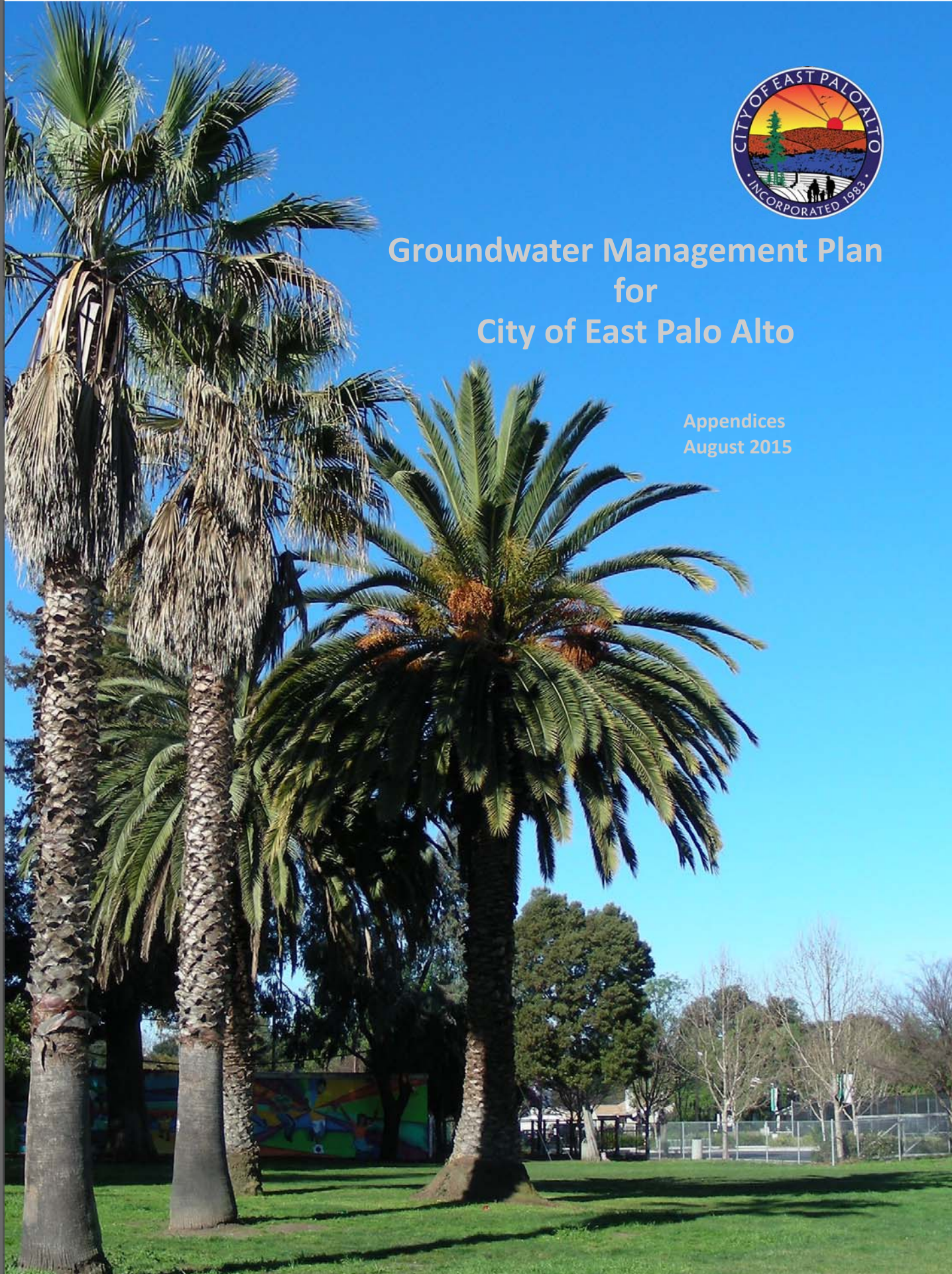




Groundwater Management Plan for City of East Palo Alto

Appendices
August 2015



APPENDIX A

Resolutions

Appendix A

Resolutions

Resolution No. 4542: *Resolution in Support of Sustainable Groundwater Management in the San Francisquito Creek Area*, September 2, 2014

Resolution No. 4559: *Resolution of Intent to Prepare a Groundwater Management Plan*, October 21, 2014

Resolution No. ____: *Resolution of Intent to Adopt a Groundwater Management Plan*, ____ __, 2015

RESOLUTION NO. 4542

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF EAST PALO ALTO
IN SUPPORT OF A SUSTAINABLE GROUNDWATER MANAGEMENT IN THE SAN
FRANCISQUITO CREEK AREA**

WHEREAS, the San Francisquito Creek area of the Midpeninsula overlies the Santa Clara and San Mateo Plain Groundwater Sub-basins; and

WHEREAS, groundwater is a critical natural resource that is vital for emergency water supplies on the Midpeninsula; and

WHEREAS, most of the water consumed on the Midpeninsula is purchased from a single source; the San Francisco Public Utilities Commission (SFPUC); with 85 percent coming from the Hetch Hetchy Reservoir on the Tuolumne River, making our primary water supply vulnerable to the impacts of climate change as well as major catastrophes; and

WHEREAS, interest in local groundwater extraction is growing as a result of rising SFPUC water prices, limits on current availability of SFPUC water, population growth and potential reductions in water supply due to climate change and droughts; and

WHEREAS, unsustainable groundwater extraction could result in declining groundwater levels, which may lead to saltwater intrusion, land subsidence and degradation of water quality; and

WHEREAS, contingency plans of many water providers for droughts and emergencies likely will rely on the same shared groundwater resources, making strong support and cooperation from well owners, water agencies, land use planning agencies and all water users important to protecting and maintaining our groundwater resources; and

WHEREAS, groundwater resources can be enhanced through cooperative water management, including water conservation/efficiency, use of alternative supplies such as recycled water, and storm water infiltration, and all forms of groundwater recharge; and

WHEREAS, groundwater and surface water in the San Francisquito Creek area are interconnected resources that cross political boundaries and support multiple beneficial uses; and

WHEREAS, more information on the hydrology and geology of the San Francisquito Creek area is needed to better design and implement sustainable groundwater management practices.

NOW THEREFORE, BE IT RESOLVED, that the City of East Palo Alto is committed to collaborating, as appropriate, with other agencies and organizations to better understand the hydrology and geology of the San Francisquito Creek area; and

BE IT FURTHER RESOLVED, that the City of East Palo Alto is committed to the sustainable management of local groundwater, including cooperative water management and conservation, to protect its quality and ensure its availability during droughts and emergency situations.

PASSED AND ADOPTED this 2nd day, of September 2014, by the following vote:

AYES: ABRICA, GAUTHIER, MARTINEZ, RUTHERFORD, MOODY
NAES: 0
ABSENT: 0
ABSTAIN: 0

SIGNED:




Laura Martínez, Mayor

ATTEST:



Nora Pimentel, Deputy City Clerk

APPROVED AS TO FORM:



John A. Nagel, City Attorney

RESOLUTION NO. 4559

RESOLUTION OF INTENTION OF THE CITY COUNCIL OF THE CITY OF EAST PALO ALTO, CALIFORNIA, TO DRAFT A GROUNDWATER MANAGEMENT PLAN

WHEREAS, the City completed the Gloria Way Water Well Production Alternatives Analysis and Water Security Feasibility Study (Todd Engineers, 2012), which recommended further evaluation and testing of additional potential groundwater well sites; and

WHEREAS, adoption of a Groundwater Management Plan is in furtherance of and consistent with the City's Water Master Plan as adopted by the City Council; and

WHEREAS, Section 10753 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their services areas; and

WHEREAS, the City of East Palo Alto is an authorized local agency and may, therefore, adopt and implement such a Groundwater Management Plan and

WHEREAS, a Notice of Public Hearing was published in a newspaper of general circulation on October 8, 2014, and on October 17, 2014, pursuant to California Government Code Section 6066, announcing the City's intention to consider the adoption of a resolution of intention to draft a Groundwater Management Plan in accordance with the California Water Code Section 10753.2; and

WHEREAS, a public hearing was held on October 21, 2014, to discuss the adoption and implementation of a Groundwater Management Plan in accordance with California Water Code Section 10753.2; and

WHEREAS, the City Council believes the groundwater can best be managed, as in the past, by the City, in coordination with agencies and owners of properties overlying the groundwater basin; and

WHEREAS, the City Council believes the adoption of a Groundwater Management Plan will serve to protect the health, safety, and welfare of the residents, businesses, and property owners by providing a supplemental/emergency water resource.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of East Palo Alto, California, as follows:

Section 1: Adopts this Resolution of Intention to draft a Groundwater Management Plan in accordance with Section 10750, et seq. of the California Water Code, and the City's consultant is hereby authorized and directed to draft such plan.

Section 2: Affirming that this Resolution is a Resolution of Intention in accordance with California Water Code Section 10753.2.

Section 3: Direct the Interim City Manager to publish this Resolution of Intention to draft a Groundwater Management Plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this Resolution upon written request.

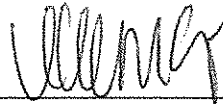
Section 4: Authorizes the Interim City Manager to execute all documents and take any other action necessary or advisable to carry out the purpose of this Resolution.

Section 5: Directing the Interim City Manager, once the Groundwater Management Plan has been prepared, to schedule a second public hearing in accordance with California Water Code Section 10753.5 to determine whether to adopt the plan.

PASSED AND ADOPTED this 21st day of October 2014, by the following vote:

AYES: ABRICA, GAUTHIER, MARTINEZ, RUTHERFORD, MOODY
NAES: 0
ABSENT: 0
ABSTAIN: 0

SIGNED:



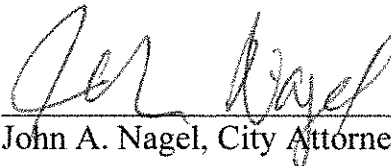
Laura Martinez, Mayor

ATTEST:



Nora Pimentel, Deputy City Clerk

APPROVED AS TO FORM:



John A. Nagel, City Attorney

APPENDIX B

Stakeholder Outreach

and

Agency Collaboration

Appendix B

Stakeholder Outreach and Agency Collaboration

Stakeholder Outreach Plan

Invitation Letters to Stakeholders, Agency Representatives and CAP

Sample Website Announcements

Summary of GWMP Workshops:

1. December 4 2014
2. February 24, 2015
3. July 14, 2015

Comment Letters and Emails



City of East Palo Alto
Groundwater Management Plan
Stakeholder Outreach Plan
November 14, 2014

Background

The City of East Palo Alto is initiating a Groundwater Management Plan (GWMP) in compliance with the California State Water Code. Completion of a GWMP will have many benefits, including:

- Development of a monitoring program that addresses groundwater levels, groundwater quality, and land subsidence
- Identification of existing and future groundwater uses and measures to manage groundwater for long-term sustainable use and minimize potential adverse impacts
- Support for City development and management of groundwater supplies to enhance its supply reliability
- Establishment of a State-accepted groundwater management program that can be used to pursue funding for groundwater-related projects and programs

Goal

The goal of this Stakeholder Outreach Plan is to provide a collaborative and open stakeholder process.

Stakeholder Outreach Activities

Initial Stakeholder Involvement

The City has participated in ongoing outreach including participation in San Francisquito Creek Subbasin Groundwater Meetings with the Tuolumne River Trust on January 22, 2013 and September 29, 2014. City staff members have had discussions with other local groundwater users (including Palo Alto Park Mutual Water Company and O'Connor Tract Co-op Water Company), neighboring cities, and local landowners such as Menlo Business Park LLC (MBP).

Public Notices and Hearings

The first step is a notice for a public hearing before the City Council regarding the intent to draft a GWMP. This notice will be published once a week for two successive weeks prior to the hearing (per Government Code 6066). At the hearing, the Council will consider adoption of a resolution of intent to draft a plan. Similarly, a public notice and resolution to adopt the GWMP will be needed for the public hearing after the GWMP is prepared. Copies of the adopted resolutions will be sent to Department of Water Resources (DWR).

Identification of Stakeholders and Other Local Water Agencies

Provision for Stakeholder participation involves identification of interested agencies, organizations and members of the general public, followed by invitations to participate. The lists of invitees and participants in the 2014 San Francisquito Creek Subbasin Groundwater Meetings are a good start, along

with persons participating in other City planning efforts. Additional stakeholders will be identified and invited through word-of-mouth and announcements. Two lists will be prepared and maintained in a spreadsheet: one including stakeholders and another with local water agencies.

Stakeholders include a variety of organizations such as the Tuolumne River Trust (which promotes stewardship of the Tuolumne River plus sustainable water use in the Bay Area), Menlo Business Park, Stanford University, and local water companies such as Palo Alto Park Mutual Water Company and O'Connor Tract Co-op Water Company.

Other local water agencies are important because the City encompasses only a portion of the San Mateo Plain Subbasin; consequently, the GWMP may be a stepping-stone for larger-scale planning. The GWMP will emphasize collaboration with other public agencies in the San Mateo subbasin, including the County of San Mateo, City of Menlo Park, Town of Atherton, and City of Redwood City among other public agencies. Given the hydrologic significance of San Francisquito Creek, the GWMP also will support collaboration with neighboring agencies in the Santa Clara subbasin, namely the City of Palo Alto and Santa Clara Valley Water District. Regional agencies including Bay Area Water Supply & Conservation Agency (BAWSCA) and the San Francisco Public Utilities Commission will be invited.

Persons on the agency and stakeholder lists will receive a stakeholder invitation letter (conveyed by email, mail, or delivery) that informs them of the Stakeholder Outreach Plan and how they can participate in development of the GWMP. The invitation letter also will be posted on the City's website, <http://www.cityofepa.org/index.aspx?NID=540>. Recognizing the City of East Palo Alto is multi-cultural, the website provides translation to 81 languages and many documents are available in English and Spanish.

Citizens Advisory Panel (CAP)

A stakeholder advisory committee, termed the Citizens Advisory Panel (CAP), will be established including representative of local water agencies, stakeholders and members of the public. CAP members will be contacted individually in scheduling workshops and will be provided information materials and the draft GWMP. CAP members will be tasked with active participation in workshops and provision of comments on the draft GWMP. Communication will occur primarily through email, but announcements and materials also will be available on the City website.

Informational Materials

An announcement of GWMP will be prepared and posted on the City's website. The City will dedicate a portion of its website page for announcements and GWMP materials and documents. A City contact person will be identified.

Workshops

The Stakeholder Outreach Plan includes three scheduled workshops to guide development of the GWMP. These are listed below and described in their respective tasks. In brief, the workshops will address the following:

1. **Initial GWMP Workshop** – Introduction to GWMP process, definition of goal of process, introduction of GWMP-Share site, identification of advisory committee, presentation of basin condition and issues.
2. **Basin Management Objectives (BMO) and Actions Workshop** -Review of issues, discussion of basin management objectives and of actions for monitoring and maintaining groundwater within BMOs.
3. **Draft GWMP Workshop** -Present draft GWMP to the City Council and provide public forum for comments and questions

Workshops will provide a forum for questions and answers, with the objective to ensure a shared understanding of basin conditions, issues, objectives, and actions. Activities to be conducted before the next workshop will be summarized. Powerpoint presentations will be prepared along with agenda, handouts, attendance list, and meeting summaries. Workshops will be held in the conference room at City Hall, a well-recognized and suitable meeting place that is central to the community. A late-afternoon meeting time is anticipated, allowing attendance by agency representatives and the public.



