Grant Progress Report

Bay Area Green Infrastructure Master Planning Project

GA# 12-415-550

Progress Report # 3

Reporting Period: 1/01/2014 to 3/31/2014

Submittal Date 5/14/2014

Grant Agreement No: 12-415-550

Project Name: Bay Area Green Infrastructure Master Planning Project

Contractor Name: San Francisco Estuary Partnership / ABAG

I certify under penalty of law that this document and any attachment was prepared by me or under my direction in accordance with the terms and conditions of each Grant Agreement Exhibit. Based on my inquiry of the persons or persons who manage the project, or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. All information submitted in this document and all attachments conform to and is in accordance with the state and federal laws and I so here certify with my signature. I am aware that there are significant penalties for submitting false or misleading information.

Project Director: Judy Kelly – Printed Name JUDY A. KELLY Signature

Summary of Work Completed To Date

Work Item	Items for Review	Critical Due Date	Estimated Due Date	Percent Work Complete	Date Submitted
EXHIBIT A – SCOPE OF WORK TO BE PERFORMED BY THE GRANTEE					
A.	PLANS AND GENERAL COMPLIANCE REQUIREMENTS				
1.	GPS information for Project site and monitoring locations	Day 90		100%	10/26/13
2.	Monitoring and Reporting Plan	N/A	N/A	N/A	N/A
2.1	Project Assessment and Evaluation Plan (PAEP)	Day 90		100%	10/26/13
2.2	Monitoring Plan (MP)	N/A	N/A	N/A	N/A
2.3	Quality Assurance Project Plan (QAPP)	N/A	N/A	N/A	N/A
2.4	Proof of Water Quality Data Submission to CEDEN	N/A	N/A	N/A	N/A
3.	Copy of final CEQA/NEPA Documentation	Day 90		100%	10/26/13
4.	Public Agency Approvals, Entitlements, or Permits	N/A	N/A	N/A	N/A
B.	PROJECT-SPECIFIC REQUIREMENTS				
1.	Project Management				
1.2	Notification of Upcoming Meetings, Workshops, and Trainings		15 Days In Advance		
2.	TAC				
2.1	List of TAC Members, Their Affiliated Organizations, and Their Roles and Responsibilities		November 2013	100%	12/2/13 04/24/14
2.2	Three (3) TAC Meeting Agendas, Sign-In Sheets, and Minutes		As Needed	33%	11/14/13
2.3	TAC Status Report	December 31, 2014			
3.	Toolkit				
3.4	The Packaged Toolkit		February 2015		
3.5	Toolkit Technical Memorandum	April 30, 2015			
3.6	List of Communities and Staff Contact Information that Participated in Toolkit Demonstration		May 2015		
4.	Green Infrastructure Master Plans		May 2015		
4.1	Preliminary Meeting Minutes and a List of Selected Watersheds		February 2014	100%	12/31/13
4.2	Toolkit Results and Secondary Meeting Minutes		December 2014		

Work Item	Items for Review	Critical Due Date	Estimated Due Date	Percent Work Complete	Date Submitted
4.3	List of Potential LID Retrofit Sites Selected for Field Verification		December 2014		
4.5	List of Selected Sites for LID Conceptual Design		April 2015		
4.6	Green Infrastructure Master Plans		May 2015		
5.	Evaluation of Potential Funding Mechanisms				
5.1	Meeting Agendas, Sign-In Sheets, and Minutes		April 2015		
5.2	In-Lieu Fee Program Memorandum		May 2015		
6.	Education and Outreach				
6.1	Website Link		October 2013	100%	10/26/13
6.3	Webinar Material		July 2015		
6.5	Project Results Presentation Material		July 2015		
EXHIBIT B – INVOICING, BUDGET DETAIL, AND REPORTING PROVISIONS					
A.	INVOICING		Quarterly	33% (3/9)	5/14/14
G.	REPORTS				
1.	Progress Reports within forty-five (45) days following the end of the calendar quarter (March, June, September, and December)		Quarterly	33% (3/9)	5/14/14
2.	Annual Progress Summaries		Annually by 9/30		
3.	Natural Resource Projects Inventory (NRPI) Survey Form	Before Final Invoice			
4.	Draft Final Project Report	August 31, 2015			
5.	Final Project Report	October 31, 2015			
6.	Final Project Summary	Before Final Invoice			
7.	Final Project Inspection and Certification	Before Final Invoice			

Progress Report Narrative

Introduction

GreenPlan Bay Area is a collaborative effort between San Francisco Estuary Partnership (SFEP), San Francisco Estuary Institute (SFEI) and several Bay Area municipalities. SFEI will develop spatial tools which will be used by several Bay Area municipalities to develop plans that identify the optimal combination of Green Infrastructure (GI)/Low Impact Development (LID) features for achieving desirable outcomes at the watershed scale.

The spatial tools, aka GreenPlan-IT, will include four components: a GIS siting tool with user interface to determine site suitability, a watershed model to identify high-yield runoff and pollutant areas ('hot spot'), optimization techniques to search for optimal combinations of LID locations, types and configurations, and a post-processor to compile and display outputs in user-friendly formats.

After development, GreenPlan-IT will be pilot tested in several municipalities/watersheds. The results of GreenPlan-IT will serve as the basis for municipal Green Infrastructure Master Plans and/or a list of priority LID sites for each jurisdiction. Conceptual designs will be developed for 8 LID sites/projects. Jurisdictions will also collaborate with ABAG/SFEP to explore potential funding frameworks (such as alternative compliance programs) for LID retrofits.

Summary of Activities

1) SFEP and SFEI held conference calls and meetings to coordinate the project including meetings on 01/08/14 and 3/13/14 to discuss GreenPlan-IT progress (notes attached).
2) Held conference calls and meetings with staff of San Jose and San Mateo regarding GreenPlan-IT development, areas of interest, data collection efforts.
3) Completed updates to the GreenPlan Bay Area webpage with meeting notes and agendas.
4) Identified watersheds and planning areas of interest in San Jose and San Mateo.
5) Development of the feasibility and the effectiveness modules of GreenPlan-IT, including consultations with technical advisors.
6) Began literature search on cost benefit module.
7) Initial research into how to develop master planning documents and alternative compliance programs.
8) Outreach on GreenPlan Bay Area to the Alameda Creek Watershed Conference and BASMAA Green Streets Work Group. (See attached Power Point presentations).

Summary of Items for Review

Invoice #3

Project Administration (Cumulative 33% complete)

Project administration during this quarter has included the completion of Invoice 3, project management including completing the quarterly report, updating the project website, reviewing project deliverables submitted by SFEI and attending team meetings.

Project Design (Cumulative 20% complete)

Project design included the tasks listed on the attached SFEI quarterly progress report as well as attending development meetings with staff from participating municipalities and SFEI; reviewing documents and providing input.

Exhibit A Deliverables

B(G)1 - Progress Reports (Cumulative 33%, 3 out of 9 complete) – continues on a quarterly basis no delays or issues to report.

Attachments

1. Minutes from GreenPlan Team Meetings 01/18/14 and 03/13/14.
2. SFEI progress report #3 (Quarter 3 – January 1, 2014 through March 31, 2014)
3. SFEI status report on the development of the GreenPlan-IT feasibility module, submitted to SFEP on January 16, 2014
4. SFEI status report on development of the GreenPlan-IT effectiveness module, submitted to SFEP on March 28, 2014
5. Match Documentation:
    a. Alameda Creek Watershed Council meeting 3/14/14 _Power Pont Presentation #1
    a. San Jose - SFEI meeting 3/12/14
    b. Green Streets Work Group meetings 2/25/14 and 3/25/14-Power Point Presentation #2

Summary of Items in Progress

1. Exhibit A - B(G)1 Progress Reports – continues on a quarterly basis; no delays or issues to report.
2. Working on conceptual structure of the siting GIS tool and considering how the tool will be used
3. TAC meeting agenda for June 17, 2014 topographs were provided for this report.

ATTACHMENT 1

Minutes from GreenPlan Team Meeting 1/8/14 3pm, SFEI

Posted by Jennifer Krebs on Jan 9

In attendance: Kristen, Lester, Jing, Jen H & Jen K

1) contracting issues: none. Jen H will contact Jesse re QR2 schedule.

2) Data collection - Both the GIS and hydrologic data from San Jose has been submitted. Jen K has contacted Chris Sommers about getting SCVURPP data but do date the data has not come. Jing is working on various data sources from SJ and has begun calibrating a model. Re San Mateo, Ken Chin has submitted all available data, which includes no hydrologic data. Jen K will check with Ken on Friday at a meeting to see if more data may come later (doubtful). Jing and Lester noted that without hydrological data specific to San Mateo, SFEI might use data from nearby Matadero Creek data.

**In April, at a future team meeting, SFEI and SFEP should discuss whether it will be fruitful to run hydrologic inputs for San Mateo OR whether it might be better to delve further into SJ watersheds OR whether it makes most sense to try to get/run GIS data only for another city, i.e. El Cerrito or Fremont.*

3) GreenPlanIT development: Kristen is assessing the various data quality/sets; she evaluated other toolkits & data they've used. This is proceeding on schedule. Jing has set up Los Gatos Creek model to calibrate in SWMM.

