern installation workshops
- 1 in-person community rain garden installation workshop
- Reporting metrics and evaluation of Rain Barrel promotion and rebate redemptions
- Report on rain barrel distribution program evaluation, metrics, and lessons learned
- Collateral materials (as needed)

Reporting Assessment/Evaluation

- C.7.b.
 - The Green Streets Stewards Pilot Program will target a broad audience by spreading messaging of the benefits of green infrastructure while recruiting people to learn more and help maintain current GI projects.
- C.7.d.
 - The Master Gardeners tabling events will satisfy the “public outreach events” portion of the permit. Apart from discussing IPM practices, we will also have a variety of pollution prevention collateral available to the public. Participation in the hands-on rain barrel and rain garden installation workshops will satisfy the “citizen involvement event” permit requirement. Any online workshops will also satisfy the “public outreach events” portion of the permit.
- C.7.e.
 - Our partnership with BAWSCA on the Rain Barrel and Rain Garden Campaign will be supported and promoted via social media, e-newsletter, and the flowstobay.org website. This will satisfy the C.7.e. “collaborative effort” portion of the permit. The maintenance and promotion of this program also qualifies as an “outreach campaign,” satisfying the C.7.b. permit requirement. Evaluation measurements will include interaction on the flowstobay.org website page as well as social media engagement. Rebate redemptions will also be evaluated.
- C.9.e.ii 1-3.
 - Reporting on store visits and tablings will satisfy the evaluation portion of Pesticide-Specific Outreach.
 - Social media posts will be written informing residents of best practices when hiring a pest control operator. Reporting will include the number of social media posts written and the reach of each post.
 - Letters will be sent to active and licensed pest control operators in San Mateo County, informing them of best management practices in regards to pesticides. The number of pest control operators receiving a letter will be reported.

Task 2: Budget Breakdown

City Support	Budget
Green Streets Stewards Pilot	\$16,000
Pesticide-Specific Outreach	\$38,000
Rain Barrel and Rain Garden Rebate Campaign & Hands-on Community Installations	\$55,000
Resilient San Carlos Schoolyards & COE Environmental Literacy Program Support	\$7,000
Total	\$116,000

Task 3: Internet-based Education

Permit requirements met: C.7.c, C.15.iv (1-2), C.15.v (a,b,d), C.15.vi(a,b,c,d)

Digital media is a powerful tool for public education. It allows a program to reach more people at a lower cost than traditional in-person outreach. It is also capable of delivering messages that are tailored, targeted, and repeated frequently. We aim to continue to expand the reach of SMCWPPP's pollution-prevention messaging on Facebook, Instagram, the flowstobay.org website, its blog, and e-newsletter.

Activity Goal

- Establish a consistent, trustworthy presence on all online channels.

Tasks

- Research, write, and post content to social media channels (a minimum of 2 times per week on both Facebook and Instagram) and track performance biweekly.
- Run Facebook/Instagram ads to generate greater engagement and reach.
- Maintain the flowstobay.org website with current information and events and keep the site updated.
- Draft timely and informative blog posts.
- Deliver e-newsletters to subscribers.

Deliverables

- 12 blog posts
- 1,000 new Facebook followers
- 500 new Instagram followers
- 6 e-newsletters
- 300 new newsletter subscribers
- Average 25% open rate and 5%click-through rate on e-newsletters

Reporting Assessment/Evaluation

- C.7.c.
 - Point of contact requirements will be fulfilled with the flowstobay.org website, Facebook, and the e-newsletter. Reporting will include the number of residents reached, activity, and engagement.
- C.15.iv-C.15.vi.
 - These requirements will be met through social media posts promoting their respective messages. Reporting will include text from the posts and their reach.

Task 3: Budget Breakdown

Internet-based Education	Budget
Facebook	\$28,000
Instagram	\$17,000
Blog	\$12,000
e-Newsletter	\$10,500
Website Update/Maintenance	\$15,500

Total	\$80,000
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Task 5: Annual Reporting & Contract Management

SGA will complete annual reporting for C7, C9, and C15 requirements for FY' 20-21 and support PIP members with their respective annual reports for C7 and C9 requirements. This training includes addressing PIP member Q&As during the reporting process and editing PIP members' annual reports prior to their submission. SGA will also hold bi-weekly client meetings with SMCWPPP to discuss and review program progress and strategy and conduct strategy meetings, as needed.