CITY OF EAST PALO ALTO

Community and Economic Development Department-Engineering Division

1960 Tate Street, East Palo Alto, CA 94303

Tel. No. 650.853.3189, Fax. No. 650.853.3179

November 14, 2014

Subject: Participation in Development of a Groundwater Management Plan

Dear Stakeholder:

The City of East Palo Alto has long relied on imported water from the San Francisco Public Utilities Commission. Recognizing the need for water supply reliability, public safety and security in emergencies, and additional supplies to support economic development, the City has embarked on groundwater development and management. This has included completion of a recent Groundwater Feasibility Study, environmental review and engineering for the Gloria Way Well Retrofit Project, exploration drilling, and active participation in a stakeholder group for groundwater management of the San Francisquito Creek subbasin. Now the City is initiating a Groundwater Management Plan (GWMP) in compliance with the California State Water Code.

Completion of a GWMP will have many benefits, including:

- Development of a monitoring program that addresses groundwater levels, groundwater quality, and subsidence
- Identification of existing and future groundwater uses and measures to manage groundwater for long-term sustainable use and minimize potential adverse impacts
- Support for City development and management of groundwater supplies to enhance its supply reliability
- Establishment of a State-accepted groundwater management program that can be used to pursue funding for groundwater-related projects and programs
- Initiation of an active stakeholder participation and agency collaboration process to serve as a stepping stone to larger-scale planning

In order to address the range of local groundwater issues, you are invited to participate in the development of the GWMP. This will involve three workshops and the opportunity to review and comment on the draft GWMP. You may also choose to participate in the Citizens Advisory Panel for the GWMP (CAP). The first workshop is scheduled for December 4, 2014, from 4:00 p.m. to 7:00 p.m., at 2415 University Avenue, East Palo Alto, CA 94303. Workshop announcements, agenda, presentations, handouts, and the draft GWMP will be posted on the City website <http://www.ci.east-palo-alto.ca.us>.

Please indicate your interest and willingness to participate through the following link:

mbozorginia@cityofepa.org

Sincerely,

Kamal Fallaha

Kamal Fallaha, P.E.
City Engineer



CITY OF EAST PALO ALTO

Community and Economic Development Department-Engineering Division

1960 Tate Street, East Palo Alto, CA 94303

Tel. No. 650.853.3189, Fax. No. 650.853.3179

November 14, 2014

Subject: Participation in Development of a Groundwater Management Plan

Dear Water Agency Representative:

The City of East Palo Alto has long relied on imported water from the San Francisco Public Utilities Commission. Recognizing the need for enhanced water supply reliability and additional supplies to support further growth and economic development, the City has embarked on groundwater development and management. This has included completion of a recent Groundwater Feasibility Study, environmental review and engineering for the Gloria Way Well Retrofit Project, exploration drilling, and active participation in a stakeholder group for groundwater management of the San Francisquito Creek subbasin. Now the City is initiating a Groundwater Management Plan (GWMP) for its service area in compliance with the California State Water Code.

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- Establishment of a State-accepted groundwater management program that can be used to pursue funding for groundwater-related projects and programs
- Initiation of an active stakeholder participation and agency collaboration process to serve as a stepping stone to larger-scale planning

In order to address the range of local groundwater issues, your organization is invited to participate in the development of the GWMP. This will involve three workshops and the opportunity to review the draft GWMP. You may also choose to participate in the Citizens Advisory Panel for the GWMP (CAP). The first workshop is scheduled for December 4, 2014, from 4:00 p.m. to 7:00 p.m., at 2415 University Avenue, East Palo Alto, CA 94303. Workshop announcements, agenda, presentations, handouts, and the draft GWMP will be posted on the City website <http://www.ci.east-palo-alto.ca.us>.

Please indicate your organization's interest and willingness to participate through the following link:

mbozorginia@cityofepa.org

Sincerely,

Kamal Fallaha

Kamal Fallaha, P.E.
City Engineer



CITY OF EAST PALO ALTO

Community and Economic Development Department-Engineering Division

1960 Tate Street, East Palo Alto, CA 94303

Tel. No. 650.853.3189, Fax. No. 650.853.3179

November 14, 2014

Subject: Participation in Development of a Groundwater Management Plan

Dear Citizens Advisory Panel:

Thank you for expressing interest in serving as a Citizens Advisory Panel (CAP) member in the development of a Groundwater Management Plan.

The City of East Palo Alto has long relied on imported water from the San Francisco Public Utilities Commission. Recognizing the need for enhanced water supply reliability and additional supplies to support further growth and economic development, the City has embarked on groundwater development and management. This has included completion of a recent Groundwater Feasibility Study, environmental review and engineering for the Gloria Way Well Retrofit Project, exploration drilling, and active participation in a stakeholder group for groundwater management of the San Francisquito Creek subbasin. Now the City is initiating a Groundwater Management Plan (GWMP) for its service area in compliance with the California State Water Code.

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- Establishment of a State-accepted groundwater management program that can be used to pursue funding for groundwater-related projects and programs
- Initiation of an active stakeholder participation and agency collaboration process to serve as a stepping stone to larger-scale planning

Development of the GWMP is a stakeholder process that will involve three workshops and the opportunity to review the draft GWMP. As a CAP member, you will have the additional responsibility of active participation in workshop discussions and provision of comments on the draft GWMP. Please recognize that a GWMP is a long-term process as the City moves from GWMP development to GWMP implementation. The first workshop is scheduled for December 4, 2014, from 4:00 p.m. to 7:00 p.m., at 2415 Universty Avenue, East Palo Alto, CA 94303. Workshop announcements, agenda, presentations, handouts, and the draft GWMP will be posted on the City website <http://www.ci.east-palo-alto.ca.us>.



CITY OF EAST PALO ALTO

Community and Economic Development Department-Engineering Division

1960 Tate Street, East Palo Alto, CA 94303

Tel. No. 650.853.3189, Fax. No. 650.853.3179

Please indicate your organization's interest and willingness to participate through the following link:

mbozorginia@cityofepa.org

Sincerely,

Kamal Fallaha

Kamal Fallaha, P.E.

City Engineer

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Workshop Announcements

City of East Palo Alto
THE CITY ON THE MOVE

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The City is now utilizing Nextdoor in an effort to facilitate a virtual Neighborhood Watch program and help foster neighbor-to-neighbor communications. Get started and connect with your neighbors and community at cityofeastpaloalto.nextdoor.com
See press release [here](#)

Agendas & Minutes
Emergency
General Flood Information
RFP - Bids
Grants

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Groundwater Management Plan – Public Workshop #1 Come and be part of the development of the Groundwater Management Plan (GWMP)!
[Additional Info...](#)

Public Workshop: Let's Develop The Design Come learn more about the proposed alignment for a new pedestrian and bicycle bridge over highway 101.
[Additional Info...](#)

Press Release: East Palo Alto Police Chief Interim City Manager Carlos Martinez announced today the appointment of Albert Pardini as the new Chief of the East Palo Alto Police Department. He will begin work as Chief on November 12, 2014.
[Additional Info...](#)



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Nextdoor

The City is now utilizing Nextdoor in an effort to facilitate a virtual Neighborhood Watch program and help foster neighbor-to-neighbor communications. Get started and connect with your neighbors and community at nextdoor.com

East Palo Alto, CA - Official... x +

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- RBD / Four Corners
- Route 101/University Avenue (State Route 109)
- Secondary Dwelling Units
- Storm Drain Master Plan & Condition Assessment
- Traffic Signal Upgrade and Geometrics Design
- Willow Road/Hwy 101 Interchange
- Runnymede Storm Drain Phase II

You are here: [Home](#) > [Government](#) > [Departments](#) > [Community and Economic Development Department](#) > [Projects in Process](#) > [Groundwater Management Plan](#)

Groundwater Management Plan

General

The City completed the Gloria Way Water Well Production Alternatives Analysis and Water Security Feasibility Study in November 2012, which recommended that the City to: (i) move forward with design of a manganese removal treatment system for the existing Gloria Way Well; (ii) further evaluate and test for additional potential well sites; and (iii) develop a groundwater management and monitoring plan.

The City intends to reactivate Gloria Way Well upon construction of a well head treatment facility to address removal of manganese, a secondary drinking water contaminant. As part of the reactivation process, State law requires the City to adopt a Groundwater Management Plan. The development of the Groundwater Management Plan is a collaborative and open process. A copy of the Stakeholder Outreach Plan can be found in the link below:

- [Stakeholder Outreach Plan](#)

1st Workshop

- [Invitation Letter to Stakeholder](#)
- [Invitation Letter to Citizens Advisory Panel](#)
- [Invitation Letter to Agencies](#)
- [Agenda](#)
- [Presentation](#)
- [Handouts](#)
- [Workshop Summary](#)

2nd Workshop

- [Agenda](#)
- [Presentation](#)
- [Handouts](#)
- [Workshop Summary](#)



**CITY OF EAST PALO ALTO
PUBLIC MEETING**

Groundwater Management Plan – Public Workshop #2

Come and be part of the development of the Groundwater Management Plan (GWMP)!

The City of East Palo Alto is developing a Groundwater Management Plan (GWMP) in compliance with the California State Water Code. Development of the GWMP is a stakeholder process that involves three workshops and the opportunity to review the draft GWMP. The first workshop was held on December 4, 2014, and it included introduction to the GWMP process, definition of goal of process, and presentation of basin condition and issues. The second workshop is scheduled on February 24, 2015, and it will focus on: (i) Review issues and define objectives; (ii) Present and review monitoring program; and (iii) Identify management actions.

Workshop Details:

When: Tuesday, February 24, 2015

Time: 3:30 pm – 6:00 pm

Where: Community Room, 2415 University Avenue
East Palo Alto, CA 94303

For more information, please visit:

<http://www.cityofepa.org/index.aspx?NID=554>



**CIUDAD DE EAST PALO ALTO
JUNTA PÚBLICA**

Plan de Manejo de Agua Subterránea-Taller Público #2

Venga y sea parte del desarrollo del plan de manejo de agua subterránea (GWMP)!

La Ciudad de East Palo Alto está creando un plan de manejo para el agua subterránea (GWMP) de acuerdo con los códigos de agua del Estado de California. El desarrollo del GWMP es un proceso de tres talleres públicos y la oportunidad de revisar el reporte preliminar de GWMP. El primer taller fue presentado el 4 de Diciembre del 2014. Durante este taller se dio una presentación del proceso GWMP, se definieron las metas y se presentaron las condiciones y problemas con el depósito del agua. El segundo taller está programado para el 24 de Febrero del 2015. Durante este taller, se hablara sobre lo siguiente: 1) repasaremos sobre los problemas y definiremos los objetivos; 2) se presentara y revisara el programa de monitorear; y 3) identificaremos las acciones de manejo.

Información del Taller

Cuando: El Martes 24 de Febrero del 2015

Hora: 3:30pm-6:00pm

Donde: El Salón de la Comunidad, 2415 University Avenue
East Palo Alto, CA 94303

Para más información, por favor visite:

<http://www.cityofepa.org/index.aspx?NID=554>



**CITY OF EAST PALO ALTO
PUBLIC MEETING**

Groundwater Management Plan – Public Workshop #3

Come and be part of the development of the Groundwater Management Plan (GWMP)!

The City of East Palo Alto is developing a Groundwater Management Plan (GWMP) in compliance with the California State Water Code. Development of the GWMP is a stakeholder process that involves three workshops and the opportunity to review the draft GWMP. The third workshop will present the draft GWMP and provide a forum for questions and comments. Come and be part of the development of the GWMP!

Workshop Details:

When: Tuesday, July 14, 2015

Time: 4:00 pm – 5:30 pm

Where: Community Room, 2415 University Avenue
East Palo Alto, CA 94303

To view or download the GWMP—or for more information—please visit:

<http://cityofepa.org/index.aspx?nid=554>

Written comments and questions are welcome. Deadline for comments on draft GWMP is July 28, 2015

For information or to submit questions or comments on the GWMP, contact Vivian Ma:

vma@cityofepa.org



**CIUDAD DE EAST PALO ALTO
JUNTA PÚBLICA**

Plan de Manejo de Agua Subterránea-Taller Público #3

Venga y sea parte del desarrollo del plan de manejo de agua subterránea (GWMP)!

La Ciudad de East Palo Alto está creando un plan de manejo para el agua subterránea (GWMP) de acuerdo con los códigos de agua del Estado de California. El desarrollo del GWMP es un proceso cual tiene tres talleres públicos y la oportunidad de revisar el reporte preliminar de GWMP. Este tercer taller será para presentar el reporte GWMP preliminar y para crear un foro para preguntas y comentarios. Venga y sea parte del GWMP!

Información del Taller

Cuando: El martes 14 de Julio del 2015

Hora: 4:00pm - 5:30pm

Donde: El Salón de la Comunidad, 2415 University Avenue
East Palo Alto, CA 94303

Para ver y obtener una copia del GWMP por favor visite:

<http://cityofepa.org/index.aspx?nid=554>

Comentarios y preguntas por escrito son bienvenidas. El último día para someter comentarios sobre el reporte preliminar es el 28 de Julio del 2015. Para más información o para someter preguntas y comentarios sobre GWMP, por favor de comunicarse con Vivian Ma:

vma@cityofepa.org



City of

East Palo Alto

THE CITY ON THE MOVE

Announcing

The City of East Palo Alto's Draft Groundwater Management Plan

The City of East Palo Alto has long relied on imported water. Recognizing the need for water supply reliability, public safety and security in emergencies, and additional supplies to support planned growth, the City has embarked on groundwater development and management, including preparation of a Groundwater Management Plan (GWMP).

The GWMP process, initiated in 2014, has involved a series of three workshops. Workshop No. 1 in December 2014 provided an introduction to the GWMP process, presentation of basin conditions, and discussion of objectives and issues. Workshop No. 2 in February 2015 reviewed management goals and issues, presented a monitoring program, discussed basin management objectives, and identified potential management actions. All of these elements have been integrated into the draft GWMP, which is offered for public review.

The City encourages you to review the draft GWMP and share your questions and comments.

The **Draft GWMP** is posted on the City website along with workshop agenda, presentations, and handouts: <http://www.ci.east-palo-alto.ca.us>.

The third and final **GWMP Workshop** will present the draft GWMP and provide a forum for questions and comments. It will be held:

July 14, 2015, Tuesday, 4-5:30 PM
Community Room
2415 University Avenue
East Palo Alto, CA 94303

Written comments and questions are welcome.

For information or to submit questions or comments on the GWMP, contact Vivian Ma: vma@cityofepa.org

You are encouraged to participate!

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City of East Palo Alto Groundwater Management Plan

Summary of Workshop No. 1

Held December 4, 2014 4:00 – 6:00 pm

In the Community Room, 2415 University Avenue, East Palo Alto

Workshop No. 1 was attended by 28 people. The Workshop objectives were to introduce the GWMP process, present basic concepts of groundwater hydrology and resources, define the goals for GWMP, describe groundwater conditions of the San Mateo/San Francisquito Subbasins, and to identify issues to address in GWMP.