**We discussed considering the roll out of GreenPlanIT and associated data at 30,60,90 % complete levels like an engineering model. The goal is to be at 90% by September 2014. SFEI tasks after this date will focus on packaging the user guide & trainings so others can use the product.*

4) GreenPlan Master Planning Update: Jen K reported that there is a meeting Friday at the CD+A offices in Oakland so the GreenPlan effort and San Mateo's Sustainable Streets effort can meet each other and get in sync for a 1/14 meeting and tour taking place in San Mateo. Jen K will attend Friday's meeting. Jen K, Kristen and Jing will all try to attend the meeting on 1/14. Jing and Jennifer had a very productive meeting in SJ before Christmas. San Jose selected planning focus areas that comport with other ongoing city initiatives.

Lester asked if SFEP would be writing guidance for other cities based upon this experience. This needs to be thought through a bit more as both San Jose and San Mateo have

planning initiatives into which GreenPlan will provide useful data. At this point, it is not foreseen that GreenPlan will culminate in a stand alone plan. How will this translate to other municipalities?

5) TAC - Jen Hunt will take the lead in doing a doodle poll to all folks on basecamp to find a date/time for a March/April 2014 meeting. The agenda will be to run folks by what's been accomplished to date, answer questions, take feedback. Before this meeting and between meetings (other TAC meetings likely in Sept 14 and March 15), SFEI will query 2 technical advisors by phone. These folks will be invited to the meetings as well. The goal of the TAC is to keep us on task, keep us on track, and ensure that we produce useful deliverables.

6) Dan Cloak - Jen H will reach out to Dan Cloak to bring him up to date with the project's progress, inform him of the upcoming IRWMP grant, and see when/how he thinks he should get involved.

Green Plan Bay Area – Minutes SFEP/SFEI Meeting 3/13/14

Attendees: Jennifer Hunt, Jesse Mills, Kristen Cayce, Jennifer Krebs, Jing Wu, Lester McKee, David Senn

Item	Desired Outcome	Meeting Notes

Updates on SFEI modeling and siting tool progress and TAC group	• show progress to date
	• show projected timeline for 60% and 90% design for modeling and siting tool
	• update on collaboration with municipal partners including toolkit application for each partner
		• LID tool
		  • Working on conceptual structure of siting tool and thinking through how the tool will be used. Have completed conceptual design and base data analysis (30%). Running analyses for 1/2 of the LID treatment types for the cities at San Jose.
		  • Up to 5 layers that can be implemented into the tool by the user
		  • 6 different parameters currently combined to get output of most favorable locations
		  • In San Jose, overlay their primary focus areas for LID
		  • Additional data layers will help hone in spatially on favorable locations
		  • Started conversations with San Mateo
		  • 60% design will have some preliminary locations for siting in San Jose. Current timeline is early June for 60%. There will also be verification steps to get to the final input for the modeling tool
		  • What level of specificity in location is needed to show the city?
		  • This will be an iterative process working with the cities and best to have meetings to discuss preliminary outputs.
		• Modeling and optimization

Updates on SFEP work	• updates on master planning process • updates on alternative compliance	• Outreach meeting plan. There is now a Green streets committee at BASMAA. • SFEI will also be incorporating grey infrastructure into the optimization piece • Jesse is looking at San Jose and San Mateo's planning documents (Master Plan and Sustainable Streets). Coming up with concepts for their planning documents. Would like to provide different tiers of options for LID implementation in their master plans. SFEP to come up with draft language for the city partners to see if this fits within their plans. Coming up with a description of LID. Getting as much specificity into the plan as possible for their planning purposes. • SFEI is focused on priority area number 1 for the toolkit and will drill down into a smaller scale for analysis.

Action Items

- Kristen Cayce and Jing Wu to resolve boundary for priority number 1 area for san jose
- Jennifer Krebs to call Ken Chin of San Mateo and determine their timing for developing their Sustainable Streets plan. Determine if their timing works with our toolkit development timing and set up a conference call for Ken, Jing, Kristen and Jennifer K to discuss partnership
- Kristen Cayce and Jing Wu to send all toolkit questions related to San Mateo County and Ken Chin to Jennifer K
- Lester McKee to determine if Dino (EPA modeler) should join the in person TAC meeting that will happen in mid May
- Jen Hunt to put together the TAC agenda for the SFEI portion of the meeting
- Jen Hunt to send 2 PPTs from today's meeting to Jennifer
- SFEI will follow up with San Jose and San Mateo as to narrowing down priority areas. Will check in with San Mateo re schedule of consulting, focus areas of city. SFEI could give San Mateo advice as to timing of neighborhood selection for infiltration/LID.

- Working with San Jose on development of model
- Selected Guadalupe River as the primary watershed
- Divided the watershed into 102 sub-catchments
- Uncalibrated flow and sediment model is developed.
    - Under simulating upper Guadalupe flow
    - Over simulating lower Guadalupe flow
    - Under simulating lower GR sediment
- Modeling component is at 60% design
    - 90% design for modeling will be calibrated model for 1 watershed: hydrology and water quality
- Optimization piece (cost//benefit analysis)
    - 30% - Understand theory of optimization; outline of logic for implementing method by end of April 2014
    - 60% - Code written for optimization by end of June 2014
    - 90% - Code tested and run; optimization output by end of Sept 2014

    - TAC group update - Kristen has tech advisors behind the scenes. Jing will too. SFEI will use tiered approach - maybe have tech advisor at first meeting. Next TAC meeting - First meeting show where we're at, checking in to see if we're having something useable.

ATTACHMENT 2

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804 • p 510-746-7334 • f 510-746-7300 www.sfei.org

Green Infrastructure Master Planning Project Quarterly Progress Report
January - March 2014

Task 1: Project Assessment and Evaluation Plan

Work Completed during the Period

- Task was incorrectly billed to by staff (total = 34.75 hours). Invoice will be corrected in Quarter 2. Work was actually completed on task 003 LID Toolkit.

Task 2: Technical Advisory Committee

Work Completed during the Period

- Lester McKee billed 15.25 hours to this task which should have been billed to task 003 LID toolkit. Invoice will be corrected in Quarter 2.
- Work completed on this task includes discussions with potential TAC members, drafting a scope of work for TAC members, and preliminary planning for 1st TAC meeting.

Task 3: LID Toolkit

Work Completed during the Period

- SFEI continued to hold internal meetings to check in on project progress, discuss technical questions, and plan project next steps.
- Jing Wu and Kristen Cayce attended the San Mateo Sustainability Streets Plan Meeting on January 14, 2014. The city of San Mateo is a project partner and the meeting provided an overview of the city's green street and LID plans. The primary take away from this meeting was that the GIS siting tool in development will be useful to help the City identify some potential locations for LID implementation, either incorporated into their green street plan or as a stand-alone guidance for future development. We will continue to work with the City on developing the siting tool for their municipality. Here is a link to the city's website on the topic: http://sustainablestreetssanmateo.com/welcome-to-the-san-mateo-sustainable-streets-project-website/.
- Staff began developing a literature review list for the cost-benefit module.
- Jing Wu and Kristen Cayce participated in 2 meetings with the city of San Jose
    - January 23, 2014: Staff participated in a phone conference with San Jose to discuss available GIS data layers for incorporation into the toolkit. San Jose packaged and delivered all relevant data to SFEI. SFEI reviewed the data and began incorporating the data into arc GIS.
    - March 12, 2014: Staff participated in an in person meeting with the city of San Jose to discuss the city's needs for the siting module. In particular, the city was

queried on which LID features are most utilized in LID development and which GIS data layers could be used to improve siting options in the tool. The city was also asked if there were other water quality questions that could be answered with the toolkit.

- Jing Wu and Kristen Cayce participated in a phone conference with the city of San Mateo on March 26, 2014. Staff needed to determine the city's planning needs and timing for the development of their Green Streets plan and how the toolkit can help inform their plan. The city does not currently have needs for hydrologic modeling but would benefit from identifying effective locations for LID implementation.
- Staff prepared for and participated in 2 team meetings with SFEP
- Staff engaged Jennifer Walker and Dan Cloak (project partners) on their project roles and deliverable requirements.
- Staff engaged Jennifer Walker on technical questions regarding the SWMM model set up and application
- Staff completed 2 project progress reports and submitted to SFEP for the LID Siting Tool and LID Model Tool
- Staff continued to work on development of the modeling tool including collecting and reviewing model data, model set up, model calibration (hydrology data), QAQC of model, model verification, and review of model outputs. Included in this work is the development of GIS layers for modeled watersheds.
- Staff continued to work on development of the siting tool including communication with municipal project partners on their LID needs, review of pertinent LID features (such as bio retention, bio infiltration) for possible inclusion in the tool, setting up the siting tool infrastructure, and discussing connectivity to the other toolkit components.