Activity Goals

- Complete FY' 20-21 annual report for outreach provisions.
- Provide support to PIP members during the reporting process.
- Communicate and meet regularly with SMCWPPP for progress reports and guidance with strategy.

Tasks

- Edit PIP members' annual reports.
- Complete and submit the annual report to the EOA project lead.
- Meet bi-weekly with the client.
- Complete administrative tasks for the project.

Deliverables

- Edit all submitted PIP members' annual reports for outreach provisions
- 1 program annual report section for C7, C9, and C15 requirements
- Bi-weekly updates and meetings with the client

Task 6: Budget Breakdown

Annual Reporting & Contract Management	Budget
Annual Reporting	\$8,000
Contract Management	\$20,500
Total	\$28,500

ATTACHMENT A - Green Streets Stewards Pilot Program Proposal

BEaST - Bioswale Education and Stewardship Training Project
University of California Cooperative Extension San Mateo/San Francisco Counties
And San Mateo Countywide Water Pollution Prevention Program - SGA

SUMMARY

The BEaST project, an integral component of San Mateo County's stormwater management, serves to educate residents and community groups on the function and value of green stormwater infrastructure (GSI), and to promote sustainable stormwater management by empowering residents and community groups to perform basic maintenance on their local GSI in cooperation with the local municipal government agencies.

In the second year of the project, we propose two options for consideration: either to continue the project at the present level of funding (+3%; total \$11,351; "option B"), or to expand the project to additional cities and bioswales: this would triple the available person-hours dedicated to the project (to 494; equivalent to one person-day per week, including 78 hours for the 4-H part of the project), while increasing the total cost to \$23,554 ("option E").

The project will continue in three phases, as before; if the project funding is expanded, then we will explore the fourth phase. We will start by training a dedicated group of UC Master Gardeners – the Green Infrastructure Gardeners (GIG) team – who will then adopt a single GSI facility for maintenance and education events: the "Bioswale Blitz" (phase two). The Master Gardeners will use their experience to teach 4-H youth members about the benefits of GSI and the maintenance needs (in phase three). With additional funding ("option E"), the 4-H youth members will adopt another GSI facility and organize their own Bioswale Blitz events. In the final, fourth phase, the 4-H youth members together with UC Master Gardeners may work with local High Schools to organize Bioswale Blitzes for students and teachers in GSI facilities near schools, or will work with community-service organizations to accomplish the same.

The project includes an education and outreach component for adults and youth, a citizen science component with hands-on learning, and a community service component. The phased approach will allow us to adjust the activities after trying them out in the field, and to scale the project depending on need and interest.

TIMELINE

Please note that because of the ongoing pandemic, the individual elements/events listed in the timeline may need to be adjusted; the project will run between January and September 2020.

- July 2021 – September 2021: initial training for UC Master Gardeners, *GSI Basics* (1)
- August 2021: additional *Green Infrastructure Gardeners* groups constituted (2)
- Sept 2021 – May 2022: Bioswale Blitz – three to five UCMG bioswale events (5)
- September 2021: initial training for 4-H youth, *GSI Basics* (6)
- June 2022: end-of-project year report (7)

DELIVERABLES

The deliverables are marked in italics. Deliverables 3 and 4 have been completed for the 2020-2021 project year; and they will be re-worked and improved as needed (e.g., elements 4f and 4g).

1. *GSI Basics Training*: The recorded training presentation and materials (including pre/post evaluation materials) on stormwater in cities, GSI, regulations, etc. This can be used to train other groups, such as community volunteers, or 4-H, or corporate volunteer programs. The training presentation and materials will be hosted on the flowstobay.org website.
2. *Green Infrastructure Gardeners (GIGs)*: A group of trained UC Master Gardeners (minimum of 3 volunteers) who will extend the information to other UC Master Gardeners in San Mateo County and to their clientele – home gardeners – in the regular course of other UCMG activities. The GIG will also train 4-H members to become ambassadors of the pilot program, to allow for the possibility for the program to scale-up and grow the stewardship base over time.
3. *Bioswale Blitz Element 1*: the Bioswale Blitz Protocol. The protocol describes the activities that comprise the Bioswale Blitz (stewardship, science, outreach) in some detail, especially the stewardship and the outreach elements. The Protocol also includes a Survey123 data entry form to be used by GIGs to collect data.
4. *Bioswale Blitz Element 2*: community science protocols. For this pilot year, we will develop preliminary protocols for the following (a) **Trash and debris survey**, (b) **Photo-documentation of vegetation**, (c) **Tree assessment** (DBH and estimated height;

canopy opacity, vitality, quality), (d) **GSI soil texture assessment**, (e) **Comparative soil moisture assessment**, (f) **GSI soil compaction assessment**, (g) **GSI soil infiltration assessment**. The protocols for (f) and (g) will initially be focused on the GSI substrates, but will be developed as comparative protocols in 2021-2022 (GSI vs. urban soils).