An illustrated presentation first addressed the reasons why the City is preparing a GWMP, defined the Plan Area along with the San Mateo/San Francisquito Subbasin areas, and described the GWMP process including the public stakeholder elements. A second portion of the presentation provided an introduction to groundwater resources, including the hydrologic cycle, recharge of surface water, and the nature of groundwater occurrence. The presentation described groundwater flow processes from recharge to discharge areas, the interconnection between groundwater and surface water, and pumping of groundwater via production wells. Groundwater quality concepts were introduced.

Subsequent discussion addressed the City's preliminary GWMP goals to:

- Provide the City of East Palo Alto with a long-term, reliable and affordable high quality supply;
- Maintain or improve groundwater quality and quantity for the benefit of all groundwater users; and
- Provide integrated water resource management for resilience during droughts and long-term climate change effects.

Suggestions for the goal statement included consideration of goals listed in the City's resolution in support of a sustainable groundwater management in the San Francisquito Creek area, consideration of surface water, mention of sustainability, and cooperation among groundwater users.

The third portion of the presentation focused on groundwater conditions in the San Mateo/San Francisquito Subbasins. The geologic framework was illustrated on maps and a geologic cross-section. Groundwater flow directions and water level trends over time were discussed along with known production wells in the subbasin. Concepts of the water balance and sustainable yield were introduced along with potential adverse impacts of pumping. Discussion touched on recharge areas, the number of private wells, depths of wells, pumping amounts, drought conditions and pumping impacts.

The last part of the presentation presented potential issues to be considered in the GWMP. Breakout sessions among meeting participants were conducted to identify issues. Review of the issues reveals three major concerns:

- Potential adverse impacts of pumping on other wells, groundwater levels and storage, subsidence potential, surface water (San Francisquito Creek), and groundwater quality (including saltwater intrusion and contamination)
- Lack of data to assess groundwater levels, groundwater quality, the water balance, subsidence, wells, pumping amounts and impacts, etc.
- Need for collaboration among local agencies/groundwater users/residents, public outreach/education, and regional management for sustainability.

Other specific issues included:

- Concern over a lack of process for groundwater use evaluation, and about locations of City wells and proximity to City limits
- Concern over general availability of City water supplies and reliability of wells in event of earthquake
- Interest in regulating groundwater wells and pumping
- Interest in utilizing other water sources (e.g., recycled water) and conserving groundwater
- Interest in mapping significant recharge areas
- Interest in managed recharge of groundwater (e.g., with recycled water).

The meeting concluded with a description of the next steps and upcoming Workshop No. 2.



City of East Palo Alto Groundwater Management Plan

Summary of Workshop No. 2

Held February 24, 2014 3:30 – 6:00 pm

In the Community Room, 2415 University Avenue, East Palo Alto

Workshop No. 2 was attended by 29 people. The Workshop objectives were to recap the GWMP process, review management goals and issues, discuss the monitoring program for the GWMP, discuss basin management objectives, and identify potential management actions. An illustrated presentation first reviewed the scope and goals for the City GWMP, and the issues identified in the first workshop. Please refer to the Summary of Workshop No. 1 for goals and issues.

A second portion of the presentation summarized the development of a monitoring program for East Palo Alto and adjacent areas. Monitoring program components include monitoring of groundwater levels and quality in available wells, tracking of pumping amounts, monitoring of potential land subsidence, and compilation of climatic and stream flow data. The City will maintain the monitoring program, monitor its own wells and subsidence stations, compile data and provide regular reports. In addition, the City seeks cooperative data sharing from local agencies and organizations to support a more comprehensive program. Comments and questions touched on monitoring costs and sources of funding, water quality conditions and parameters for sampling, aquifers to be monitored, and frequency and scope of reporting. The monitoring program will be summarized in the GWMP and presented in detail in an appendix to the GWMP.

The third portion of the presentation focused on basin management objectives (BMOs). BMOs express what we want to achieve in a GWMP; they are consistent with management goals and linked to specific issues. BMOs also are to be measurable and achievable, with identified management actions. The presentation and accompanying discussion focused on four major topics:

- Subsidence
- Groundwater levels
- Groundwater quality
- Groundwater-surface water interactions

The presentation of subsidence summarized guidelines developed by Santa Clara Valley Water District and indicated that local monitoring is needed to establish the relationship between pumping and subsidence. In the subsequent discussion among participants, it was indicated that more research is needed.

The presentation of groundwater levels indicated that BMOs need to be linked to the construction characteristics of local production wells and the groundwater level histories in those wells. The City is seeking information on private wells and requests cooperative data sharing.

The discussion of water quality focused on the potential for saltwater intrusion; concern was expressed about potential impacts of City pumping on the regional deep aquifer that extends under the bay. The potential presence of man-made contaminants in groundwater also should be assessed and monitored.

The presentation of groundwater-surface water interactions focused on San Francisquito Creek as a regional resource for aquatic habitat, recreation, and recharge. Given that the City overlaps only a small bayside portion of the watershed, suggested BMOs were directed to increasing understanding of groundwater-surface water interactions, increasing awareness of issues, and regional collaboration.

Lastly the workshop focused on identifying potential management actions for consideration in the GWMP. Breakout sessions among participants identified a diversity of potential actions, which can be organized into four broad categories:

- **Obtain funding.** Suggested actions include collaboration with San Mateo County, Tuolumne River Trust, and local developers and corporations.
- **Conduct studies.** Studies should address stream/groundwater interactions, shallow/deep aquifer relationships, identification and proper sealing of abandoned wells, identification of recharge areas and stormwater recharge opportunities, conduct of pumping tests, and development of a sub-basin water balance and groundwater flow model.
- **Implement monitoring program.** Participants provided specific recommendations and generally indicated that monitoring should address subsidence, streamflow and quality, shallow groundwater, contamination sites and contaminants, nitrate, and sea level rise.
- **Develop regional planning.** Participants expressed broad agreement for regional water resource management. Suggestions included data sharing, public outreach, numerical modeling, reallocation of imported water to the City, and planning for water recycling, gray water use, water conservation, low-impact development, response to sea level rise, and managed aquifer recharge with surface water, stormwater and recycled water.

The meeting concluded with a description of next steps.



City of East Palo Alto Groundwater Management Plan

Summary of Workshop No. 3

Held July 14, 2014 4:00 – 5:30 pm

In the Community Room, 2415 University Avenue, East Palo Alto

Workshop No. 3 was attended by 31 people. The Workshop objectives were to present the draft GWMP document and provide a forum for questions and comments.

The first part of the workshop was an illustrated presentation that briefly reviewed the GWMP process and its goals and objectives. Previous workshops had addressed the management context, physical setting, and water resource issues, and also had presented the monitoring program. Accordingly, this workshop focused on the GWMP components—the activities that the City will undertake to achieve goals and objectives—and the implementation strategy and schedule. GWMP components were summarized, including the following:

1. Stakeholder involvement
2. Monitoring program
3. Groundwater sustainability
4. Groundwater protection
5. Coordinated planning and management

A handout was provided, listing specific actions for each GWMP component and providing an implementation schedule. The implementation strategy recognizes that the GWMP is being developed and implemented *before* the City initiates significant pumping, and thus emphasizes initiation of the monitoring program, step-by-step development of groundwater pumping, acquisition of funding for groundwater management and a numerical model, continuation of City groundwater management and support for regional management. The plan for Fiscal year 2015-2016 includes initiation of baseline monitoring, completion of Gloria Way Well facilities, environmental studies and design for Pad D Production well, and preparation of the first GWMP monitoring report.

The second part of the workshop was a forum for questions and comments. For example, the discussion addressed sustainability—the importance of return flows as recharge, San Francisquito Creek and the importance of protecting its recharge (among other benefits), the need for recycled water use and managed recharge of stormwater. Discussion also addressed availability of recycled water from Palo Alto Regional Water Quality Control Plant and the possibility of installation of a recycled water pipeline as part of a current San Francisquito Creek Joint Powers Authority project. Concern was expressed over declining groundwater levels in recent years and what that portends for the future with increased pumping. Regional groundwater management also was discussed, including an upcoming assessment by San Mateo County of the San Mateo Plain subbasin. Some questions addressed staffing and funding to implement the GWMP, when the Gloria Way Well will be completed, plans for storage in the City, steps for development of a numerical model, and implementation for subsidence monitoring.

The meeting concluded with a description of next steps. Comments on the draft GWMP are due by July 28, 2015. Subsequently, in August a final GWMP will be produced that incorporates questions and comments. A duly noticed and publicized public hearing will be held before the City Council in September, regarding whether or not the GWMP should be adopted. Everyone was encouraged to check the City website for announcements and documents.

Comment Letters and Emails

Comments on the Draft Groundwater Management Plan (GWMP) were requested at the third workshop and with the website announcement of the Draft GWMP. Comments received at the workshop are summarized briefly in the *Summary of GWMP Workshop-July 14, 2015*, which is included in this appendix. Written comment letters and emails were received from the stakeholders and agencies listed below. All comments were reviewed and addressed as appropriate in the GWMP.

- Ken Bencala
- Peter Drekmeier, Tuolumne River Trust
- Jerry Hearn
- Steven Inn, Alameda County Water District
- Trish Mulvey
- Manuel Nathenson, O'Connor Tract Co-Operative Water Co.
- Tim Parker, Parker Groundwater

Below are comments on two of the Draft Basin Management Actions.

1. BMA : Encourage evaluation of the creek as a source of recharge.

The text discusses (page 61, Section 5.3.2.)

“For projects involving San Francisquito Creek, encourage evaluation of the creek as an important source of groundwater recharge; promote and protect recharge.”

Also of importance to such an evaluation would be consideration of the value of protecting natural flows in SFC. The goal of studying recharge in SFC likely is not solely to maximize recharge. Natural flows in SFC provide ecosystems services and esthetic benefit to the creek and riparian areas as well as presumably to downstream marshes and the Bay.

Note a typo on page 61, Section 5.3.2. The reference to “Section 10” is to “Section 3.10”.

2. BMA: Seek funding for a groundwater flow model.

The text lists (page 60, Section 5.3.1) the action:

“Seek funding for development of a robust, calibrated, and validated predictive groundwater flow model to evaluate potential impacts of pumping and management scenarios. ” which is to be done in the context of (page 59, Section 5.3) “conjunctive use, which is the coordinated management of surface and groundwater supplies to increase the yield of both supplies and to enhance water reliability.”

The notion ‘to increase the yield’ seems to hold a presumptive implication that consumption of water is the only goal. The overall the goal of the Basin Management Actions might not solely be “Groundwater Sustainability”, but rather a consideration of the health and benefit of the integrated surface and groundwater system.

To that end, the development of a groundwater flow model would be best designed from the beginning to include a SFC flow model component.

As an example, a basin groundwater flow model that included a SFC flow model could be used to evaluate the potential of a worst case scenario (low creek flow with high pumping) resulting in decreasing creek flow or even hydraulic disconnection of the creek from the aquifer. The negative outcomes could result from either effectively taking water from the creek or even from setting up a condition in which basin wide drawdown keeps water from flowing into the creek.

Note typos on page 50, Section 4.1.

“Initiation of groundwater pumping by the City (e.g., at Gloria Way Well) will result in a decrease of local groundwater levels with stabilization at a lower levels (see Todd, 2012 and ESA, 2013).”
Is ‘ a lower levels ‘ what you want here? Is the meaning clearer without the ‘a’ or without the final ‘s’ in ‘levels’? Or is a bit more explanation needed?

“...preliminary groundwater flow modeling of the Gloria Way Well pumping at 300 gpm for 5 years could lower groundwater levels...”

I presume you mean “ ...modeling of the Gloria Way Well indicates / or demonstrates / suggests / predicts/ ... pumping at ...could lower ... levels”.

In the spirit of the GWMP comments I sent yesterday I am passing along 2 items that are relevant to the matter of SFC GW-SW Connectivity.

These items are both about scales larger than the San Francisquito Cone Sub Basin and the San Francisquito Creek watershed. (And I recognize that East Palo Alto is not responsible for the health and hydrology of the entire creek.) Nevertheless, the ideas are important to the evolving appreciation that ground water resources do not exist in the isolation of any individual well.

The first attached file is a New York Times article about 'overcounting' water resources when groundwater pumping reduces river flow. The specifics in the article are about the Colorado River; so the scale is huge - but the points made are relevant to collaborative management of our local groundwater resource.

The second attached file is a Notice from the USEPA of a definitive review of the science of stream-wetland connectivity. If you read 'wetland' broadly as 'shallow subsurface connection' then the findings of the review definitely speak to SFC. -- If nothing else, if you download the full report you'll see several great graphics illustrating GW-SW connectivity.

Take care - I hope these are of interest to you,

Ken

Hi Vivian and Iris,

Thanks for a good workshop last week.

I just had a few thoughts on the plan.

- 1) Recharge from irrigation water takes place mostly above the upper groundwater table, so we shouldn't confuse it with recharge of the lower table that EPA will be pumping from.
- 2) It would be helpful to have major streets on the maps (both cross section and aerial) to give a better sense of which areas percolate into the lower groundwater table vs. upper.
- 3) The weblink for Acterra didn't work when I checked it a couple of weeks ago.

Thanks for your good work!

-Peter



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East Palo Alto Draft Groundwater Management Plan Comments

Jerry Hearn July 14, 2015

1. **Figure 1** (page 6) – The text references the Santa Clara Valley Groundwater Basin. Figure 1 should correspond to the text, instead of outlining the “Santa Clara Groundwater Basin” which can be confused with the Santa Clara Subbasin.
2. 1.5. (page 9) **Agency Collaboration** – The text references collaboration with other agencies within the Santa Clara Subbasin, but does not mention Stanford University which also is located on the San Francisquito Cone.
3. 2.2. (page 15) **Urban Water Management Plans** - I believe that Stanford has some wells, either active or currently inactive, that also sit on the San Francisquito Cone and, if so, should be mentioned in this section. The plan mentions later (page 30) pumping of groundwater by the university in the 1960s.
4. 2.4.3 (page 19) **San Mateo County Department of Public Works** – The San Francisquito Creek Watershed Council is mentioned as an Associate Member of the JPA. The Council is no longer in existence, so that statement needs to reflect this.
5. 3.2.1 (page 23) **San Francisco Bay** – The first sentence seems to be missing some words....
6. 3.2.2. (page 24) **San Francisquito Creek** – The comments about development in the first paragraph leave out the Town of Woodside, a very important component to the groundwater concerns of the watershed. It should also be mentioned. In the second paragraph, I would substitute “reach” for “channel” as the way it is worded gives the impression that there is more than one channel in the creek which is not the case. In the fourth paragraph, second sentence, I would remove the word “riparian” as it doesn’t seem to make sense in the context. In the final paragraph, I think it is more accurate to list the San Mateo County Flood Control District as the party to the JPA, rather than San Mateo County as a whole.
7. 3.2.2 (page 25) **San Francisquito Creek** (continued) – There is some confusion here with the JPA projects. The one being described in the text of the initial paragraph and the bullet points is not SAFER Bay, but rather the bay-101 project. I think the correct title is Flood Damage Reduction, Ecosystem Restoration and Recreation project. I would advise you to check with Len Materman about this section to insure for accuracy as the third paragraph on the page (starting with “As of February 2015...”) seems to be describing the SAFER Bay project progress.
8. 3.3 (page 25) **Geology and Aquifers** - The initial sentence might read better as:

“The City of East Palo Alto overlies a portion of the San Francisquito Cone Subbasin, an area that overlaps the San Mateo Plain and Santa Clara Subbasins of the Santa Clara Valley Groundwater Basin”.