Task 4: Green Infrastructure Master Plans

Work Completed during the Period

- No work completed during invoice period

Task 5: Education and Outreach

Work Completed during the Period

- No work completed during invoice period

ATTACHMENT 3

Date: January 16, 2014

Green Infrastructure Master Planning Project

California Water Quality Control Board

GreenPlan-IT SFEI Deliverable 3.3a: Status report for development of feasibility module and GIS data for inclusion in the toolkit

In 2011 work by Kass, et al. to develop a method for identifying areas in the San Francisco Bay Region that would be suitable for implementation of Low Impact Development (LID) was completed. This methodology used readily available GIS data layers (e.g. soils, slope, distance to groundwater, etc.) and industry-defined thresholds to characterize the built landscape for implementation of a suite of infiltration (bioswales, vegetated swale, permeable pavement, wetland ponds, and stormwater wetlands) LID treatments (Kass et al. 2011). Building upon this effort, the GreenPlan-IT project will refine these methods and develop a LID Siting Tool (Siting Tool). The Siting Tool will be a GIS-based landscape-scale desktop tool that will identify locations that are appropriate for implementation of LID. The Siting Tool expands upon the Kass et al. tool by incorporating bioretention LID treatment types as well as providing an interface for user customizations.

The utility and limitations of the Siting Tool and analyses are driven by the underlying data. To create a robust and applicable tool a thorough evaluation of existing LID site locator tools for methods and data usage which guided the development of a draft list of recommended datasets (Table 1). Existing LID site locator tools that have been reviewed for their methods and data usage include Kass et al., Geosyntec's SBPAT, EPA/TetraTech's SUSTAIN, and Green Solutions Project (CCS 2011). The Green Plan-IT team used several criteria for inclusion of a dataset in the draft list. Data needed to be 1) common in existing tools, 2) required to assess suitability for LID placement, 3) not duplicative with another dataset, and 4) commonly available or potentially available through partners. Some of the datasets in Table 1 did not meet all these criteria but the team felt it would be good to test their utility. The project is still assessing the quality,

www.sfei.org

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p. (510) 746 7334 (SFEI) f: (510) 746 7300

value, and availability of these datasets therefore Table 1 contains probable datasets used in the Siting Tool but may be modified as the project evolves.

Table 1. Draft list of potential GIS layers for use in Siting Tool

Data Theme	Dataset
Topography	LiDAR
	Derived elevation products [contours, slope, aspect)
Land Cover	Land ownership
	Parcels
	Land Cover
Hydrology	Storm drains
	Depth to groundwater
	Stream network
	Watersheds and stormsheds
Geology	Bedrock
	Soils
Transportation	Roads with ownership
	Right of ways
Imagery	High resolution (< 1ft) aerial photography 2010 or later

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p: (510) 746 7334 (SFEI) f: (510) 746 7300

Additional Data	Red curbs
	Footprint of areas slated for redevelopment

Before the coding of the GIS-based LID Siting Tool begins, we need to perform a thorough needs and data assessment to ensure a clear and efficient path through the development process. The current focus of the Siting Tool development is information gathering. As mentioned above, work to date on the development of the Siting Tool includes an assessment of existing tools with a focus on methods and data, evaluation of SFEI's data inventory, development of a data management plan, data acquisition, and partner engagement.

The Siting Tool team took part in the Municipality Kick-off meeting as well as crafting the Municipality Survey which initiated the external data inventory and acquisition. After evaluating existing tools and understanding the data availability, the project team has begun acquiring data from partner cities. Through an exchange on SFEI's File Transfer Protocol (FTP), we've received various datasets from both City of San Mateo and City of San Jose.

We have developed and initiated a quality assessment process of each of the datasets relevant to GreenPlan-IT. This process includes viewing the data in GIS, reading metadata (if exists), exploring the attributes, and roughly verifying data accuracy by comparing the data to datasets with known accuracy like NAIP aerial imagery or the federal Watershed Boundary Dataset. Where questions remain about quality, vintage, or methods of development the GreenPlan team has been contacting city staff to gain more information. This last step has been quite fruitful with City of San Jose. We have not yet engaged City of San Mateo in this way but imagine the results would be similar. With data in house we have begun to draft a data management plan including data storage and workflow to ensure that all parts of the Toolkit (Siting, Effectiveness, and Optimization) development access data in a consistent manner. Information from the data assessment process is stored with the data and will be incorporated into the management plan.

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p: (510) 746 7334 (SFEI) f: (510) 746 7300

Beyond data acquisition and assessment the Siting Tool team has engaged partner cities in conversation regarding City priorities, limitations, and opportunities to leverage or enhance existing efforts. These conversations will help shape the Siting Tool's functionality, framework, and user interface.

The next steps in development of the GIS Siting Tool are to synthesize information gathered through the GIS data assessment and city engagement into a conceptual model for the framework of the tool.

References

Kass, J., Walker, J., Cayce, K., Senn, D. and Williams, M. (2011). White Paper on Regional Landscape Characterization for Low Impact Development Site Suitability Analysis. SWRCB Agreement #06-345-552-0. Contribution No. 653. San Francisco Estuary Institute, Richmond, California.

Community Conservation Solutions (CCS). August 2011. The Green Solution Project - Alameda County Phase I SF Bay Area. Technical Report.

www.sfei.org

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p. (510) 746 7334 (SFEI) f. (510) 746 7300

ATTACHMENT 4

Date: March 28, 2014

Green Infrastructure Master Planning Project

California Water Quality Control Board

GreenPlan-IT SFEI Deliverable 3.3b: Status report on the development of the effectiveness module including any relevant issues/challenges and questions to inform further LID Toolkit development.

The purpose of incorporating an effectiveness module into the GreenPlan-IT toolkit is to evaluate relative effectiveness of implementing Low Impact Development (LID) across different areas within a watershed, based on potential for reducing contaminant loads and runoff volume. The effectiveness model is built upon a spatially distributed hydrologic and water quality model that simulates underling watershed processes and LID mechanisms to identify critical sources areas and to quantify LID removal efficiency.

The development of an effectiveness module involves many steps and tasks, which include selecting model platform, identifying partnering cities and modeling watersheds within those cities, collecting model input data, setting up the model, and finally the completion of model calibration. To date, several of these key tasks were completed. The status of the module development, issues/challenges encountered during the process, and planned next steps are briefly summarized below.

Tasks Completed

- **Select model platform**

The publicly available EPA Storm Water Management Model (SWMM) version 5.0 (Rossman, 2010) was selected as the modeling platform for this project, after review of existing LID toolkits and previous stromwater/LID modeling studies. SFEI in collaboration with project partner Jennifer Walker, concluded that the SWMM model is the most appropriate model for proposed project outcomes. SWMM is a dynamic rainfall-runoff simulation model used for single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas. The model tracks the quantity and quality of runoff generated within each subcatchment, and allows for accurate representation of any combination of LID controls within a study area to determine their effectiveness in managing stormwater and combined sewer overflows. The widespread usage of SWMM for modeling urban watershed runoff

www.sfei.org

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p: (510) 746 7334 (SFEI) f: (510) 746 7300

processes and its LID simulation capabilities make it an ideally suited model for this project.

- **Identify partnering cities and watershed areas**

The Municipality Kick-off meeting identified city of San Jose as one of partnering cities of the project. Shortly after, the project team had a follow-up technical meeting with six city staff to discuss potential areas within the cityscape for model development. Based on the city's 2040 plan, the downtown and north San Jose areas were identified as priority watersheds for future development and for LID implementation or retrofit, which, for most part, are located within Guadalupe watershed (Figure 1). After reviewing and evaluating the data availability, the project team has chosen Guadalupe as the pilot watershed to develop and demonstrate the effectiveness module.

The city of San Mateo is also a partner of this project. However, the effectiveness tool will not be developed for the city, due to a lack of flow and water quality data to support model development. Therefore, the effectiveness model will be developed based on data from the city of San Jose only.

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p. (510) 746 7334 (SFEI) f: (510) 746 7300

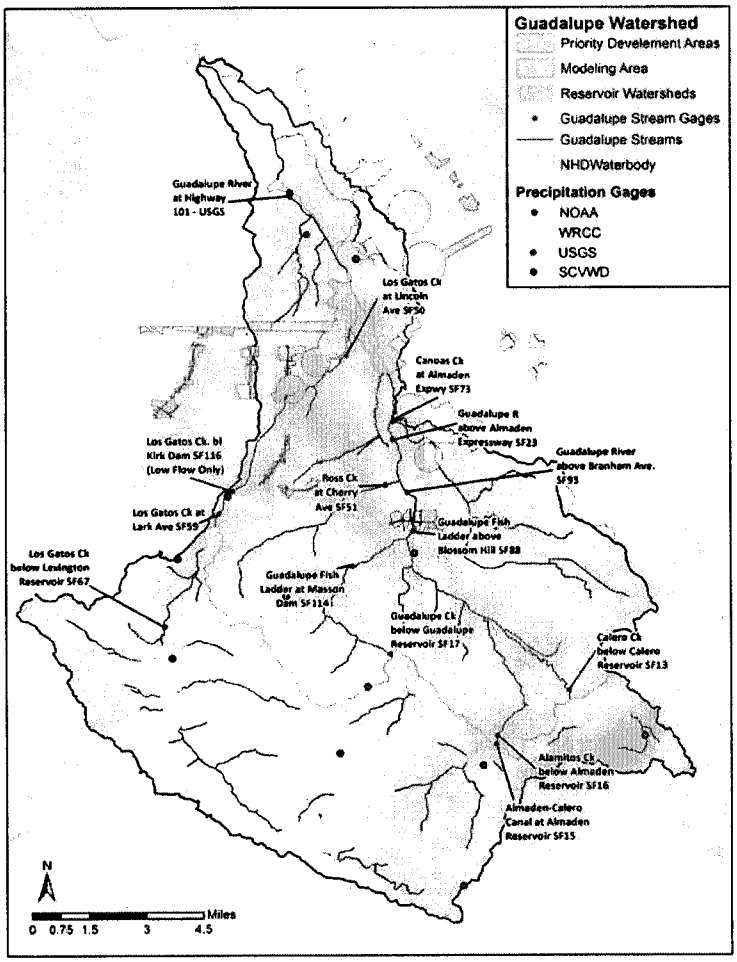


Figure1. Modeling area and San Jose priority development area.