5. *Bioswale Blitz Element 3*: the bioswale blitz event where MGs maintain the GSI, perform community science, and educate passersby on the importance of GSI and the need to maintain local GSI facilities. Master Gardeners will carry out three events during the project year, either on a single GSI facility, or on multiple GSI facilities. The details (location, timing, frequency) will again depend on collaboration with individual cities.
6. *GSI Basics Training for 4-H*: We will conduct a second training for 4-H youth members, to create interest and awareness among the 4-H program, in preparation for future 4-H Bioswale Blitz events. With expanded funding: 4-H members will adopt a bioswale (a different swale from that adopted by the UCMGs).
7. *Second year report*: we will prepare an end-of-project report on June 30, 2022 (2-3 pages, detailing the results to date, and including a summary of the community science activities)

COSTS

Please note two proposed options: the baseline (“option B”) and the expanded (“option E”)

Baseline (option B):

Personnel: We propose to dedicate 143 hours of UC Master Gardener (UCMG) Program Coordinator’s time over the project period, for an approximate total of \$7,345. We would also suggest allocating 78 hours of our 4-H program coordinator’s time, for an approximate total of \$4,006 (this is an increase of 26 hours over the first year, reflecting the likely greater involvement of the 4-H program). A preliminary estimate for the total personnel expenses for the second year would thus be \$11,351. We note the possibility that the personnel time may have to be substituted between the two positions, i.e., we may need to fund additional hours of the UCMG Program Coordinator’s time and fewer hours of the 4-H Coordinator’s time, depending on the level of interest and availability of the 4-H youth members.

Expanded (option E)

Personnel: We propose to dedicate 416 hours of UC Master Gardener (UCMG) Program Coordinator’s time (or equivalent position) over the project period, for an approximate total of \$19,548. We would most likely create a new position (1 day/week) to focus specifically on this project, but the person would report to our UCMG program coordinator, and would be hired at the same level. We would also suggest allocating 78 hours of our 4-H program coordinator’s time, for an approximate total of \$4,006. A preliminary estimate for the total personnel expenses for the second year would thus be \$23,554. We note the possibility that the personnel time may have to be substituted between the two positions, i.e., we may need to fund additional hours of the UCMG Program Coordinator’s time and fewer hours of the 4-H Coordinator’s time, depending on the level of interest and availability of the 4-H youth members.

Note that the project would be led by Igor Lacan, UCCE Advisor, who would dedicate 120 hours over the course of the year, valued at around \$12,000.

PROJECT PHASES

Phase 1: UC Master Gardener Green Infrastructure Gardeners (GIGs) training.

In this phase, UCCE Advisor Igor Lacan and UC Master Gardener (UCMG) Program Coordinator Kali Burke will train a group of UCMG volunteers - the UCMG Green Infrastructure Gardeners (GIGs) - on the basics of green stormwater infrastructure. This training will include the following learning objectives

- (a) understanding the basics of the water cycle and how it is modified by urbanization;
- (b) understanding the sources of water pollution, types of potentially polluted water (wastewater vs. stormwater), and the particular problem posed by nonpoint source pollution and urban stormwater (its mode of generation, major contaminants, and effects on receiving waters);
- (c) understanding (at a high level) the strategies and systems for managing polluted water (WWTPS, storm drains; combined vs. separate systems; grey vs. green infrastructure), and a basic understanding of the legal framework that drives them (CWA, NPDES, permits), and the local stormwater program in San Mateo County and its approach on the multi-benefit nature of GSI
- (d) recognizing the types and functions of urban green stormwater infrastructure (GSI), and the GSI locations in San Mateo County, as well as potential role of stormwater management in home gardens (<https://www.flowstobay.org/preventing-stormwater-pollution/in-my-community/green-infrastructure/#green-infrastructure-story-map>)
- (e) understanding the need for basic GSI maintenance, and the challenges of maintaining plants in GSI in Mediterranean climates.

We estimate that this initial training will take 3 hours (and will take Igor and Kali about 30 hours to prepare). Two practical demonstrations will be arranged later (to take one hour, total)

- (1) the urban storm hydrograph demonstration, and
- (2) the surface-groundwater connection demonstration.