9. 3.3 (page 25) **Geology and Aquifers** – In earlier technical descriptions references were cited. I think this would be useful for those who would want to know more about the underlying geology, and would be consistent with the overall approach of the plan.

10. 3.3.1. (page 26) **Aquifer Zones** – In the first line of the “Shallow Aquifer Zone” paragraph, “gravel filled” might be better to be hyphenated (i.e. gravel-filled) to make for easier reading and understanding.

11. 3.3.1 (page 26) **Bay Mud Aquitard** – the text implies that in Figure 8 the reader will be able to see demarcated the unconfined and confined aquifer zones. There is no reference to this on the figure. This causes confusion. It would be very interested to actually see on the map where the potential for recharge lies.

12. 3.4. (page 29) **Aquifer Properties** – I believe it is the measurement or estimation of aquifer properties that is used for quantification, not the properties themselves as is implied in the first sentence of this section.

13. 3.5 (page 29) **Groundwater Levels and Flow** – The final sentence on this page references the “San Francisquito Subbasin”. Is this synonymous with the San Francisquito Cone? If so, this labeling should remain consistent throughout the plan to avoid confusion.

14. 3.5 (page 30) **Groundwater Levels and Flow** – The initial sentence in the third paragraph on this page uses the term “sub-Basins”. The three wells that are being referenced are, to my knowledge, all in the same “subbasin” the San Francisquito Cone. Am I correct with this?

15. (page 31 **Figure 9** – I think the labeling on the vertical axis (feet mean sea level) needs some attention or it is a term that I have never heard before.....

16. 3.6 (page 33) **Potential for Subsidence** – Suggestion: change “determine its extent” to “determine the extent of the problem”. The way it reads implies that the agencies are measuring the extent of the Santa Clara Valley, not of the subsidence issue. In the following sentence, “r” should be replaced by “rate” I believe. Also, is the instrument an “extensometer” or and “extensiometer”? There are two different spellings in this paragraph. I am not familiar with the instrument.

17. (page 38) **Figure 12** – Though the text on page 37 refers the reader to this figure to located the Pad D potential well site, it is not demarcated on the figure 12 map.

18. (page 43) **Figure 13** – This took some doing to figure out, since the title is a bit misleading. What it really shows is an overlay of water purveyors (and assumed rates of

percolation) over the Cone and the bay mud demarcation. I spent some time trying to figure out how the “recharge areas” were being designated. In working through the text, I discovered that the general recharge area is west of the bay mud demarcation. It would be helpful, maybe, to hatch that area to make it visual and not count on a reading of the text to make it clear.

19. 3.10.2 (page 43) **Percolation from Urban Uses** – If recent memory serves me, the highest usage figures were from Portola Valley and Woodside (Cal Water-Bear Gulch District) and they were greater than that of Purissima Hills. Might be worth checking for it would change the assumed recharge rates. Also, if geography serves me right, the Purissima Hills Water District may only serve a very small portion of customers within the San Francisquito Creek watershed when compared to Woodside and Portola Valley usage.

20. 3.11.1 (page 47) **Historical Conditions** – I think the second sentence on this page needs some attention as it didn’t make sense to me. (However, if water levels in the deep aquifer fall below sea level and downward and landward hydraulic gradients could result in saline water intrusion via the conduits.) I understand the idea, but something seems to be missing.

21. 3.11.15 (page 48) **Iron and Manganese** – This section treats two contaminants at once, so it is important to label whether it is iron or manganese concentrations before each measurement for clarity.

22. 3.11.6 (page 48/49) **Contamination Sites** – Some of these sites are located quite near some abandoned wells. Would increased pumping at either of the proposed sites potentially cause changes to the underground flow patterns that would draw water from the contaminated sites down through the abandoned wells into the lower aquifers and contaminate the groundwater? I don’t know enough about hydrology and geology to answer that question, but it should be addressed.

23. 4.2 (page 51/52) **Avoid Subsidence** – In the first sentence, the 7500 AFY figure was for the entire San Francisquito Cone. That should be made clear. This is very relevant to the section as most of the pumping that caused the pre-1970 subsidence occurred in jurisdictions outside East Palo Alto. Yet the city, due to its proximity to the bay and creek, is most exposed to the flooding potential of overdrafting of the cone. This calls not only for management at the city level, but very close interaction with the other purveyors and extractors.

24. 4.4 (page 53/54) **Integrate Management of Groundwater and Surface Water** – This is very picky, but there should be no semicolon between “supply and maintaining in the first sentence. In the first sentence of the second paragraph of this section “plain” after San Mateo should be capitalized.

25. 4.5 (page 54) **Improve Understanding of the Groundwater System** – A couple of suggestions as to form:

- under the first bullet, data is collected or gathered, not “created” (I hope !)

- under the third bullet, “conducting studies” reads and sounds better

26. 4.6 (page 55) **Promote Regional Groundwater Management** - This is very key to the future of maintaining reliable and sustainable water supplies in the area, and throughout the world, in fact. The latest news about the critical state of the world’s major aquifers, including the Central Valley of California, make this abundantly clear!

Unfortunately, I have run out of time to closely review the text of the remaining part of the plan and probably won’t be able to get back to it in the near future. I assume that the management actions align with the program as set out in the first part of the plan. Thank you for letting me comment on your draft. I hope my comments have proven to be useful.

Jerry Hearn



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July 23, 2015

Ms. Vivian Ma
Associate Civil Engineer
City of East Palo Alto
Community and Economic Development Department
1960 Tate Street
East Palo Alto, CA 94303

RECEIVED
JUL 27 2015
Community Development Department
City of East Palo Alto

Dear Ms. Ma:

Subject: City of East Palo Alto Draft Groundwater Management Plan

Alameda County Water District (ACWD) congratulates the City of East Palo Alto (City) for completing a draft Groundwater Management Plan (GWMP), reaching an important milestone towards sustainable groundwater management within the City and the San Francisquito Cone. ACWD appreciates the City's solicitation of comments from various agencies and other stakeholders throughout the process, including this opportunity to provide written comments on the draft GWMP.

ACWD's interest in the City's plans for groundwater development arises from our management of the Niles Cone Groundwater Basin (Niles Cone), a neighboring basin which may hydraulically interconnect with the San Francisquito Sub-basin and other parts of the San Mateo Plain (see attached California Department of Water Resources figure, which shows the demarcation of local groundwater basins from a geologic perspective). Groundwater from the Niles Cone accounts for approximately 40 percent of the water supply distributed to a population of 344,000 in the cities of Fremont, Newark, and Union City. Local runoff along with imported water is percolated into the Niles Cone through recharge in Alameda Creek itself and through recharge ponds in the Quarry Lakes Recreational Area and adjacent areas. Managed aquifer recharge, especially during dry periods, is critical to avoid overdraft and consequential saltwater intrusion in the Niles Cone.

ACWD seeks a cooperative relationship with the City and any other agency managing groundwater in the San Francisquito Cone and the San Mateo Plain. ACWD hopes that such cooperation will serve a common interest: that we may all use groundwater within the safe yield of our respective basins without inducing undue impacts on each other's basins and operations. Accordingly, ACWD appreciates that the draft GWMP includes a preliminary water balance and

interim operating criteria for the San Francisquito Cone, and a plan to refine the analysis in the future through additional data collection and numerical modeling. The following comments are intended to serve this objective.

1. Estimate Capacity of the San Francisquito Cone to Sustain Pumping During Dry Periods

The draft GWMP's preliminary estimates suggest that the natural replenishment of the San Francisquito Cone in a typical year may be sufficient to support increased pumping. However, the observed recent decline in measured groundwater levels suggests that natural recharge during dry years may already be exceeded by current rates of pumping and other outflows, raising the question as to how far groundwater levels would drop in a dry year or succession of dry years with future increased groundwater pumping. Whether or not future groundwater levels would drop below the critical minimum (at which subsidence or saltwater intrusion would be incipient) would depend on: dry-period rates of pumping and recharge, the volume of useable groundwater storage (above the critical minimum groundwater head) at the start of the dry period, and the duration of the dry period.

Storage would be utilized, and groundwater levels would fall, when recharge rates are lower than pumping and other outflows, as would likely be the case during dry months or years. Therefore, the final GWMP should more explicitly recognize the transient nature of recharge (and safe yield), and should recommend a transient predictive quantitative (modeling) analysis in which recharge is lower and pumping greater in dry periods. The amount of water yielded from storage per drop in indicator well levels should be realistically represented in the analysis. The modeling analysis should simulate wet and dry cycles based on historical patterns, adjusted as appropriate toward longer and more frequent droughts due to climate change.

2. Consider Boundary Conditions with the Niles Cone and Potential Inter-basin Flow

The potential for horizontal groundwater flow (transmissivity) between the San Francisquito Cone and the Niles Cone is not well known and merits further evaluation. If aquifers of the two basins join or hydraulically communicate, inter-basin flow could be significant enough to warrant consideration in basin water budgets. It is our hope that the City's operating criteria to protect the San Francisquito Cone will also preclude adverse impacts on the Niles Cone. However, to verify, ACWD would request that the GWMP specify proper representation of possible inter-basin boundary flows in a future modeling analysis, and coordination with ACWD.

3. Consider Alternative Water Supplies for Recharge or Direct Use in Dry Years

ACWD practices managed aquifer recharge in both wet and dry periods. In wet periods, the surface water used for managed aquifer recharge is mostly natural Alameda Creek Watershed runoff, whereas in dry periods the amount of imports used for managed aquifer recharge is significantly increased. ACWD has learned through many decades of experience that

City of East Palo Alto

Page 3

July 23, 2015

supplemental supplies are needed to replenish the Niles Cone during dry periods, because the useable amount of stored groundwater, even when the aquifers are filled to capacity in wet periods, is not enough to sustain pumping demand in dry periods without risking saltwater intrusion. Accordingly, ACWD has secured an external water banking agreement in conjunction with its State Water Project contract to enable operation of the groundwater basin in "put and take" mode during dry periods.

To the City's credit, the draft GWMP pledges to explore opportunities for managed aquifer recharge to enhance natural recharge of the San Francisquito Cone, perhaps with local runoff or creek flow during wet periods. ACWD would request that the GWMP emphasize the need to procure a supplemental dry year surface water source for managed aquifer recharge (or direct use in-lieu of groundwater pumping) if numerical modeling or other analysis were to indicate that critically low groundwater heads or adverse impacts (including impacts on neighboring groundwater basins) could otherwise result.

Again, thank you for the opportunity to comment on the draft Groundwater Management Plan. If you have any questions, please contact Michelle Myers, Groundwater Resources Manager, at (510) 668-4454.

Sincerely,



Steven D. Inn
Manager of Water Resources

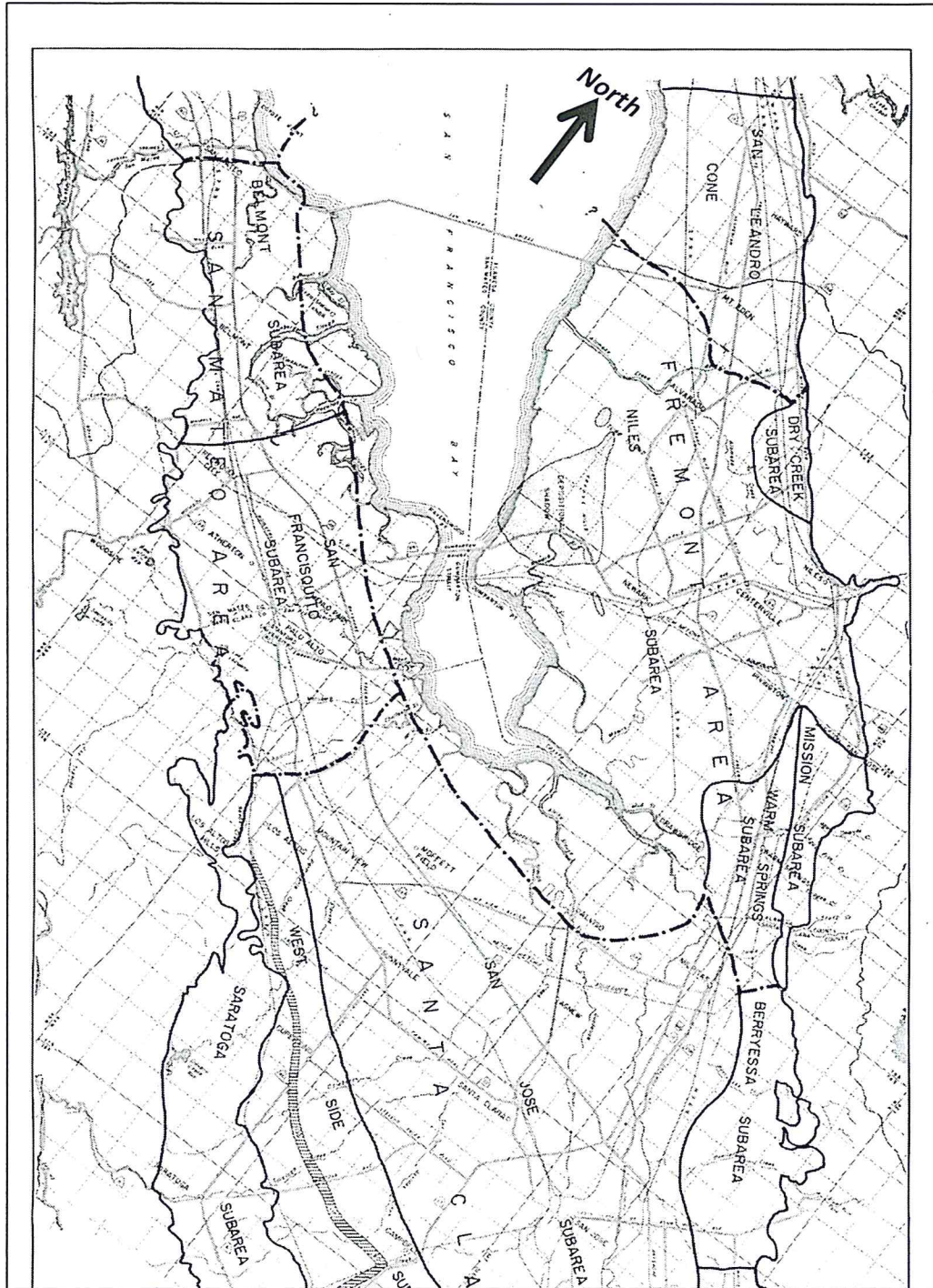
mh/mh

Enclosure

By E-mail

cc: Michelle Myers, ACWD
Mike Halliwell, ACWD

PHYSIOGRAPHIC SUBAREAS



Source: Calif. Dept. of Water Resources Bulletin 118-1, Evaluation of Groundwater Resources, South Bay, Appendix A: Geology, August, 1967

From: trish mulvey [<mailto:mulvey@ix.netcom.com>]
Sent: Thursday, July 16, 2015 3:18 PM
To: 'Jerry Hearn'; Vivian Ma
Subject: RE: EPA draft GWMP comments

Hugs & thanks, Jerry, for the exceptional attention to detail and wonderfully constructive suggestions.