- **Collect and review data for model development**

A large amount of data are needed and collected and compiled to support model development. Specifically, meteorological data, GIS data (DEM, stream network, land use, slope, soil, impervious areas), and monitoring data (flow and water quality) were compiled. Quality of data sets is variable and this is being evaluated carefully in the context of project objectives.

The data collection effort started with a Municipality Survey that evaluated the external data inventory and proceeded with acquiring data from partnering cities and various other state and federal sources. Through an exchange on SFEI's File Transfer Protocol (FTP), we've received a number of datasets from City of San Jose. We also

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p. (510) 746 7334 (SFEI) f: (510) 746 7300

requested rainfall, stream flow and water diversion data from Santa Clara Valley Water District at stations within Guadalupe watershed, as well as downloaded flow and sediment concentration data at one USGS station from USGS website (Figure 1). In addition, we also reviewed some in-house GIS and RMP monitoring data for potential use in model development.

All collected data were reviewed for quality.

- **Setup SWMM model**

Once the model was selected and all data were collected and reviewed, the SWMM model was set up to run for hydrology and water quality. SFEI staff worked closely with Jennifer Walker to set up the model and troubleshoot challenges. The setup process involved four major steps: 1) delineating Guadalupe watershed modeling area into 102 sub-catchments; 2) reformatting input data into SWMM model formats; 3) determining model simulation period based on data availability; and 4) estimating initial model parameters through GIS analysis and literature review.

The model is currently developed and initial calibration steps have been performed for hydrology and part of water quality (sediment).

Next Steps

- The next and also the final step of developing the effectiveness module is to calibrate the SWMM for both hydrology and water quality. This is a critical step of model development and requires significant time and effort. Model calibration is an iterative process of adjusting key model parameters to match model predictions (output) with observed data for a given set of local conditions. Through the model calibration, it is hoped that the resulting model will accurately represent important processes of runoff and pollutant generation and transport for the system. In this case, model calibration will be performed at USGS station at Highway 101, near the mouth of Guadalupe River (Figure 1).
- Develop the cost-benefit module.
- The Project Team will also convene a Technical Advisory Committee meeting in June 2014. The TAC will be comprised of project partners, municipal partners, technical advisors (as needed), and other interested parties including BASMAA. The TAC will review progress to date and provide guidance for next steps, toolkit outputs, and primary use of the toolkit.

SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p: (510) 746 7334 (SFEI) f: (510) 746 7300

Issues/Challenges

- **Data availability/quality**

The performance of any environmental models is largely dedicated by the availability and quality of the underlying data. The most significant challenge to the modeling study has been the lack of data to support model development. Very little monitored water quality data is available. This is true throughout the Bay Area where data are sparse for most small watersheds. Although sufficient data are available for model development within the Guadalupe watershed, since it has been very well studied and monitored, we will have to confront the data availability and quality issues when applying the toolkit to other watersheds in the region..

- **Scale**

Another challenge in developing effectiveness module is the spatial scale. As shown in Figure 1, San Jose's priority area for LID implementation is only a small portion of Guadalupe watershed, however, the modeling area was necessarily enlarged to include a large portion of the watershed in order to have proper boundary conditions for model calibration. How to delineate a watershed of this scale into sub-basins that are small enough to be meaningful for guiding LID implementation while not putting extra burden on model run time is a challenge and requires professional judgment. The project team overcame this challenge by using two spatial scales for different parts of the modeling area: small scale for priority development area and coarse resolution for the rest of study area. In this way, we were able to perform initial calibration of the model and at the same time set the proper scale for developing cost-benefit module of the Toolkit.

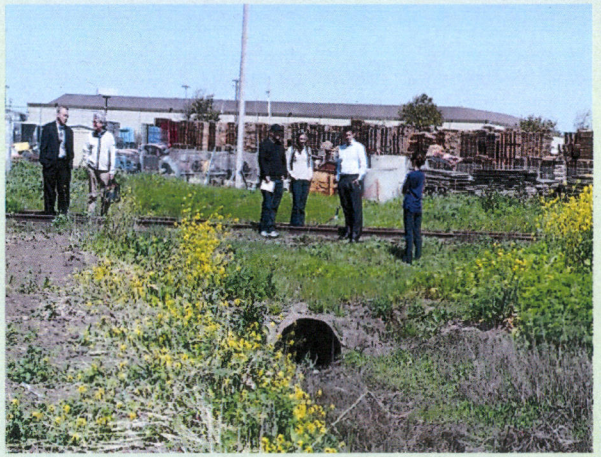
References

Rossman, L (2010). Storm Water Management Model User's Manual Version 5.0, EPA/600/R-05/040, July 2010.

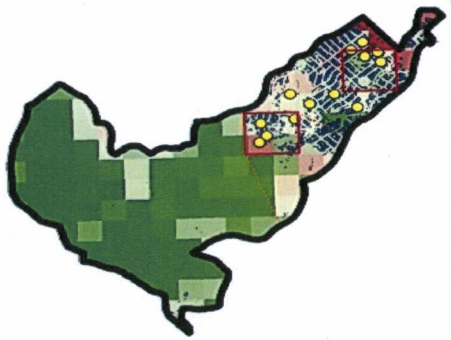
SAN FRANCISCO ESTUARY INSTITUTE
4911 Central Avenue, Richmond, CA 94804
p: (510) 746 7334 (SFEI) f: (510) 746 7300

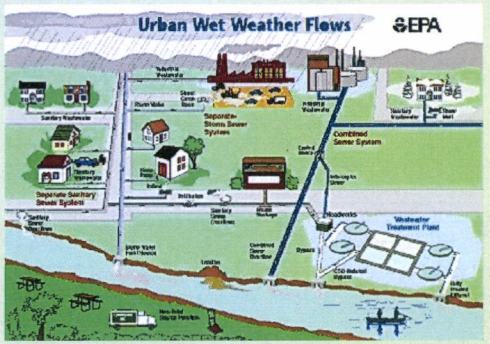
GreenPlan Bay Area

Project Overview



Master Plan





SAN FRANCISCO ESTUARY PARTNERSHIP

ATTACHMENT 5a

Prop 84 Stormwater Planning Grant

- Funder: State Water Resources Control Board
- Timeframe: 8/13 to 8/15

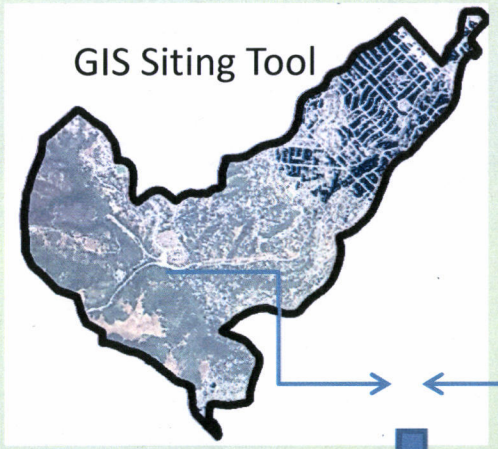
- Participants:
  - SFEP
  - SFEI, including subs Dan Cloak and Jennifer Walker
  - Cities/Counties around the Bay