The training will be delivered via Zoom in 2021, and then in person when possible. We will evaluate the effectiveness, and modify the training as necessary, so that it can be adapted and re-used in Phases 3 and 4.

Phase 2: The Bioswale Blitz, in which the UC Master Gardener GIG team adopts a GSI facility.

In this phase, UCMG GIG team will adopt a stormwater facility for one year. Coordinating with the city, the GIG team will perform two or three maintenance events (depending on the level of maintenance needed) – the Bioswale Blitz.

The Bioswale Blitz comprises three elements:

~ community service element: the GIG team will perform the basic trash pickup and check the inlets and outlets, and will trim the overgrown vegetation as agreed with the city.

~ citizen science and hands-on learning element: the GIG team will comprehensively assess the bioswale environment and substrate (including the amount and type of trash found, and the before-and-after images), and record plant condition and growth; this assessment comprises seven science activities, of which some or all can be repeated by the 4-H youth and the local high school students. The science and learning activities are described in detail below.

~ public education and outreach element: during the event the GIG team will display two sandwich boards with information on the GSI facility, and will have a small set of documents to hand out to interested passersby. SGA will design, produce and/or print these collateral materials. Iteration: Depending on the interest level among UCMGs, it is possible that multiple GIG teams will be formed, and thus multiple GSI facilities will be adopted.

Phase 3: UCMG GIG team train the 4-H youth members, who then adopt a GSI facility.

(potential – dependent on interest and capacity, and the COVID-19 conditions)

In this phase, the GIG team alongside Igor Lacan, Kali Burke, and our 4-H program coordinator Zeva Cho will train a group of 4-H youth on (a) the basics of GSI (using the training adapted from Phase 1), and (b) on the Bioswale Blitz. The goal is for the 4-H Youth GIG team to adopt a bioswale (again, in consultation with the city in which the bioswale is located), where they will organize two (or three, if possible) Bioswale Blitzes during the second year (pending additional funding). The 4-H members will coordinate with UCMG GIG team to borrow the educational materials and maintenance equipment. The 4-H Bioswale Blitz format will mirror the format developed by the UCMG GIG team, including all three elements (service, science, and education). The learning goals for the 4-H Youth GIG team are equivalent to that of the UCMG GIG team.

Iteration: Depending on the interest level among 4-H youth members, it is possible that multiple 4-H Youth GIG teams will be formed, and thus multiple additional GSI facilities will be adopted.

Note: Because of the pandemic, the final portion of Phase 3 (the actual bioswale blitz) and the entire Phase 4 are most likely on hold for the Fall semester of the 2021/2022 School year, but we will explore the interest among science teachers in Half Moon Bay again in summer 2021, with the offer to conduct on-line trainings for the interested teachers and students in the early winter 2021 (following the 4-H training sessions).

Phase 4 Potential expansion (depending on availability of the expanded funding and school interest): Local High School students, led by the 4-H youth and the UCMG GIG team, adopt a GSI facility. *(potential – dependent on interest and capacity, and may be difficult under the current COVID-19 conditions; would require an extension of the project with additional funding)*

In this final stage, we will contact high schools near GSI facilities and offer to partner up the teacher(s) with the 4-H youth members and the UCMG GIG team. The 4-H and UCMGs would organize a Bioswale Blitz in a GSI facility near a high school, and work with the teacher to supervise the students as they perform two Blitz elements (the facility cleanup, and the scientific observations and hands-on learning) and would themselves lead the public education element. This stage may also involve engagement with a variety of community-service organizations that are located near GSI facilities (e.g., Rotary Club, Chamber of Commerce, other community clubs or churches, neighborhood block associations); this will depend on local circumstances.

Iteration: Depending on the interest level among schools and community groups, it is possible that multiple community Bioswale Blitz events could be held and, and thus multiple GSI facilities would be adopted; this will depend not only on the local interest, but also on the capacity of the UCMG GIG team and/or the 4-H Youth GIG team to coordinate and oversee these events.

CITIZEN SCIENCE AND HANDS-ON LEARNING COMPONENTS:

The following is a brief description of the citizen science and hands-on learning activities that the UCMG GIG team will carry out during each Bioswale Blitz. While the Master Gardeners will carry out all or most of the activities, the 4-H youth GIG team, and high school students can choose to carry out those elements which best fit into the school curriculum or for which there is the most interest.