Vivian, I really want to emphasize the importance of thorough review of all the places where names like basin/subbasin/San Francisquito Cone are used.

This undertaking has its own fair share of complexity, so we need to be really careful about correct explanations of the groundwater location being referenced.

trish

Comments on Draft Groundwater Management Plan

Some comments are for errors whereas others are more thinking about consequences. The latter comments don't require changes or a response, but they are things you should be thinking about.

p. 30 "A slight decline in groundwater elevations has been observed over the past several years, likely in response to the current drought and reduced sub-basin recharge." The decline statement is OK, but we don't really know if someone has started pumping more water than normal. O'Connor Water is pumping less than normal. The change is about 10 ft in 3 years, and I think that is more than "slight." I think you should give a value in the report as many people are not good at estimating values from a graph.

Fig. 9 The last entry on the x-axis says Jan-08 and should be Jan-15.

O'Connor Water measured a water level of 35.2 ft below ground level 3 hours after the pump was off on June 30, 2015. You might want to add this data point to the graph. It appears that you have a value for elevation of the O'Connor wells as your graph is in feet above sea level.

I have long wondered why the data from the Hale Street well have so much variation. You gave a URL in the Appendix for water level data from the Santa Clara Valley Water District, and I downloaded data from the Hale Street well and three nearby wells that I think are in Eleanor Pardee Park and vicinity (see attached plots in Excel spread sheet). The three wells show almost no seasonal signal whereas the Hale well has very strong seasonal variation. The three wells show declines starting in 2012. Data for Hale are missing for 2012, but there is a strong decline starting in 2013. All four wells seem to be showing some level of recovery in 2015. One possibility for the seasonal behavior in the Hale well is that it is responding to increased summer pumping by O'Connor. We are not that far from Hale, and there was a response when they ran their flow test in Dec. 2010. Proximity to the creek could also be a factor for the Hale well.

p. 33 "The SCVWD has established a tolerable continuing rate of subsidence of 0.01 feet per year." I found their 2013 Annual Groundwater Report, and this really is their goal. They have a model that mandates that water levels can be no deeper than some value to prevent subsidence from exceeding this figure.

From Todd Engineers, 2012, Gloria Way Water Well Production Alternatives Analysis & East Palo Alto Security Feasibility Study. The pump test run on the Gloria Way well in 2003 was 300 gpm with a drawdown after 1000 minutes of 125 ft. For the well producing continuously at 300 gpm, the model drawdown at the well is 75 ft after one year. The water level reduction at the shoreline is 10 ft after one year of pumping.

If the well is produced at 300 gpm, the deep drawdown seems likely to produce measurable subsidence. The water level reduction at the shoreline would seem to violate the assumed measure on p. 53 of "• Maintenance of groundwater levels along the Bayshore above mean sea level." This seems to indicate that the average well flow will most likely have to be a fraction of the maximum flow running 24 hours a day.

p. 37 Pad D is mentioned as appearing on Fig. 12, but it isn't on the map. It is shown in fig. C1 in Appendix C.

p. 39 Menlo Park's test boring is mentioned as appearing on Fig. 12, but it isn't on the map. It is shown in fig. C1 in Appendix C.

p. 47 "Groundwater from wells operated by the O'Connor Tract Cooperative Water Company in Menlo Park meets all drinking water quality standards without the need for additional treatment." Not true. O'Connor water meets all standards except for manganese where it exceeds the secondary standard.

p. 48 "Some of the nearby PPMWC and O'Connor Tract wells also have manganese concentrations above the SMCL." Correct for O'Connor. I do not know the values for PPMWC.

p. 48 The water from the Pad D well looks much better than the water from Gloria Way.

p. 50 "Initiation of groundwater pumping by the City (e.g., at Gloria Way Well) will result in a decrease of local groundwater levels with stabilization at a lower levels (see Todd, 2012 and ESA, 2013). For perspective, preliminary groundwater flow modeling of the Gloria Way Well pumping at 300 gpm for 5 years could lower groundwater levels by 35 feet at distances of about 500 feet, with drawdown impacts diminishing with increased distance from the well." Yes, this is going to be a problem for meeting the water level and subsidence standards being committed to in the Plan. It is essential that water level data be obtained from the Palo Park Mutual Water Company wells before and after there is pumping from the Gloria Way well.

P. 52 "• Planned future pumping is significantly less than pre-1970s amounts and groundwater levels declines are not anticipated to approach pre-1970s levels." I agree that this is true for the general area, but 125-ft of drawdown at the Gloria Way well will bring EPA pretty close to pre-1970s levels near the well. At least locally, there would be a significant removal of water from the deep aquifer with some zone of dewatering.

p. 53 "•Maintenance of groundwater levels along the Bayshore above mean sea level." Capitalizing Bayshore here is confusing. I think you mean along the shore of the bay. Bayshore capitalized is the name of the freeway.

p. 63 "The USGS provided a proposed scope of work for a regional subsidence monitoring program for the City and nearby agencies; this scope is included in Appendix C." I cannot find this scope of work in Appendix C.

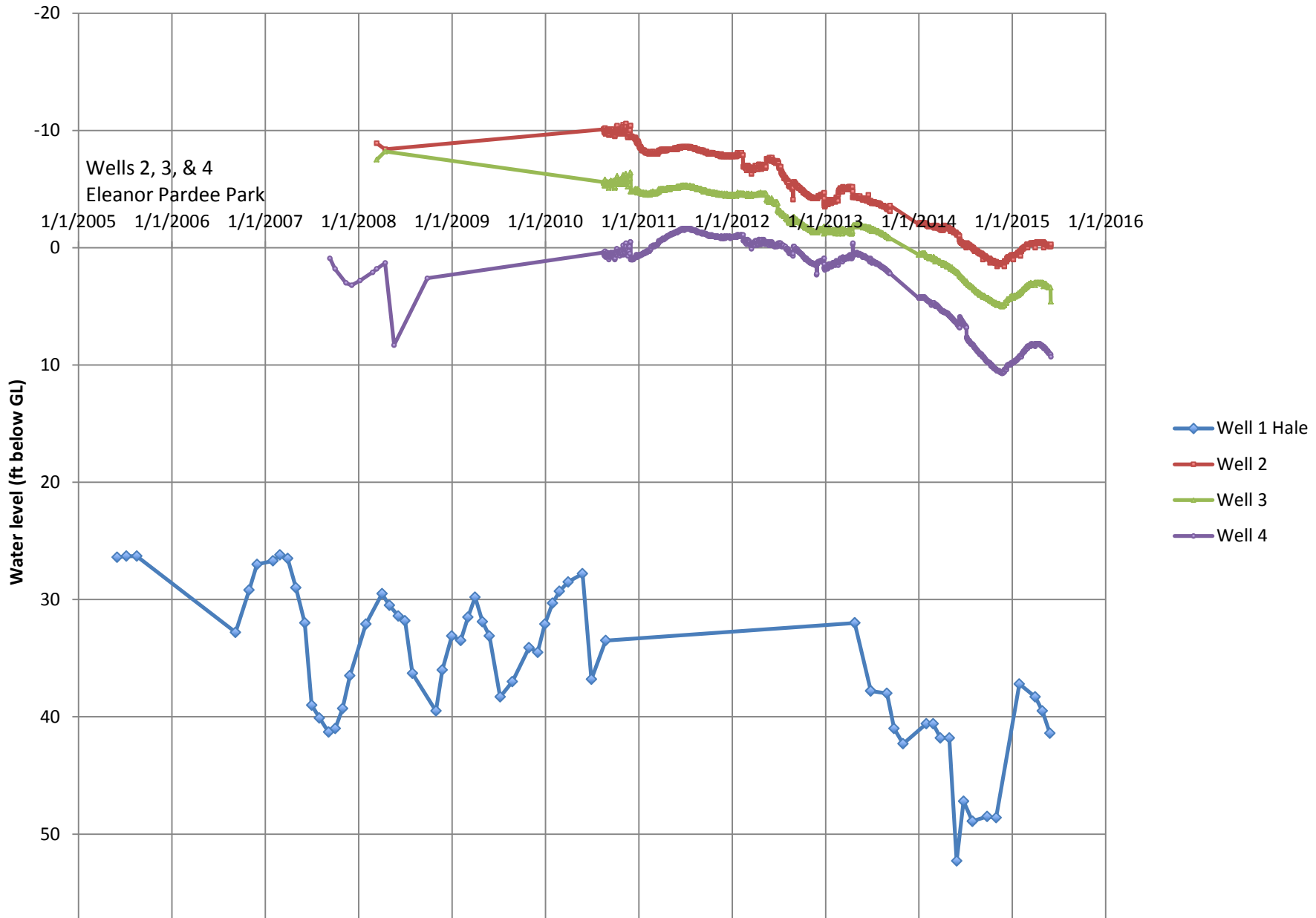
Appendix C p. 4 "Active water supply production wells will be sampled for groundwater quality on an annual basis, as set forth in Title 22 of the California Code of Regulations and in compliance with federal and state regulations." Water wells are not required to sample for groundwater quality on an annual basis except for nitrate. The normal

schedule for a major ion and metals tests is once every 3 years. O'Connor Water does sample for major ion, metals, and selected hydrocarbons every year to provide a good water quality report every year. Definitely would like Palo Alto Park Mutual Water Company to sample every year once production starts at the Gloria Way well. To get them to do that, the City of East Palo Alto might have to subsidize the cost of the analyses for them.

Appendix C p. 7 "O'Connor Tract Water Company (O'Connor) operates two active production wells at 381 Oak Court" Actually, they are at 211 Oak Court. We would prefer that you just say Oak Court in Menlo Park.

Appendix C Table C1 p. 2 Both O'Connor wells are located at 211 Oak Court. Well #2 was drilled in 1937. The 1963 well had to be plugged and abandoned because of sanding up. A new well was drilled in 1966 and is named well #1. The perforated intervals in well #2 are 175-207, 214-224, 243-275 ft. The well depth is now 304 ft.

Manuel Nathenson



From: Timothy K. Parker [<mailto:tim@pg-tim.com>]
Sent: Friday, June 26, 2015 11:55 AM
To: Vivian Ma
Cc: Timothy K Parker; Brewster, Bill@DWR; Chris Bonds; Erik Ekdahl
Subject: Re: City of East Palo Alto - Draft GWMP & Workshop #3

Hi Vivian:

I have only minor comments from a 5 minute skimming of the draft GMP (groundwater spelled as one word):

5.5.1 Relationships With State and Federal Agencies

- The section lists DWR and SWRCB, but I note that neither are on your email distribution - I have cc'd appropriate representative contacts at both agencies. DWR and SWRCB, while largely focused on drought and SGMA implementation issues, are still no doubt interested in GMP progress even in low and very low priority basins. Additionally, there may be opportunities for technical assistance and resources for the City in the future from these key two agencies involved in statewide groundwater management.

6.0 Implementation Plan

The implementation plan should include the following:

- Periodic GMP progress review and reporting - in my experience, annual review and progress reporting is useful in the first few year of the GMP program, going to five years eventually the periodic progress review and reporting is really important to keep stakeholders, leverage resources and opportunities, and for just plain pressure to perform.
- Periodic GMP review and update (understanding that this GMP may ultimately be replaced by a GSP, but until a GSP is prepared, the GMP remains in place - and in case there is no GSA or GSP, then this will be the only plan.) - the GMP should be reviewed and updated periodically to make changes where needed and for plan improvements as more information is collected and assimilated.
- Funding and Finance - there is no mention of funding, finance or cost in the implementation plan - leads the reader to believe that everything is already funded with money set aside. If this is the case, and the City is prepared to pay for and fund everything, then please ignore the comment. If that is not the case, it may be worth considering putting together a subsection in the Implementation Plan on finance/funding, identifying what is funded, where funding is needed and approximate costs, and possible options for funding.

Please do not hesitate to contact me if you have questions.

Best Regards, Tim Parker.

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APPENDIX C

Groundwater Monitoring

Program and Protocols

Appendix C
Groundwater Monitoring Plan
City of East Palo Alto

C1.0 INTRODUCTION

C1.1 Background

C1.2 Monitoring Objectives

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Table C1 Groundwater Monitoring Well Construction Information

Table C2 Land Subsidence Survey Benchmarks

Table C3 City Groundwater Sample Laboratory Analytes

Figure C1 Groundwater Monitoring Locations

Figure C2 Surface Water Monitoring Locations

Figure C3 Land Subsidence Monitoring Locations

Attachment C1 City Survey Benchmark Information

C1.0 INTRODUCTION

A key component of the City's Groundwater Management Plan (GWMP) is the establishment and implementation of a groundwater monitoring program. The monitoring program described herein is designed to track future changes in water levels, water quality, and storage in the groundwater subbasin. The monitoring program includes a network of groundwater monitoring wells, a measurement and sampling program, established monitoring protocols and frequency, and a data management, evaluation, and reporting program. Also included in this monitoring plan are surface water and land subsidence monitoring programs. Surface water monitoring includes tracking of meteorological data, streamflow in San Francisquito Creek, and tidal data (as needed). Subsidence monitoring includes benchmark surveying and in the future may include surveying of additional benchmarks and GPS stations within to the City.

C1.1 Background

In 2012, the City completed the *Gloria Way Water Well Production Alternatives Analysis and Water Security Feasibility Study* (Todd Engineers, 2012), which recommended that the City move forward with design of a manganese removal treatment system for the existing Gloria Way well and implement other projects related to groundwater production and groundwater management planning. In 2014, the City evaluated and tested a second potential well site, Pad D. Results of this test well investigation indicated that groundwater production at Pad D is feasible. This groundwater management plan and monitoring plan is another element of the City's groundwater production initiative.

The hydrogeology of the San Francisquito Creek Subbasin and City is described in the *Gloria Way Water Well Production Alternatives Analysis and Water Security Feasibility Study* and summarized in the *Groundwater Management Plan*. Most known production wells in the City and surrounding areas are completed in the confined aquifer zones deeper than 250 feet below ground surface. A thick, laterally-continuous fine-grained aquitard or confining layer, deposited when the area was below sea level, overlies the deep aquifer zone. This confining layer underlies the entire City and is thickest along the margins of San Francisco Bay (Todd, 2012).

The City's proximity to San Francisco Bay presents a risk of saline water intrusion and groundwater quality degradation if groundwater pumping results in excessive drawdown that reverses the natural groundwater flow direction toward the Bay. Land subsidence also can occur as a result of excessive drawdown. The amount of groundwater that can be produced safely without triggering adverse impacts is finite and depends on several variables including the rate and distribution of pumping, along with the rates of natural recharge. Because the City, neighboring municipalities, and private pumpers currently extract groundwater and plan to increase production, implementation of a groundwater monitoring program and development of a groundwater management plan for the City are necessary key steps in ensuring that groundwater production is sustainable.

C1.2 Monitoring Objectives

For the City of East Palo Alto, the primary objective of a groundwater monitoring program is to provide data and information to support groundwater management and operations of well systems such that

the groundwater supply is protected and production is sustainable. Data collected from the monitoring program will support the City and neighboring municipalities in evaluating current and future groundwater Sub-basin storage, flow, and quality conditions, identify areas of concern and data gaps, and support groundwater management activities.