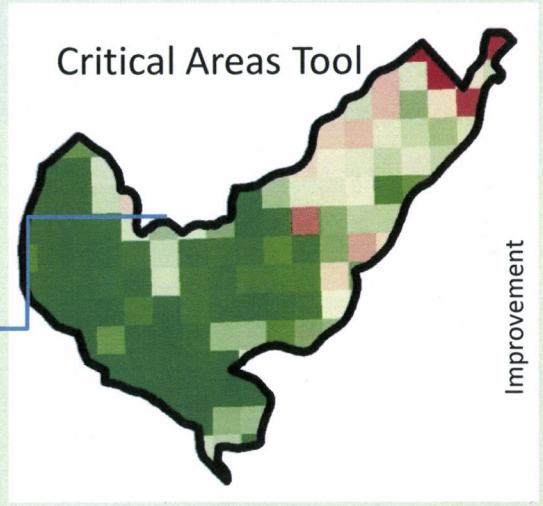
Developing the Model

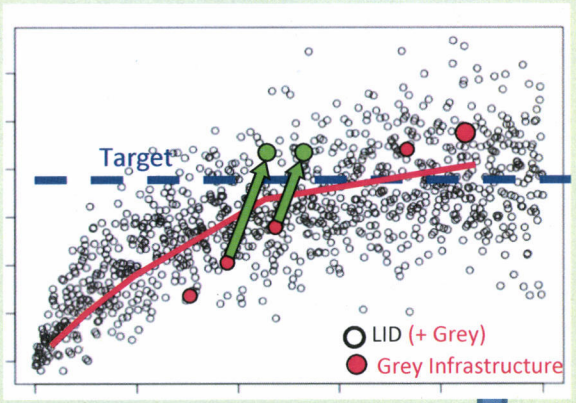
In a given watershed…

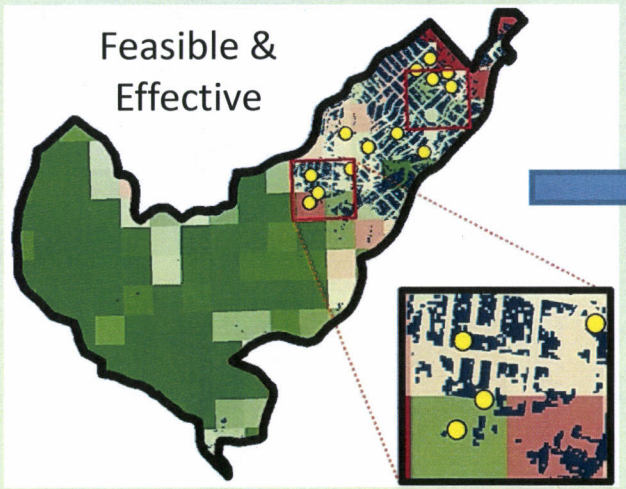
- What quantitative water quality and hydrological improvements can be made with Low Impact Development?
- What is the optimal plan of where to site such features?
- With LID, can we improve upon the cost/benefit of grey infrastructure alone?

GreenPlan-IT









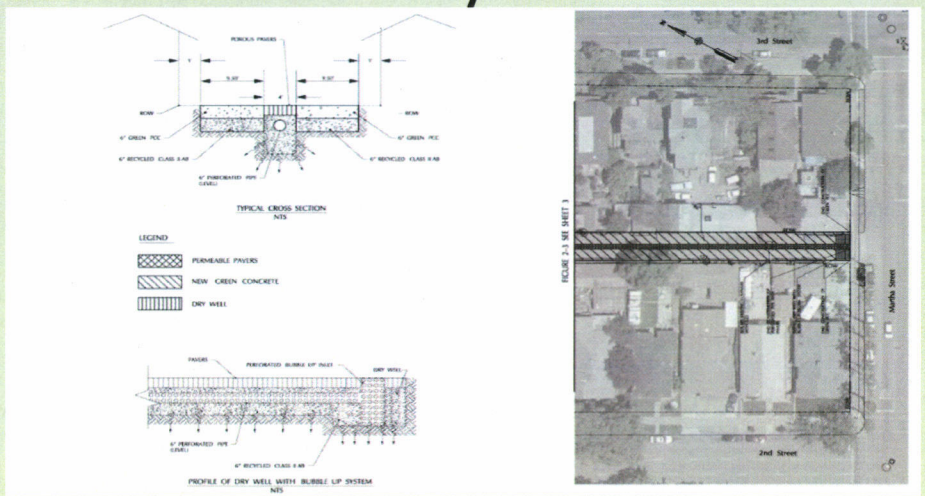
Optimization Tool
- Maximize benefit
- Minimize cost

Among Data Inputs

- **Topography** – ~1ft vertical resoluton (LiDAR)
- **Land cover** - ownership, parcels, roads
- **Hydrology** - storm drainage network, depth to groundwater, flow
- **Water Quality Monitoring**
- **Imagery** – current (2010 or later) high resolution (<1 ft) aerial photography
- **Catchment Delineations -** <HUC12
- **Additional data** - any other partner-specific data themes or locations to be included in analysis of LID implementation, e.g., red curbs, right of ways, public parks, etc.
- **Meteorology** – precipitation, temperature
- **Diversion** - any water uses that divert water from the stream/watershed (locations and amounts)
- **Existing LID information** - Location, type, remove efficiency, design capacity, any post-implementation monitoring data
- **Existing Stormwater Models**
- **Local cost information on various types of LID** - capital, operation and maintenance

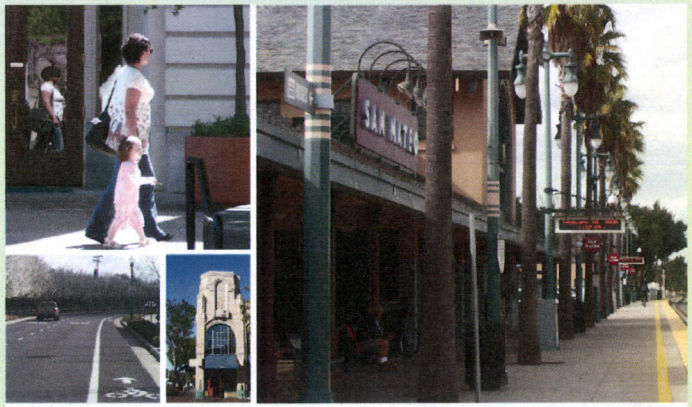
GreenPlans

- Selected jurisdictions for pilot test of GreenPlan-IT are San Mateo and San Jose
- After running and verifying GreenPlan-IT, these cities will adopt Green Plans OR data will be incorporated in other planning initiatives under way
- 8 concept designs of green features may be incorporated in plans



City of San Mateo

- Sustainable Streets Planning Initiative underway via Caltrans Grant
- Integrating GreenPlan sites & designs into Sustainable Streets Plan
- Plan will be city-wide, but implementation still unclear (change city fee structures? Multimodal impact fees?)
- Will go to city council in 2015



PROPOSAL PREPARED FOR THE CITY OF SAN MATEO

PROFESSIONAL PLANNING AND ENGINEERING SERVICES FOR DEVELOPMENT OF THE SUSTAINABLE STREETS PLAN

DECEMBER 19, 2012

NELSON NYGAARD

IN ASSOCIATION WITH:
COMMUNITY DESIGN+ARCHITECTURE
LOCAL GOVERNMENT COMMISSION
CHANGELAB SOLUTIONS
NATIONAL COMPLETE STREETS COALITION

Printed on 100% recycled paper

City of San Jose

- Focus on two areas of city – North San Jose (flows to both Guadalupe & Coyote) & Monterey Road (urban industrial)
- These areas are slated for development.
- Plans will go to City Council (Specific Plans or Urban Villages) & be adopted that call out info from GreenPlan
- Wants to involve SCVWD

Alternative Compliance

- How to fund LID called out in GreenPlans?
- Can cities use funds from permit required projects that have low cost-benefit, to fund other more desirable projects?
- Focus on San Mateo and San Jose to begin with

TAC involvement

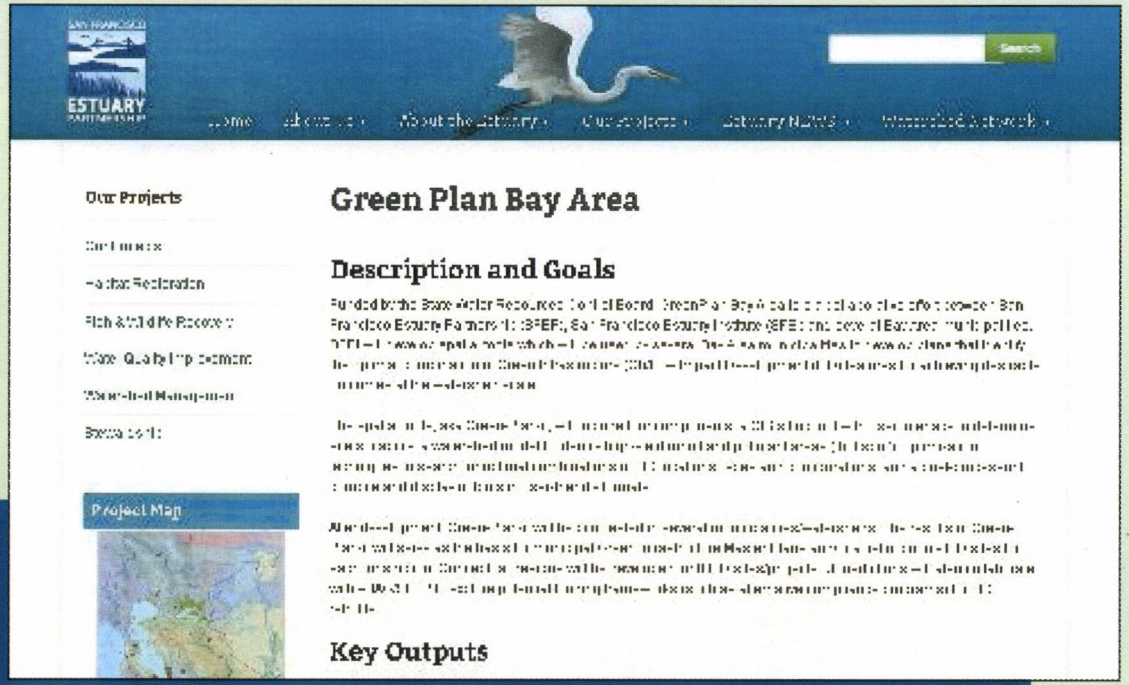
- 30, 60, 90 percent “design” consults on GreenPlan-IT
- Check in’s on Master Plans as they are developed
- Check in’s on Alternative Compliance as it’s developed

Webinars

- After completion of GreenPlan-IT, development of training modules so other interested parties can access tool
- Fall 2015???