The activities are ordered approximately in the order of increasing complexity. We briefly note with a diamond <> the learning objectives of each activity.

(a) **Trash and debris survey:** while collecting the trash and debris, note on the pre-formatted datasheet the quantity of trash (categories will be pre-populated on the datasheet), and its location. For debris, estimate the thickness (depth) of debris using a ruler, and note on the blank sketch map of the GSI facility the locations with most debris and trash. Data will be uploaded to the on-line database, for transfer to the C/CAG storymap website.

(<> gain experience with recording data and annotating a blank sketch map; discuss types of trash and debris found and its potential origins, natural vs. human-made, and its potential pathways into the GSI facility – directly tossed vs. brought in with stormwater).

(b) **Photo-documentation of vegetation:** take pictures of the bioswale (3 horizontal images, and one overhead image) to document the vegetation development. Upload images to the on-line record book so they can be transferred to the storymap website to show vegetation progression over time and changes with seasons. For a more quantitative assessment, use the HabitApp to estimate percent canopy coverage of trees. This activity can be modified to include the use of a vegetation sampling frame (quadrat frame), to allow for counting or point-sampling of vegetation, and this may be tried in the future if there is interest.

(<> gain experience with estimating aerial cover from photographs, i.e. the increase or decrease in plant cover over time and the change in plant cover since last season; describe factors that could be influencing these changes.)

(c) **Tree assessment:** for bioswales with trees, the GIG team will also note the tree condition using the Bond 4-element visual rating scale (opacity, vitality, growth, quality), and will measure the trunk diameter at standard height (1.4 m), and will estimate tree height and canopy spread.

This information will also be uploaded to the storymap website, so that growth rates and condition changes can be monitored over time

(<> gain experience in calculating the yearly growth rate using the change in diameter, and gain an understanding of tree growth patterns; then, describe the relationship of diameter growth and change in tree height.

(<> describe the change in tree condition scores, and discuss the factors such as season and precipitation that could have influenced these scores)

(d) **Comparative soil texture assessment:** using the USDA texture-by-feel flowchart, determine the texture of bioswale substrate and a nearby native soil (if no soil is available nearby, use the supplied soil from Half Moon Bay). Record the results in the on-line record book.

(<> gain an understanding of what aspect of soil the term "texture" is describing; understand the three particle size classes that make up different soil textures; gain a basic understanding of which soil properties are influenced by texture; discuss the possible reasons for using coarse-textured substrate in the GSI facility)

(e) **Comparative soil moisture assessment:** using the soil moisture meter, measure soil moisture at the surface in the GSI, and again 25 cm below the surface (use the soil auger to make a hole, then insert the soil moisture probe in the hole). Repeat this procedure in the nearby landscape soil. Record the results in the on-line record book.

(<> gain an understanding of soil moisture and its relationship to soil texture; discuss sources of soil moisture; discuss the factors that would lead to a difference in soil moisture at the surface and at depth).

(f) **Comparative soil compaction assessment:** using a pressure gauge (a Pesola spring scale with the rod attachment), measure the penetration resistance of the bioswale substrate and a nearby native soil. Record the results in the on-line record book.

(<> gain an understanding of the concept of soil compaction, and its importance for both plant growth and water infiltration; discuss factors related to compaction)

(g) **Comparative soil infiltration assessment:** using the infiltrometer, estimate the infiltration rate of the bioswale substrate and – where available – that of a nearby parkstrip or other "regular" soil. Record the values in the on-line record book, so they can be added to the storymap website. (<> gain an understanding of the concept of infiltration, and gain skills in measuring infiltration (change in water level over time in the infiltrometer); discuss and clarify factors that affect infiltration into soils, including soil texture and degree of compaction)

SUPPLIES

The supplies required for the initial training and the Bioswale Blitz are briefly described below.

Initial training:

Prior to a Bioswale Blitz, we will train the UCMG GIG team on the use of all equipment, and on safety while working in the urban landscape. In addition to this, we already have two didactic tools (The Stormwater Floodplain simulator and the Groundwater Model) to demonstrate the importance of the green stormwater infrastructure.

Bioswale Blitz event

The equipment needed was purchased in the summer of 2020.

For 2021-2022, we estimate a minimal cost for additional consumables (e.g., trash bags; replaceable/consumable parts of the data collection devices; added safety vests, etc) not to exceed \$650. Sandwich boards and printed materials will continue to be supplied to the GIG team by SGA.