The specific objectives of this monitoring program include:

- Monitoring of groundwater elevations and associated groundwater storage in the City and adjacent portions of the San Francisquito Cone and San Mateo Groundwater Sub-basins
- Monitoring of groundwater quality including the presence and potential migration of saline water from San Francisco Bay
- Monitoring of potential land subsidence induced by lowered groundwater elevations
- Monitoring of surface water flows in San Francisquito Creek

Monitoring of groundwater elevations in each groundwater basin in California is also required by the State. On November 4, 2009, the State Legislature amended the Water Code with SBx7-6, which mandates the California Statewide Groundwater Elevation Monitoring program (referred to as the CASGEM program) to track seasonal and long-term trends in groundwater elevations in California's groundwater basins. To achieve that goal, the amendment requires collaboration between local monitoring entities and the Department of Water Resources (DWR) to collect groundwater elevation data. More information on the CASGEM program and requirements can be found on the DWR website <http://www.water.ca.gov/groundwater/casgem/>. Wells in Santa Clara County including within the southeastern portion of the San Francisquito groundwater Sub-basin are monitored by the Santa Clara Valley Water District as a part of the CASGEM for the Santa Clara Groundwater Basin. Currently neither the County of San Mateo nor any of the municipalities in the southern San Mateo Plain (northern San Francisquito groundwater Sub-basin) conduct routine groundwater monitoring. Implementation of a CASGEM-compliant groundwater monitoring program, along with groundwater management, allows the City to become eligible for State Local Groundwater Assistance grants and other State funding.

California's recently-enacted Sustainable Groundwater Management Act (SGMA) requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in medium- and high-priority groundwater basins and adopt locally-based groundwater sustainability plans (GSP). While the San Mateo Plain is deemed very-low priority and compliance with SGMA is not required, this GWMP and Monitoring Plan for East Palo Alto may serve as interim Plans that can be modified in the future to include other areas of the San Mateo Plain and prepare a GSP in accordance with the SGMA.

The City plans to implement groundwater monitoring and management activities on its own, focused on its jurisdiction. However, the City recognizes that surface water and groundwater monitoring are regional issues, and desires to conduct groundwater monitoring and management in cooperation and conjunction with neighboring water companies, cities, and other agencies. Given the current groundwater production by nearby mutual water companies, planned future groundwater production by neighboring municipalities, and the extent and connectivity of the San Francisquito groundwater Sub-basin (which includes portions of the cities of Palo Alto, Menlo Park, and Redwood City), the

monitoring program should ideally include basin-wide groundwater monitoring of wells both within East Palo Alto and in neighboring cities. The risks of overdraft and of saline water intrusion or subsidence, depletion of groundwater storage and surface water flows, and other potential impacts are common to each municipality; therefore if possible each City should participate in the monitoring program.

As a part of this monitoring plan, the City intends to collate and evaluate groundwater, surface water, and land subsidence monitoring information currently collected by other public agencies and private well owners within and adjacent to the City. In particular, groundwater elevation, groundwater quality, and land elevation data collected by well owners, the Santa Clara Valley Water District (SCVWD) and DWR, and land elevation and San Francisquito Creek stage and flow data measured by the United States Geologic Survey (USGS) will be routinely reviewed as a component of this Plan.

This Plan is a first step in Groundwater Monitoring of the San Mateo Plain and San Francisquito Groundwater Sub-basins. Additional coordination, regional management, and regional monitoring, potentially in accordance with a new regional monitoring plan, may be conducted in the near future in conjunction with other stakeholders and agencies.

C1.3 Monitoring Program Components

The groundwater monitoring program includes the following components:

- Monitoring and maintenance of wells
- Potential installation and monitoring of new wells
- Measurement of depth to water and calculation of groundwater elevations in wells
- Measurement of water quality field parameters during pumping or purging
- Collection and laboratory analysis of water quality samples for a suite of inorganic analytes
- Measurement and recording of flow rates and total volumes pumped from production wells
- Compilation of meteorological data measured by NOAA and tidal data as needed
- Compilation of San Francisquito Creek flow rates measured by USGS
- Installation and maintenance of land subsidence monitoring stations
- Collection of land subsidence monitoring data
- Collation and management of groundwater, surface water, and land subsidence data
- Analysis and evaluation of monitoring results
- Preparation of Annual groundwater monitoring reports

These specific components fall into four general categories:

Groundwater Elevation Monitoring

Monitoring of groundwater levels is fundamental to determine groundwater hydraulic heads above (or below) sea level, and actual trends in groundwater storage in the Sub-basin over time. Water levels will be measured frequently at an established schedule (as discussed below) to evaluate seasonal and long-term fluctuations in groundwater elevations. Water levels will be measured in both monitoring and

production wells. Ground surface elevations and top of casing elevations for each well will be surveyed by a licensed land surveyor to provide actual groundwater elevations from depth measurements.

Groundwater Quality Monitoring

Groundwater quality sampling will be performed to establish the current distribution and track future water quality trends of selected chemicals of concern, including total dissolved solids (TDS), bromide, and chloride, indicators of saline water intrusion from the Bay, and iron and manganese, which are known to exceed secondary drinking water standards in wells in the City. Active City water supply production wells will be sampled regularly for groundwater quality, as set forth in Title 22 of the California Code of Regulations and in compliance with federal and state regulations. These required analyses include testing of inorganic, organic, and radioactive chemicals of concern as well as key physical properties. The Gloria Way Well, along with other active City water supply wells in the area, are or will be required to perform this testing annually, while other water purveyors may conduct sampling on a less frequent basis in accordance with Title 22. All available water quality data will be integrated into the water quality monitoring program.

In addition to the municipal production wells, periodic groundwater quality sampling of monitoring wells in and adjacent to the City will be performed. Monitoring of some of these wells will be performed by other agencies or private parties, and the City will request monitoring results for other Agency wells and will include these data in the City's groundwater monitoring reports.

Surface Water Monitoring

Surface water data will be collected for use in future recharge and surface water-groundwater evaluations and modeling. Surface water monitoring will include collation and evaluation of hydrologic data measured at a nearby meteorological station, and streamflow in San Francisquito Creek as measured at the existing USGS Stream Gage.

Land Subsidence Monitoring

Dewatering of aquifers is a potential cause of land subsidence. In unconsolidated aquifer systems, groundwater is pumped from pore spaces between grains of sand and gravel. If the aquifer is composed partly of compressible clays and/or silt deposits, lowered water pressure can cause the clay and silt deposits to gradually compact, and the effects are seen as a lowering of the land surface.

The City will monitor land subsidence using a series of survey benchmarks within and adjacent to the City. The City also may work in collaboration with the United States Geologic Survey (USGS) in additional subsidence monitoring within the City.

Data Analysis and Reporting

In addition to data collection, data analysis and reporting will be a component of the monitoring program. The City intends to conduct routine compilation and evaluation of groundwater elevation, quality, surface water, and land subsidence data. Annual groundwater monitoring reports will document groundwater Sub-basin conditions and trends. In addition, the City will track and report production from its own wells and other wells, as provided by cooperating individuals and organizations.

C2.0 MONITORING FACILITIES AND LOCATIONS

This section describes the locations of the groundwater, surface water, and land subsidence monitoring stations, along with the characteristics of each monitoring facility or station. **Figures C1** through **C3** shows the locations and types of the existing monitoring stations included in the City’s monitoring program.

A key element of the monitoring program is collection of data from monitoring facilities both within and outside of the boundaries of the City of East Palo Alto. Monitoring of adjacent areas is recommended because the aquifer system beneath the City is contiguous with other areas of the Groundwater Sub-basin. Monitoring of City facilities will be coordinated with data collection at other monitoring and production wells, surface water monitoring stations, and land subsidence monitoring stations. The City has contacted other agency and private well owners, agencies monitoring surface water gages, and land subsidence stations to coordinate monitoring and facilitate future data sharing.

C2.1 Groundwater Monitoring and Production Wells

Groundwater monitoring for elevations and water quality will be performed using existing monitoring and production wells. Additional new monitoring wells may be installed in the future to augment the existing well network. Production rates from all City municipal wells also will be monitored. Instantaneous flow rates and total pumped volumes will be tracked via flow meters at the well heads.

There are numerous existing monitoring and production wells in and adjacent to the City. Available information from San Mateo County, Santa Clara Valley Water District (SCVWD), the California Department of Water Resources (DWR), and other sources was reviewed to identify existing wells suitable for monitoring. Because the primary water-bearing aquifer (“deep” or “principal” aquifer) occurs below the regional Bay Mud Aquitard (which is present from the ground surface to depths of around 150-250 feet below ground surface across the City), almost all of the wells proposed for monitoring are completed in the deep aquifer zone. **Figure C1** shows the locations of wells appropriate and accessible for monitoring within and adjacent to the City. **Table C1** summarizes available information including construction specifications for these wells.

C2.1.1 Monitoring Program Wells within the City

East Palo Alto, the Palo Alto Park Mutual Water Company, and several private parties routinely monitor wells in the City. East Palo Alto will obtain and evaluate monitoring data from its own wells, Water Company wells, and private monitoring wells as a part of the monitoring program.

City of East Palo Alto Wells

The City will monitor the **Gloria Way** well and the **Pad D** test well. These two wells are completed to depths appropriate for monitoring potential impacts to the productive deep aquifer zones. The Gloria Way Well produces groundwater from around 260 to 325 feet below ground surface (ft bgs). Other production wells in and near the City produce water from similar depths. The recently-installed Pad D

test well has multiple screened intervals between 170 and 525, and is suitable for monitoring composite water levels and groundwater quality in the deep aquifer zone.

Romic and 1990 Bay Road Wells

Several suitably-constructed monitoring wells within the City are owned by third parties, who have agreed to provide access and/or coordinate monitoring with the City. Deep aquifer monitoring wells exist at and adjacent to the Romic Environmental Technologies Corporation (Romic) at 2081 Bay Road, and the 1990 Bay Road (Rhone-Poulenc) remediation sites, near the margin of San Francisco Bay. In 2014, Romic installed a new “D-Zone” monitoring well south of their site. This new well (**RP-3D**), along with existing Romic D-Zone well **RP-16D**, are completed to total depths of 191 and 220 ft bgs, respectively, and are suitable for monitoring groundwater near the top of the deep aquifer zone beneath the regional Bay Mud aquitard. The 1990 Bay Road Site has one well, monitoring well **W-101**, suitable for monitoring the deep aquifer zone. Owners of the Romic and 1990 Bay Road Sites routinely sound and sample these monitoring wells and have agreed to provide groundwater elevation and groundwater quality data to the City for these wells.

Palo Alto Park Mutual Water Company Wells

The Palo Alto Park Mutual Water Company (PAPMWC) operates five active wells at 2190 Addison Avenue, and serves 650 connections in East Palo Alto. Wells **#2, #3, #5, #6, and #7** are completed to total depths of up to 521 ft bgs. PAPMWC routinely monitors these wells for water levels and groundwater quality, and prepares Annual Water Quality Monitoring Reports in accordance with State Water System requirements. On an ongoing basis, the City will obtain and evaluate PAPMWC’s monitoring data as a part of the monitoring program.

Private Domestic and Irrigation Wells

A monitoring component identified in the Gloria Way Well Joint Initial Study and Environmental Assessment (IS-EA) is groundwater elevation monitoring in private domestic and irrigation wells. Prior to project implementation, the City will identify all private domestic and irrigation wells within a 3,000 foot radius of the Gloria Way Well site and assess whether the private wells are in current use or abandoned. If a private well is used to supply water to a residence or business at the time the Gloria Way Well is scheduled for start-up, the City will offer the well owner the opportunity to participate in a voluntary private well monitoring program. At a minimum, the City will measure baseline groundwater levels in the private wells prior to the start of proposed pumping at Gloria Way Well, and then quarterly for two years. Several private wells were identified in the IS-EA, and the City is in the process of contact the well owners to arrange access for monitoring.

C2.1.2 Monitoring Program Wells Outside of the City

The cities of Palo Alto and Menlo Park each own several emergency water supply wells. O’Connor Tract Water Company in Menlo Park produces groundwater from two active wells. The SCVWD and DWR also monitor several well clusters in Palo Alto. Although East Palo Alto does not have the authority to monitor wells outside of the City, it will obtain and evaluate the neighboring city, Water Company, and agency monitoring data as a part of the monitoring program.

O'Connor Tract Water Company Wells

O'Connor Tract Water Company (O'Connor) operates two active production wells on Oak Court in Menlo Park, and serves approximately 307 AFY to about 340 connections in Menlo Park and East Palo Alto. O'Connor's two wells **No. 1** and **No. 2** are completed to total depths of 315 and 532 feet. O'Connor routinely monitors these wells for water levels and groundwater quality, and prepares Annual Water Quality Monitoring Reports in accordance with State Water System requirements. The City will obtain and evaluate O'Connor's well data as a part of the monitoring program.

City of Palo Alto Wells

The City of Palo Alto maintains eight emergency water supply wells south of East Palo Alto: **El Camino, Eleanor Pardee, Fernando, Hale, Library, Matadero, Peers, and Rinconada**. These eight emergency wells range are completed in the principal aquifer zone. Palo Alto currently does not routinely monitor these wells for levels and water quality, but may implement monitoring in the future. East Palo Alto will obtain and evaluate the Palo Alto's future monitoring data as a part of the monitoring program.

City of Menlo Park Wells

The City of Menlo Park intends to construct several emergency water supply wells. Menlo Park's Supplemental Emergency Water Supply Project calls for installation of one well at the **Corporation Yard**, with construction beginning after completion of the Environmental Review in 2015, and subsequent installation of two or three additional wells at five potential sites. It is anticipated that Menlo Park may conduct groundwater monitoring at the emergency wells. East Palo Alto will obtain and evaluate Menlo Park's monitoring data as a part of the monitoring program.

Santa Clara Valley Water District Wells

The Santa Clara Valley Water District routinely monitors several wells for groundwater elevations in Palo Alto, south and east of the City of East Palo Alto. This includes daily monitoring of a cluster of four nested wells at **Eleanor Park** (wells **05S03W36P001** through **P004**) ranging in depth from 200 to 930 feet. It also includes monthly monitoring of a cluster of three shallow nested wells **06S02W05F001** through **F003** located adjacent to Mayfield Slough and ranging in depth from 25 to 200 feet, monthly monitoring of the **New Hale Well 05S03W35G10** adjacent to San Francisquito Creek, and monthly monitoring of the **New Rinconada Well 06S03W1B2** in Palo Alto. Water level data for Santa Clara Valley Water District wells in Palo Alto may be accessed via the District website <https://gis.valleywater.org/GroundwaterElevations/>. The SCVWD also monitors groundwater quality in several wells in Palo Alto. Data from the SCVWD monitoring program will be integrated with the City's data analysis and reporting program.

Department of Water Resources Wells

The California Department of Water Resources (DWR) routinely monitors and collects data from the SCVWD for several wells for water levels in Palo Alto, including the Eleanor Park and Mayfield slough well clusters in Palo Alto. These wells are monitored by the SCVWD as a part of the CASGEM for the Santa Clara Groundwater Basin. DWR also maintains a database of historical groundwater quality data

in and around East Palo Alto. Water level and groundwater quality data for the DWR wells in Palo Alto may be accessed via the DWR website <http://www.water.ca.gov/waterdatalibrary/index.cfm>.