Thanks!

http://www.sfestuary.org/greenplanning



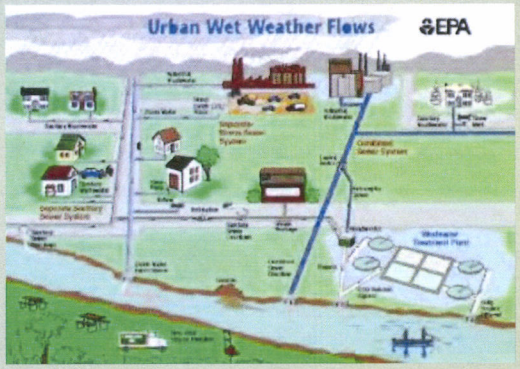
Jennifer Krebs

San Francisco Estuary Partnership

510-622-2315

Green Infrastructure

Preventing SW Pollution Around SF Bay



Jennifer Krebs
Principal Environmental Planner, SFEP

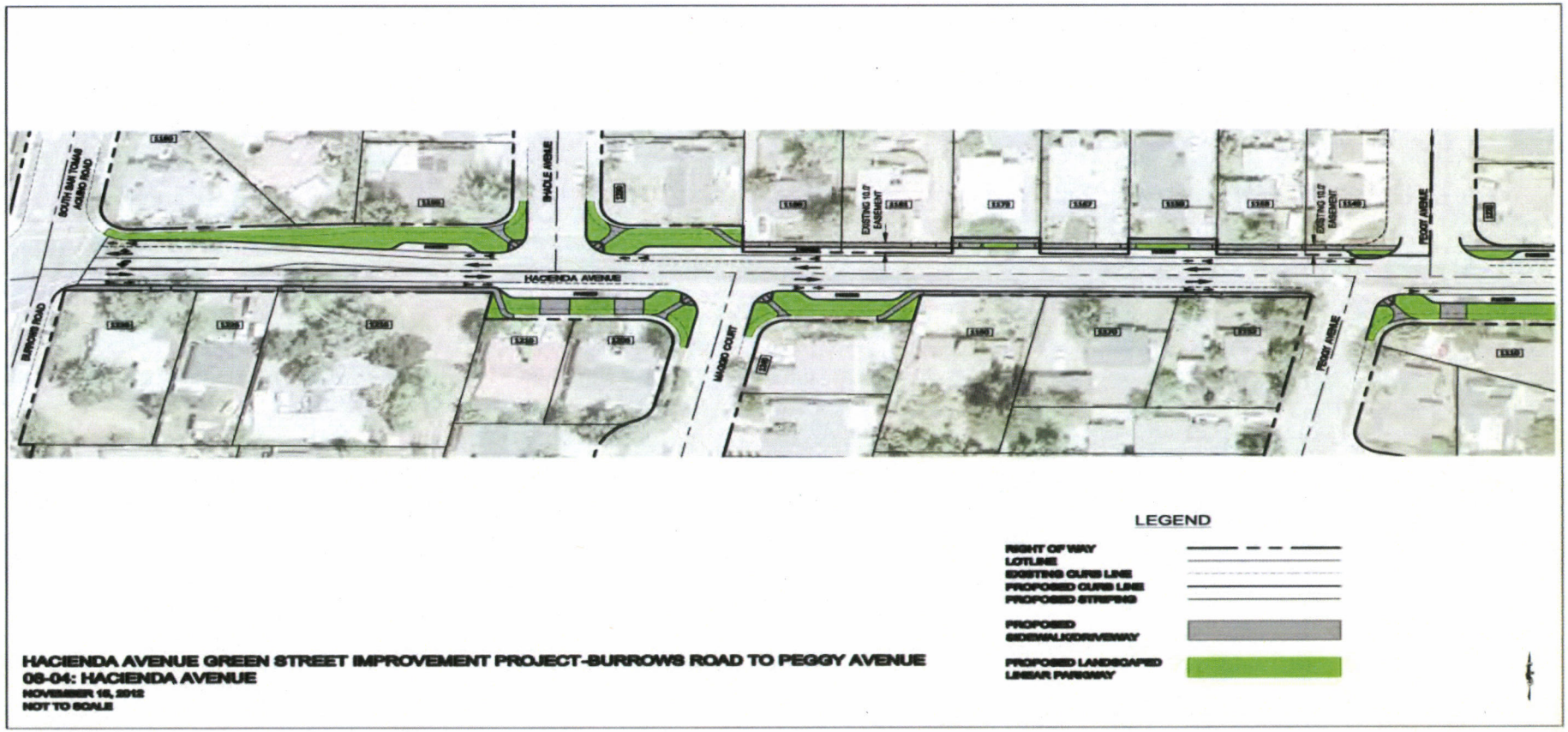
SAN FRANCISCO ESTUARY PARTNERSHIP

ATTACHMENT SC

Outline

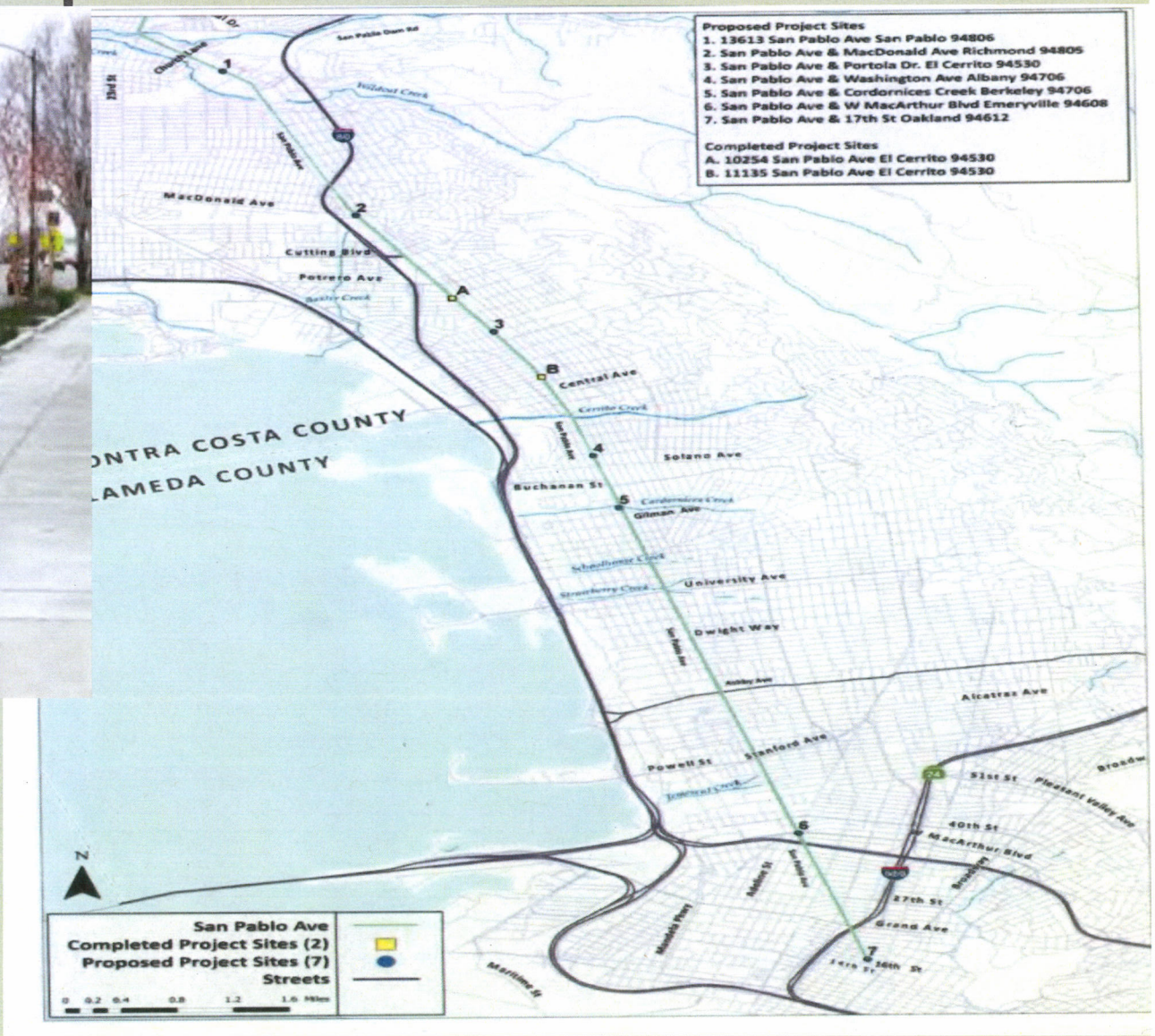
- Bay Area GI Projects on the Ground
  - Campbell, San Pablo Spine, San Francisco, Fremont, Oro Loma, San Jose
- Future GI Projects (planning efforts)
- Ongoing Learning Community – LID Leadership Group
- The next generation of GI Projects

Hacienda Ave - Campbell



Construction – spring 2014

San Pablo Ave Spine

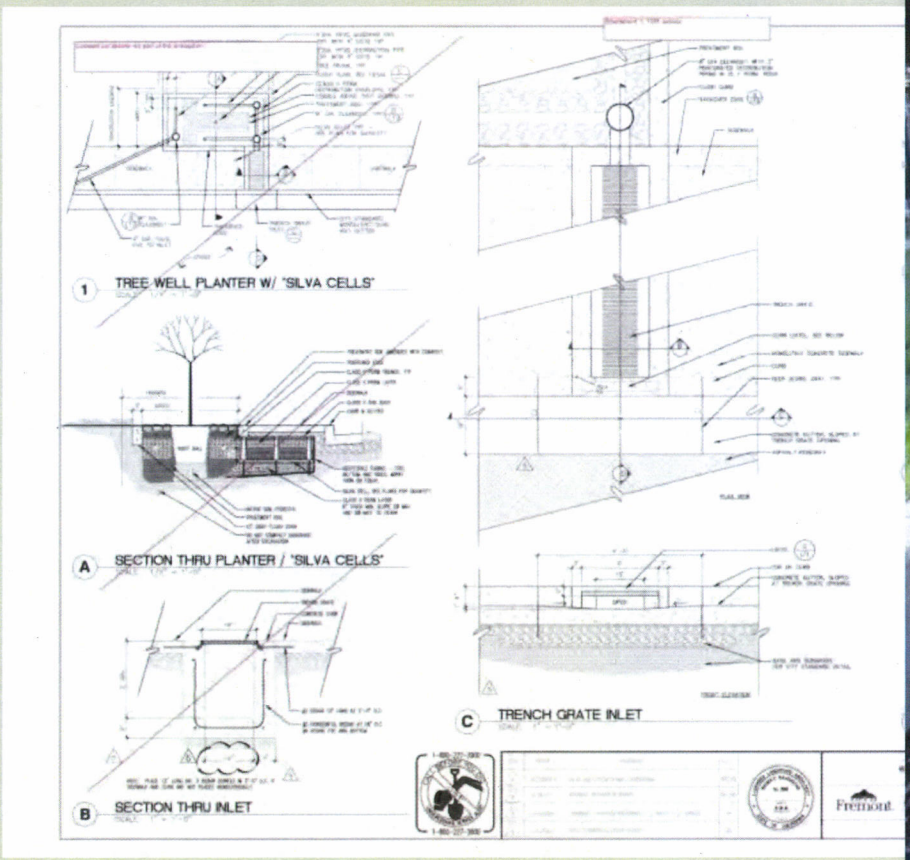


Construction – spring 2014 (some sites)