Other Agency and Private Wells

There are several other Agency and private wells in Menlo Park suitable for monitoring. These include the **USGS**, **St. Patricks**, and **Veterans** wells. These wells may be suitable for monitoring, and may be further evaluated as monitoring points in the future.

Potential New Monitoring Wells

The City and/or other agencies may install additional monitoring wells to supplement the existing well network. The City is currently pursuing grant funding for a monitoring/sentinel well installation project within the City. Future monitoring/sentinel wells will be sited and designed in order to improve spatial coverage of the monitoring network.

C2.2 Climate and Surface Water Stations

As a component of the groundwater monitoring program, selected surface water data collected by State and Federal agencies will be collated and evaluated. **Figure C2** shows the locations of surface water stations currently monitored by Federal Agencies. Surface water data, including precipitation and creek flows, are indicators of relative amounts of groundwater recharge over time and groundwater storage in the Sub-basin. These data may also be used in future water balance and groundwater modeling projects.

NOAA Climate Station

The National Oceanic and Atmospheric Administration (NOAA) maintains a climate station in Palo Alto. Station No. COOP: 046646 monitors daily precipitation using a Standard Rain Gage, and historical precipitation data are available for the period 1953 to present. Station data may be downloaded over a specific period of time either annually, monthly, or daily. Palo Alto climate data may be accessed via the NOAA website <http://www.ncdc.noaa.gov/cdo-web/datasets/ANNUAL/stations/COOP:046646/detail>.

NOAA Tidal Stations

San Francisco Bay tidal data represent the base level for local surface water and groundwater flows and are useful in evaluating groundwater level data and pumping test data from monitoring wells near the Bay. The National Oceanic and Atmospheric Administration/National Ocean Service (NOAA/NOS) maintains tide stations at two locations near East Palo Alto.

- The Redwood City station (No. 9414523) provides continuous water level data plus related meteorological data (wind, air temperature, water temperature, barometric pressure). The station was installed in August 1997 and is currently active.
- The Coyote Creek station (No. 9414575) is located near the mouth of Coyote Creek where it enters the bay northwest of Alviso. This station provides continuous water level data

Data from these stations can be accessed as needed at the NOAA Center for Operational Oceanographic Products and Services: <http://tidesandcurrents.noaa.gov>.

USGS Creek Station

The USGS maintains a stream gage on San Francisquito Creek in Palo Alto. Station No. 11164500 monitors daily stage and flow, and historical streamflow data are available for the period 1930 to present. Streamflow data may be downloaded over a specific period of time either annually, monthly, or daily. Streamflow data may be accessed via the USGS website <http://waterdata.usgs.gov/ca/nwis/uv?11164500>.

C2.3 Land Subsidence Stations

The City's land subsidence monitoring program will utilize existing land surface elevation benchmarks currently monitored by the City and other agencies, and potentially new benchmarks and a new continuously recording GPS Station. **Figure C3** shows the locations of the existing land subsidence monitoring stations and **Table C2** provides information for each survey benchmark. Currently, there are three sets of benchmarks available for land subsidence monitoring: City benchmarks; Santa Clara Valley Water District benchmarks; and NOAA National Geodesic Survey benchmarks.

City Benchmarks

In August 2014, the City installed five new survey benchmarks at locations distributed across the City (Figure C3). The survey benchmarks consist of stainless steel rods set in sleeve monuments in grade boxes. The City will routinely re-survey these benchmarks as a part of the land subsidence monitoring program.

NOAA National Geodesic Survey Benchmarks

NOAA's National Geodetic Survey (NGS) maintains, and provides access to the National Spatial Reference System (NSRS), a consistent coordinate system that defines latitude, longitude, height, scale, gravity, and orientation throughout the United States. The foundational elements of the NSRS include a series of survey benchmarks. Some of these benchmarks are located in and adjacent to the City (Figure C3). NGS benchmark data can be accessed and downloaded for all survey control stations maintained by NGS <http://www.ngs.noaa.gov/cgi-bin/datasheet.pr?Type=DATASHEETS>.

Santa Clara Valley Water District Benchmarks

In addition to monitoring groundwater elevations and groundwater quality, the SCVWD also monitors land subsidence across the Santa Clara Valley to document any change in the land surface elevation. The District conducts ongoing monitoring of 150 land surface elevation benchmarks, 2 extensometers, and monitors groundwater levels at 10 subsidence index wells to determine if land subsidence is occurring or is threatening to exceed established thresholds. SCVWD subsidence monitoring points adjacent to the City are shown in **Figure C3**. SCVWD benchmark data can be obtained by contacting the District Records and Library Unit at (408) 630-2838.

Potential New Benchmarks and GPS Station

Over the past year, the City has worked with the USGS to review the adequacy of existing land subsidence monitoring stations and identify potential improvements to the survey network. The City

intends to install new survey benchmarks, including a new benchmark at the Gloria Way Well, and may install a continuously-recording Global Positioning System (GPS) station and/or conduct InSar radar surveys to augment the existing benchmark network.

C3.0 RECOMMENDED MONITORING PROCEDURES

This section presents recommended general procedures for groundwater level, groundwater quality, surface water, and land subsidence monitoring. It describes:

- Suggested monitoring frequencies
- Field equipment needed to perform the monitoring
- Water level monitoring procedures
- Groundwater quality sample collection and handling procedures
- Recommended groundwater quality analyses
- Groundwater production rate and surface water monitoring procedures
- Land subsidence monitoring procedures

Prior to initiation of the monitoring program, a detailed Sampling and Analysis Plan (SAP) should be prepared. A SAP includes specific protocols and instructions for groundwater level, production, and water quality measurements (including specifications for monitoring and sampling equipment), land subsidence, and surface water monitoring. The SAP should be compliant with CASGEM-recommended monitoring procedures and include procedures for:

- Pre-field preparations
- Operations, maintenance, and calibration procedures for field instruments
- Water level monitoring
- Well purging and sampling (minimum purge volumes, field parameter stabilization guidelines prior to sample collection)
- Sample handling and preservation
- Equipment decontamination
- Laboratory analytical program
- QA/QC (blanks and sample duplicates)
- Land subsidence monitoring procedures
- Well pumping rate measurement and recording
- Record keeping and documentation (surface casing inspection form, purging and sampling form, and chain of custody form)

In addition, contractors and field technicians performing the monitoring should be properly trained and should follow the procedures listed in the SAP on a routine basis.

Some groundwater monitoring data to be evaluated as a part of the City's monitoring program will be collected by other agencies and private parties (SCVWD, DWR, NOAA, adjacent cities, municipal water

companies, and environmental cleanup parties). The City recognizes that these other entities may have established monitoring procedures that may differ from those used by the City. When possible, the City will review those procedures to confirm that the data quality is acceptable for the City's monitoring program.

C3.1 Monitoring Frequencies

Groundwater levels change seasonally and are responsive to variations in natural recharge and groundwater pumping. In order to characterize water level changes, water level monitoring should be conducted frequently; quarterly measurements would establish baseline trends and seasonal fluctuations. A proposed quarterly schedule would involve measurements during the first week of January, April, July, and October of each year. City production wells including the Gloria Way Well and a potential new well at Pad D may be fitted with pressure transducers and telemetry, providing continuous water level data in these wells.

Groundwater quality is less susceptible to significant seasonal variations or changes in groundwater pumping. Exceptions to this include areas near the Bay, where saline water intrusion could occur and early detection of subtle changes is crucial. Taking these factors into consideration, water quality monitoring of City production wells on an annual basis will be sufficient (albeit minimal) for the groundwater quality monitoring program. During initiation of the monitoring program, monitoring of groundwater quality could occur more frequently to establish baseline concentrations. At a minimum, water quality monitoring at the active production wells will continue at the frequencies required for compliance with state regulations for drinking water. A potential annual schedule would involve sampling during the first week of October of each year.

Inelastic land subsidence occurs relatively slowly. Surveys of benchmark monuments in the City will be performed annually upon initiation of City groundwater pumping. Other agencies (SCVWD, NOAA) conduct land subsidence benchmark surveying at different frequencies.

Surface water and climate monitoring by the USGS and NOAA is typically performed daily. Monthly and annual averages will be tracked as a part of the City's monitoring program.

C3.2 Monitoring Equipment

Field equipment needed to perform the water level and groundwater quality monitoring includes:

- Calibrated electric sounder or steel tape for water level measurements
- Portable or dedicated well pump (or equivalent purging device)
- Generator or other pump power supply
- Disposable Teflon bailer and cord
- Calibrated field conductivity/pH/temperature/turbidity meter(s)
- 0.45-micron membrane filter
- Appropriate sampling containers

- Self-adhesive labels of sufficient quantity for the planned sampling activity
- Chain-of-custody records
- Bubble wrap or appropriate packing material
- Blue ice or double bagged ice
- Sealable plastic bags
- Coolers
- Strapping/packaging tape
- Pen with indelible ink
- Truck-mounted polytank, 55-gallon drum or other appropriate container for temporary storage or purge water
- Field log book or electronic tablet for recording field procedures and measurements

The standard equipment for obtaining water level measurements should be a battery-powered sounder. The sounder must have firmly affixed or permanent marks on the sounder line at regular intervals (minimum interval of 0.01 foot). A graduated steel tape (with 0.01-foot graduations) can be used for water level measurements in conjunction with other methods, and when required, for a quality control check of other methods.

C3.3 Water Level Monitoring Procedures

The City staff or contractor performing the water level monitoring will examine the wellhead for signs of tampering or deterioration and note observations in the log book. Depth to groundwater will be measured using a calibrated electrical well sounder. The depth will be measured to the nearest 0.01 foot. Duplicate measurements of depth to water in each well should be made and recorded in the log book.

C3.4 Groundwater Quality Sample Collection and Handling Procedures

Groundwater quality sampling will be performed to establish the current distribution and track future water quality trends of selected chemicals of concern, including total dissolved solids (TDS) and chloride, indicators of saline water intrusion from the Bay, and iron and manganese, which are known to exceed secondary drinking water standards in wells in the City.

Active water supply production wells are sampled for groundwater quality on an annual basis, as set forth in Title 22 of the California Code of Regulations and in compliance with federal and state regulations. These required analyses include testing of inorganic, organic, and radioactive chemicals of concern as well as key physical properties. The Gloria Way Well, along with other active municipal water supply wells in the area, are required to perform this testing and these water quality data should become part of the water quality monitoring program.

In addition to these production wells, periodic groundwater quality sampling of monitoring wells in and adjacent to the City will be performed. Water quality analytes for the monitoring wells should at a minimum include TDS, chloride, and potentially other analytes as identified in the SAP.

Field measurement of electrical conductivity is recommended as a surrogate for TDS and indicator of potential saline water intrusion; frequent EC measurements could be made in the field to supplement samples for analysis at a laboratory. Field measurements of pH should accompany collection of groundwater quality samples.

Two types of groundwater quality samples will be collected: 1) samples from water supply wells equipped with dedicated pumps (e.g., Gloria Way Well), and 2) samples from monitoring wells without dedicated pumps (e.g., Pad D Well). Samples from water supply wells can be collected from the sampling port at the well head, after the well has operated for at least 5 minutes. Samples from monitoring wells should be collected after purging using a submersible pump of at least three well casing volumes and stabilization of field parameters. After purging, the samples should be collected using a disposable Teflon bailer.

Laboratory-supplied sample containers should be filled, sealed and stored in accordance with sample preservation requirements documented in the SAP. After sampling, field data should be recorded in the field book or tablet. Field information includes:

- Sampler's name
- Depth to water
- Total sounded depth of well
- Time and date of sample collection
- Station number and location
- Sample number
- Indicator parameter measurements (pH, temperature, electrical conductivity)
- Depth below water surface from which water sample is taken
- Current weather conditions
- General field conditions

The sampler should prepare a chain of custody form that lists the samples collected with dates and times. The form will also indicate the destination laboratory, the requested analyses, and the analytical turnaround time. The form will be used to track the custody of the samples from the time they are collected until their arrival at the destination laboratory.

C3.5 Groundwater Quality Analytical Program

The proposed water quality analytes for this City groundwater monitoring program have been selected to evaluate overall inorganic water quality and potential changes associated with saline water intrusion from San Francisco Bay. **Table C3** lists the water quality parameters proposed for the groundwater samples. The table also includes water quality comparison criteria (i.e., current California maximum contaminant levels or MCLs, public health goals or PHGs, and secondary MCLs). Also included are EPA laboratory analytical methods, recommended laboratory reporting limits, preservation, and holding times or limitations requirements.

The groundwater samples collected from the monitoring wells will be analyzed by a California Department of Public Health Certified Environmental Laboratory Accreditation Program (ELAP) analytical laboratory.

C3.5 Groundwater Production Rate Monitoring

Production rates from each City water supply well will be monitored using instantaneous and/or totalizing flow meters. Total production for each month will be recorded and archived in the monitoring database.

C3.6 Climate and Surface Water Monitoring Procedures

Climate and surface water data measured by NOAA and the USGS will be regularly downloaded from the respective agency websites (see Section C2) and archived in the monitoring database.

C3.7 Subsidence Monitoring Station Procedures

City elevation benchmarks will be re-surveyed annually by a State-licensed land surveyor. Surveyor reports will be generated documenting the survey results, and annual surveyed elevations will be archived in the monitoring database.

C4.0 COORDINATION WITH OTHER AGENCIES AND WELL OWNERS

The City intends to work closely with other agencies and well owners in the groundwater sub-basin. If other agencies intend to implement routine groundwater monitoring the City will coordinate measurement/sampling dates in order to generate contemporaneous data. In 2015, the City contacted consultants for the Romic and 1990 Bay Road sites, and they have agreed to provide access to deep monitoring wells at those sites and/or collect groundwater samples for the City.

C5.0 DATA MANAGEMENT, EVALUATION AND REPORTING

The City and participating agencies will incorporate in a database all groundwater level, quality, pumping, surface water, and land subsidence data collected for the groundwater monitoring program. A comprehensive Geographic Information System (GIS) database will allow evaluation of flow and quality trends in space and time. Coordinates and construction specifications for all wells will be incorporated in the database.

A licensed geologist or civil engineer knowledgeable in groundwater hydrogeology will evaluate the groundwater monitoring data on an ongoing basis. Water-level hydrographs and maps of groundwater elevations and water quality over time will be prepared. Quarterly groundwater elevation data will be reviewed routinely, and quarterly reports or memoranda will be prepared documenting the monitoring

work performed and results. Annual reports should also be prepared documenting the monitoring program results and trends in groundwater elevations and quality.

If the monitoring data indicate that significant adverse impacts (such as increasing salinity levels) are occurring, mitigation measures (potentially including reductions in pumping) could be evaluated as a part of the groundwater management plan.

C6.0 REFERENCES

Todd Engineers, 2012, Gloria Way Water Well Production Alternatives Analysis and Water Security Feasibility Study for the City of East Palo Alto, California, November.