Newcomb Avenue, SF

Constructed – 2012, monitoring in progress

Fremont Tree Well Filters

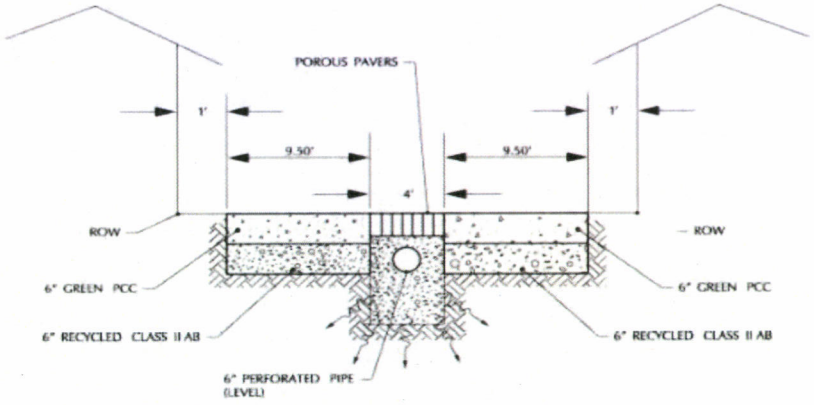


Constructed – 2012, monitoring in progress

Oro Loma

Construction – Fall 2014

San José Green Streets & Alleys



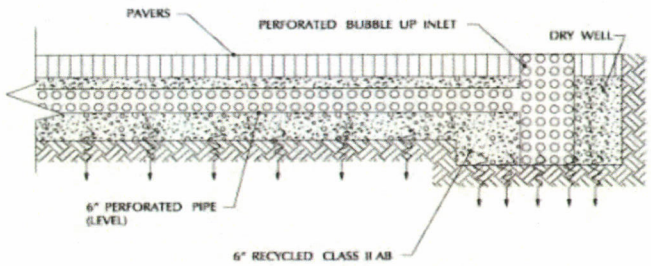
TYPICAL CROSS SECTION
NTS

LEGEND

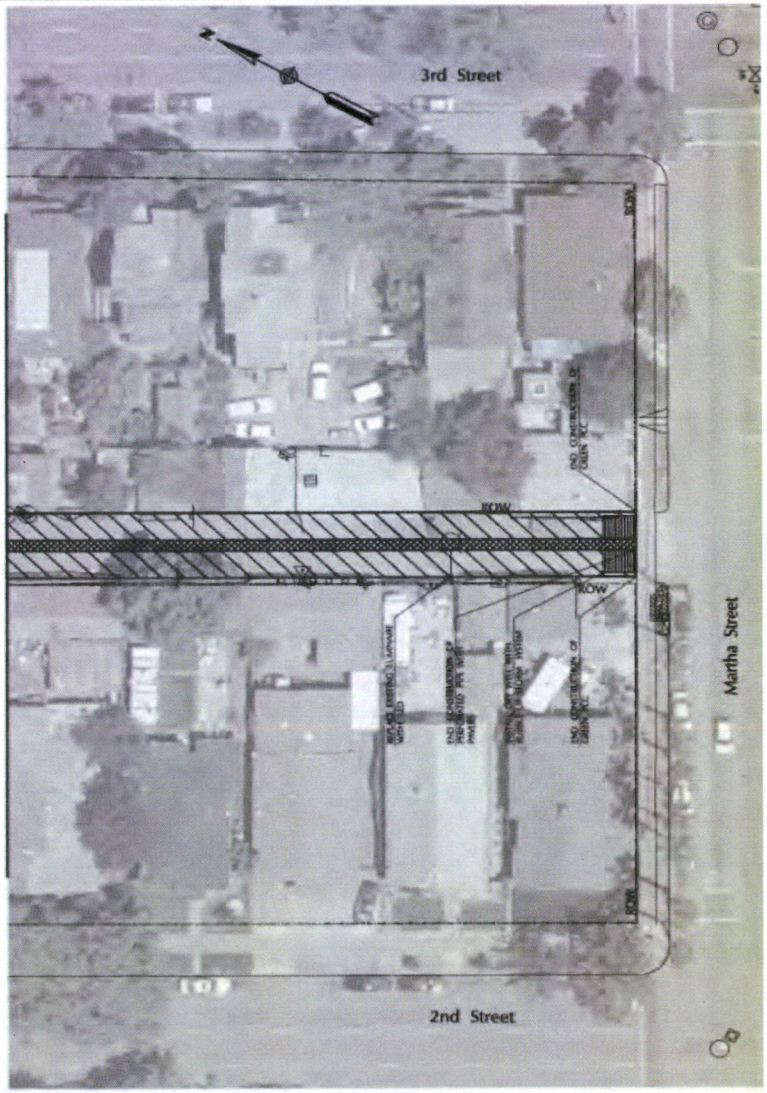
PERMEABLE PAVERS

NEW GREEN CONCRETE

DRY WELL

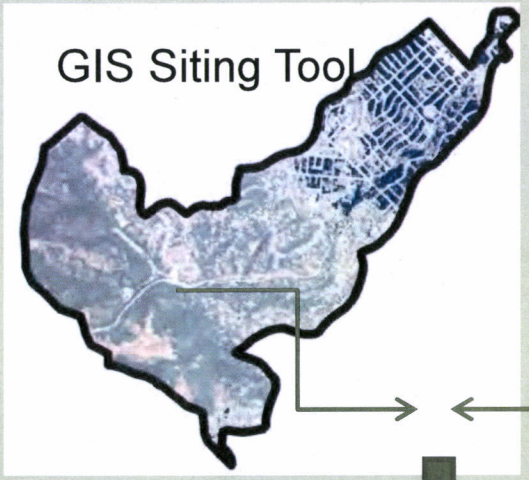


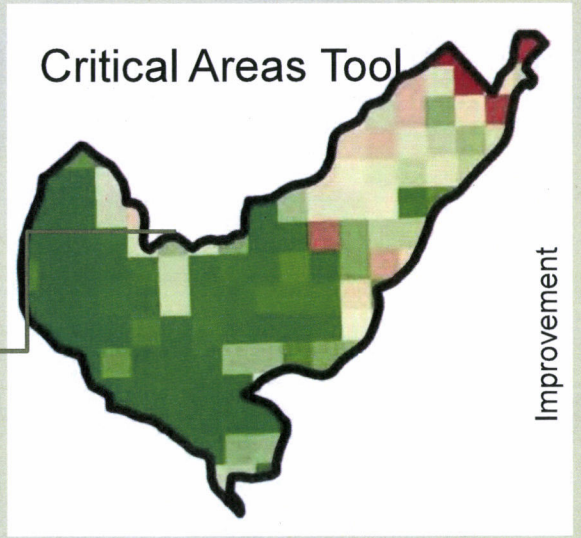
PROFILE OF DRY WELL WITH BUBBLE UP SYSTEM
NTS

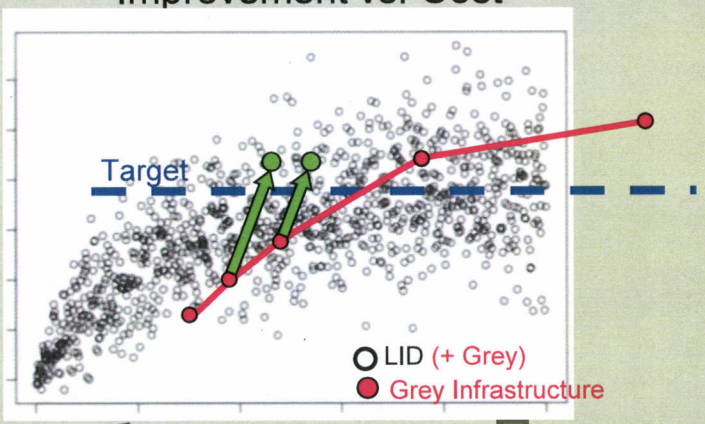


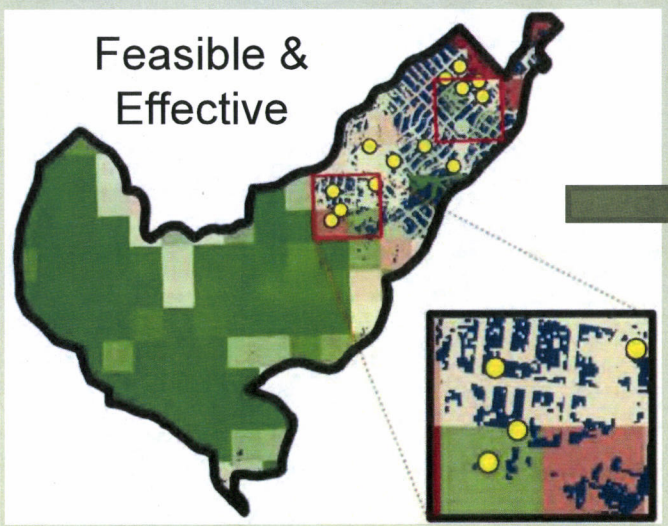
Construction – 2014, 2015, 2016

GreenPlan Bay Area









Optimization Tool
- Maximize benefit
- Minimize cost

LID Leadership

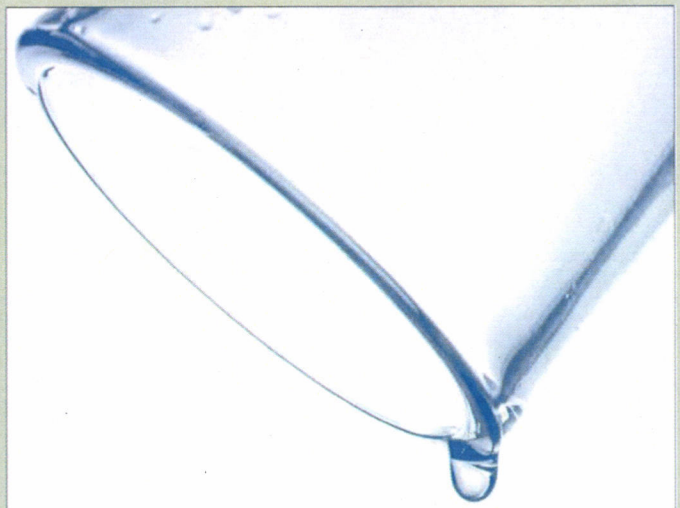
The Next Generation of Projects

- Communities need plans that accept and incorporate GI
  - GreenPlan Bay Area
  - Plan Bay Area
  - General Plans
  - Specific Plans
- Communities need to increase partnerships
  - Water Agencies (IRWMP)
  - Transportation Agencies (MTC, CMA, Caltrans)
- Regulatory Agencies need to Coordinate Better, Have "Integrated Agendas"
  - Air District, BCDC, Water Board, MTC
- DEVELOP INTEGRATED FUNDING STRATEGIES

Other Efforts

ReNUWIt
Re-inventing the Nation's
URBAN WATER
INFRASTRUCTURE

www.renuwit.org



Water 4.0

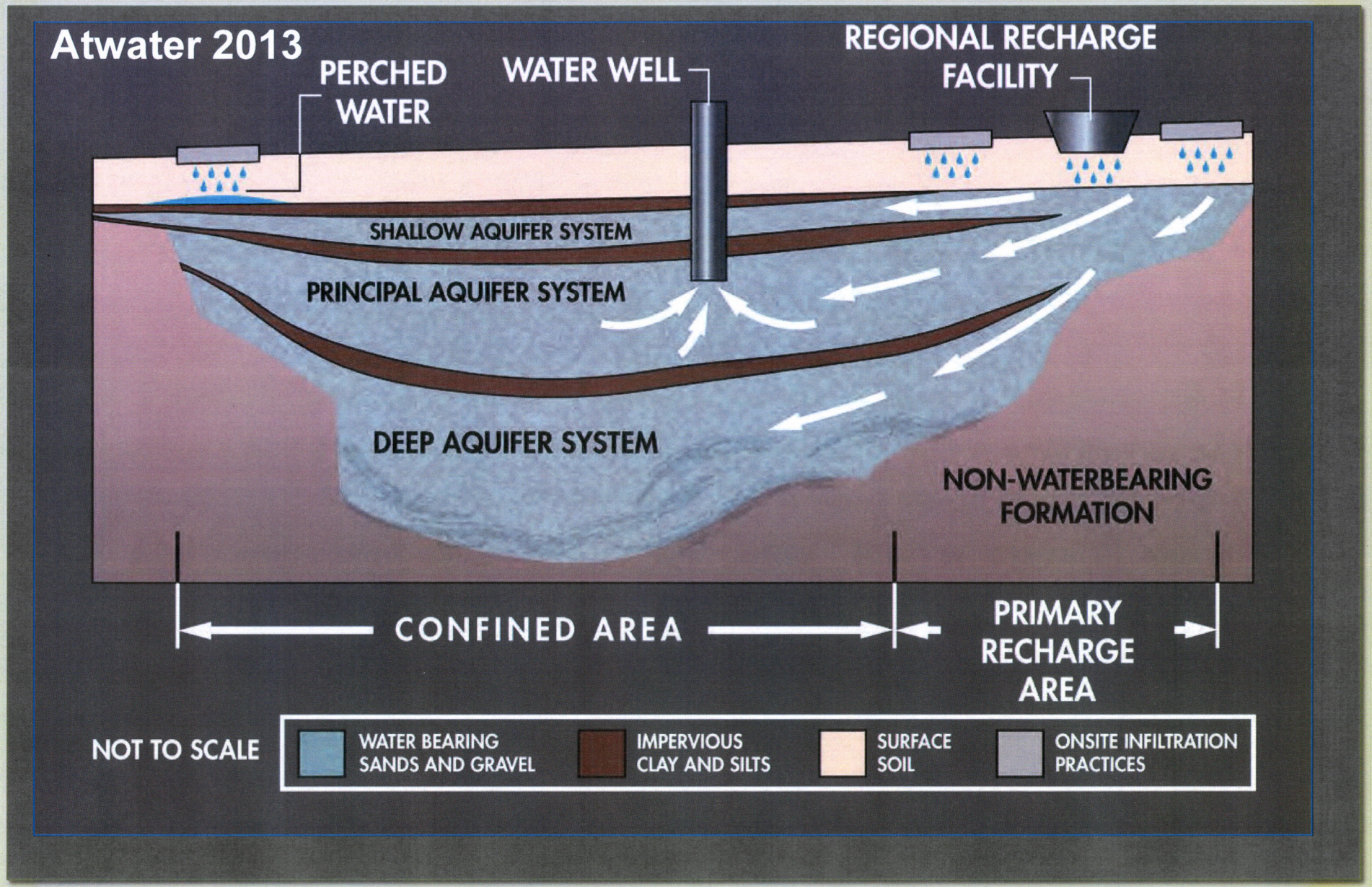
The Past, Present, and Future of
The World's Most Vital Resource

David Sedlak

www.water4point0.com

sedlak@berkeley.edu
@water4point0

Runoff Capture and Use



Q&A

Thanks!

Jennifer Krebs

SF Estuary Partnership

jkrebs@waterboards.ca.gov

510-622-2315

SAN FRANCISCO ESTUARY PARTNERSHIP