Appendix C Tables

Table C1. Groundwater Monitoring Well Construction Information

Well Name/Number	Owner/Organization/ Monitoring Entity	Address	Date Installed	Northing/ Latitude	Easting/ Longitude	Surface Elevation (ft amsl)	Measuring Point Elevation (ft amsl)	Total Depth (feet)	Diameter (inches)	Screened Interval(s)	Dedicated Pump
Gloria Way	City of East Palo Alto	Gloria Way and Bay Road, EPA	Nov-1979	TBD after treatment system construction	TBD after treatment system construction	TBD after treatment system construction	TBD after treatment system construction	351	12.75	258-280, 318-323	Yes
Pad D	City of East Palo Alto	East Bayshore Road and Clarke Avenue, EPA	May-2014	1993255.02	6087139.59	NA	17.93	540	6	170-180, 320-345, 375-385, 435-460, 505-525	No
RP-16D	Romic Corporation/ISIS Environmental	2081 Bay Road, EPA	NA	NA	NA	9.5	8.99	191	4	164-184	NA
RP-3D	Romic Corporation/ISIS Environmental	2081 Bay Road, EPA	2014	NA	NA	NA	NA	220*	4	200-220*	NA
W-101	1990 Bay Road Site/SS Papadopoulos	1990 Bay Road, EPA	Apr-1986	NA	NA	Approx. 7.07	6.57	180	5	158.3-178.3	NA
#2/05S03W25M1	Palo Alto Park Mutual Water Company	2190 Addison Ave, EPA	1915	37.467148856	122.146451668	NA	NA	67	12	60-67	NA
#3/05S03W25M2	Palo Alto Park Mutual Water Company	2190 Addison Ave, EPA	1936	NA	NA	NA	NA	330	10	188-195, 219-235, 249-257, 269-285	NA
#5/05S03W25M5	Palo Alto Park Mutual Water Company	2190 Addison Ave, EPA	1950	NA	NA	NA	NA	306	10	218-279	NA
#6/05S03W25M2	Palo Alto Park Mutual Water Company	2190 Addison Ave, EPA	1953	37.466970019	122.146448799	NA	NA	260	10.25	247-251	NA
#7/05S03W25M6	Palo Alto Park Mutual Water Company	2190 Addison Ave, EPA	Dec-90	NA	NA	NA	NA	521	12	248-260, 290-300, 340-366, 378-388, 424-440	NA

Table C1. Groundwater Monitoring Well Construction Information

Well Name/Number	Owner/Organization/Monitoring Entity	Address	Date Installed	Northing/Latitude	Easting/Longitude	Surface Elevation (ft amsl)	Measuring Point Elevation (ft amsl)	Total Depth (feet)	Diameter (inches)	Screened Interval(s)	Dedicated Pump
#1/ 05S03W36D1	O'Conner Tract Water Company	Oak Court, Menlo Park	7/6/1966	NA	NA	NA	NA	550	12	181-372, 396-489, 508-532	NA
#2/ 05S03W36D2	O'Conner Tract Water Company	Oak Court, Menlo Park	1937	NA	NA	NA	NA	304	12	175-207, 214-224, 243-275	NA
06S02W05F001M/ DWR374429N1221 039W001	DWR/Santa Clara Valley Water District	NA	NA	37.442880	-122.10388	5.00	6.85	25	NA	20-25	NA
06S02W05F002M/ DWR374429N1221 039W002	DWR/Santa Clara Valley Water District	NA	NA	37.442870	-122.10388	6.90	8.62	50	NA	38-48	NA
06S02W05F003M/ DWR374429N1221 039W003	DWR/Santa Clara Valley Water District	NA	NA	37.442880	-122.10388	6.90	7.40	200	NA	NA	NA
Eleanor Park 4/ 05S03W36P005M	Santa Clara Valley Water District	Eleanor Park, 851 Center Drive Palo Alto	2/26/2003	NA	NA	21.70	20.91	200	2	180-200	NA
Eleanor Park 3/ 05S03W36P004M	Santa Clara Valley Water District	Eleanor Park, 851 Center Drive Palo Alto	2/26/2003	NA	NA	21.70	20.85	560	2	540-560	NA
Eleanor Park 2/ 05S03W36P003M	Santa Clara Valley Water District	Eleanor Park, 851 Center Drive Palo Alto	2/26/2003	NA	NA	21.70	20.95	740	2	720-740	NA
Eleanor Park 1/ 05S03W36P002M	Santa Clara Valley Water District	Eleanor Park, 851 Center Drive Palo Alto	2/26/2003	NA	NA	21.70	21.38	930	2	830-850	NA

Table C1. Groundwater Monitoring Well Construction Information

Well Name/Number	Owner/Organization /Monitoring Entity	Address	Date Installed	Northing/ Latitude	Easting/ Longitude	Surface Elevation (ft amsl)	Measuring Point Elevation (ft amsl)	Total Depth (feet)	Diameter (inches)	Screened Interval(s)	Dedicated Pump
Hale/ 05S03W35G10M	Santa Clara Valley Water District /City of Palo Alto	Hale Street, Palo Alto	12/28/1955	NA	NA	44	NA	840	14	108-828	NA
Rinconada/ 06S03W1B2	City of Palo Alto	Hopkins Street, Palo Alto	5/20/1954	NA	NA	21.17	NA	900	14	156-900	NA
Fernando/ 06S03W12A10	City of Palo Alto	Fernando Station, Palo Alto	5/8/1905	NA	NA	30.79	NA	1020	NA	NA	NA
Peers/ 06S03W12D1	City of Palo Alto	Peers Park, Palo Alto	3/14/1958	NA	NA	33.06	NA	NA	14	150-850	NA
El Camino	City of Palo Alto	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Library	City of Palo Alto	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Matadero	City of Palo Alto	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Eleanor Pardee	City of Palo Alto	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
 NA – Information not available.
 ft amsl – feet above mean sea level.

Table C2. Survey Benchmarks

Benchmark Owner/ID	Northing	Easting	Latitude	Longitude	Elevation	Description
City of East Palo Alto BM 1	1993704.80	6087885.94			13.17	Driven stainless steel rod in sleeve monument grade box in the lawn in University Square Park at Tate and Oaks Streets east side of concrete path.
City of East Palo Alto BM 2	1999609.22	6089767.25			10.06	A 2" aluminum disc in wetlands on the northeasterly headwall of a Bay Trail bridge at the north side of Bay Road.
City of East Palo Alto BM 3	2002206.13	6085811.80			9.78	Driven stainless steel rod in sleeve monument grade box in the concrete median of University Avenue between SR84 and the Union Pacific Railroad tracks. Located 400 ft +/- north of railroad.
City of East Palo Alto BM 4	1993379.43	6085090.94			37.21	A brass disc in the walkway in the northeast quadrant of the University Avenue bridge over San Francisquito Creek. Also SCVWD BM 455.
City of East Palo Alto BM 5	1998092.34	6083303.85			16.81	Driven stainless steel rod in sleeve monument grade box in landscaping at south edge of Newbridge Street sidewalk near intersection with Bay Road and 100' west of bus stop.

Table C2. Survey Benchmarks

Benchmark Owner/ID	Northing	Easting	Latitude	Longitude	Elevation	Description
SCVWD BM309	1992371	6096954	37 27 20.52 N	122 06 03.88 W	10.62	Brass disk on the westerly end of southern wingwall of tidal gate structure at Mayfield Slough in the Palo Alto Flood Basin. From Embarcadero Road and Embarcadero Way, north of Embarcadero Road to "T" intersection, then east 0.15 mile to dirt road on north side of Embarcadero, then north 0.5 mile to tide gate concrete bridge. City of Palo Alto.
SCVWD BM1170	1992707	6094906	37 27 23.50 N	122 06 29.35 W	8.65	Brass disk. Beginning at the intersection of Embarcadero Road and Embarcadero Way. 0.4 mile Northeast to a "T" intersection, 0.4 mile Northwest to the abandoned Palo Alto Yacht Club located on the east side of road opposite to the City of Palo Alto Duck Pond. Disk is 12.6 feet Northwest of the Southwest edge of the concrete retaining wall. Set on top of a concrete post about 2 feet higher than Northeasterly ground.
SCVWD BM1171	1991434	6093695	37 27 10.71 N	122 06 44.09 W	7.54	Brass disk; USCGS (TIDAL 4). Beginning at the intersection of Embarcadero Road and Embarcadero Way in Palo Alto; then northeast 0.20 miles to driveway on east side of Embarcadero Road into the Palo Alto Sewage Treatment Plant; then 200 feet east, then 500 feet south to a large concrete pad adjacent to a large propane storage tank. Disk is located on the northwesterly corner of the concrete pad. City of Palo Alto.
SCVWD BM1024	1991800	6092780	37 27 14.18 N	122 06 55.52 W	4.64	SCVWD brass disk. Starting at the intersection of Highway 101 and University Avenue. 1.3 miles Southeast along freeway, then 0.5 miles Northeast along Embarcadero Road, then 0.1 Miles Northwest along Palo Alto airport's entrance road, on top of the southwest corner of a 4 feet by 7 feet raised concrete slab, supporting reclaimed water turn out valve located at 66 feet southwest from the southwest leg of observation steel tower located in road median for Airport's access road. City of Palo Alto.
SCVWD BM360	1994433	6090465	37 27 39.81 N	122 07 24.79 W	16.91	Brass disk on concrete abutment at approximate centerline pedestrian footbridge on Easterly end of bridge at San Francisquito Creek, at 2000 feet Southerly of Palo Alto Airport. City of Palo Alto. Set 1993.
SCVWD BM361	1991771	6091090	37 27 13.60 N	122 07 16.47 W	10.08	Brass disk. Top of curb at angle point. Near hiking path entrance at end of Geng Road, next to the grounds of Palo Alto Athletic Park. City of Palo Alto.

Table C2. Survey Benchmarks

Benchmark Owner/ID	Northing	Easting	Latitude	Longitude	Elevation	Description
SCVWD BM362	1991521	6089254	37 27 10.81 N	122 07 39.18 W	17.98	Brass disk. Southeast corner of sidewalk at Northeasterly right corner of San Francisquito Creek and East Bayshore Frontage Road Bridge. Point is southwesterly away from 1985 East Bayshore. City of Palo Alto.
SCVWD BM607	1990251	6091560	37 26 58.641 N	122 07 10.318 W	8.91	Brass disk on top of curb; at mid return; east corner of intersection E. Bayshore Road and Embarcadero Road; adjacent to ramp for disabled; at approximate pedestrian crossing's most westerly paint stripe. City of Palo Alto.
SCVWD BM523	1991375	6089082	37 27 09.33 N	122 07 41.29 W	19.24	Brass disk on top of curb at the end of sidewalk at West Bayshore Road (Frontage road on southwesterly side of Highway 101) and San Francisquito Creek, 2500 feet northwesterly from Embarcadero Road. City of Palo Alto.
SCVWD BM455	1993378	6085090	37 27 28.45 N	122 08 31.22 W	37.43	Brass disk on top of concrete island sidewalk; at the southwesterly corner of University Avenue and Woodland Avenue; on bridge for San Francisquito Creek. Point is located across the street from University Circle parking lot. Disk is located at 45 feet west from centerline for University Avenue; 60 feet south of centerline for Woodland Avenue; 35 feet east from 3.3 feet tall concrete headwall; 19 feet south from traffic light pole; 48 feet east from northerly end of concrete headwall; also, 66 feet north of souherly end of headwall. City of Palo Alto.
SCVWD BM456	1992925	6081685	37 27 23.38 N	122 09 13.35 W	44.15	Brass disk in top of Southwestern headwall, behind a 3 feet tall concrete floodwall and at center of creek. San Francisquito Creek and Pope Street / Chaucer. City of Palo Alto
SCVWD BM1174	1992053	6079100	37 27 14.30 N	122 09 45.21 W	58.80	USCGS brass disk on top of the northeast headwall for San Francisquito Creek at the intersection of Middlefield Road and Woodland Avenue-Palo Alto Avenue; station is about 100 feet east of stop sign at northwest corner of Middlefield Road and Woodland Avenue; also about 100 feet north from a stop sign at the southeast corner of Middlefield Road and Palo Alto Avenue. Station is level with top of road (headwall is not higher than the ground). City of Palo Alto.
SCVWD BM967	1989665	6076734	37 26 50.28 N	122 10 14.02 W	75.11	USCGS brass disk (C329); located on top of the southwest corner of railroad bridge over San Francisquito Creek; at about 500 feet West from intersection of Alma Avenue and Palo Alto Avenue; about 400 feet Northerly from El Camino Real. City of Palo Alto.

Table C2. Survey Benchmarks

Benchmark Owner/ID	Northing	Easting	Latitude	Longitude	Elevation	Description
SCVWD BM457	1989434	6076388	37 26 47.94 N	122 10 18.26 W	77.32	Brass disk on top of sidewalk at southeasterly corner of bridge for El Camino Real over San Francisquito Creek; also about 400 feet west from the intersection of El Camino Real at Sand Hill Road (in the area of Stanford Shopping Center). City of Palo Alto.
SCVWD BM1139	1989604	6076390	37 26 49.62 N	122 10 18.27 W	78.89	Corp. of Engineers brass disk. On top and center of concrete sidewalk; at the northwest corner of El Camino Real over San Francisquito Creek; about 400 feet west from Sand Hill Road. City of Palo Alto.

SCVWD – Santa Clara Valley Water District
 Northing and Easting in CA State Plane Coordinates NAD83 (feet).
 Benchmark elevations in feet above mean sea level.

Table C3. Groundwater Sample Laboratory Analytes for City Wells

Analysis	Method (EPA/SM)	Recommended Reporting Limits	Holding Time (days)	Preservation	Standards (mg/L)		
					CA Primary MCL	PHG	CA Secondary MCL
Bicarbonate (HCO ₃ ⁻)	SM 2320B	5 mg/L	14	<6 °C	-	-	-
Boron	EPA 200.7	50 µg/L	28	<6 °C	-	-	-
Bromide(Br ⁻)*	EPA 300.1	5 µg/L	28	<6 °C	-	-	-
Calcium (Ca ²⁺)	EPA 200.7	1.0 mg/L	180	Add HNO ₃ to pH <2	-	-	—
Chloride (Cl ⁻)	EPA 300.0	0.5 mg/L	28	<6 °C	-	250	-
Iodide (I ⁻)*	200.7	5 µg/L	28	<6 °C	-	-	—
Iron (Fe) (total)	EPA 200.8	100 µg/L	180	Add HNO ₃ to pH <2	-	-	0.300
Magnesium (Mg ²⁺)	EPA 200.7	1 mg/L	180	Add HNO ₃ to pH <2	-	-	-
Manganese (Mn ²⁺)	EPA 200.8	20 µg/L	180	Add HNO ₃ to pH <2	-	0.050	-
Potassium (K ⁺)	EPA 200.7	1 mg/L	180	Add HNO ₃ to pH <2	-	-	-
Sodium (Na ⁺)	EPA 200.7	1 mg/L	180	Add HNO ₃ to pH <2	-	-	-
pH (units)	SM 4500	1 pH units	0.01	<6 °C	-	6.5-8.5	-
Total Dissolved Solids (TDS)	SM 2540C	10 mg/L	7	<6 °C	-	500	-
Sulfate (SO ₄ ²⁻)	EPA 300	0.5 mg/L	28	<6 °C	-	250	-

Notes:

mg/L = milligrams per liter

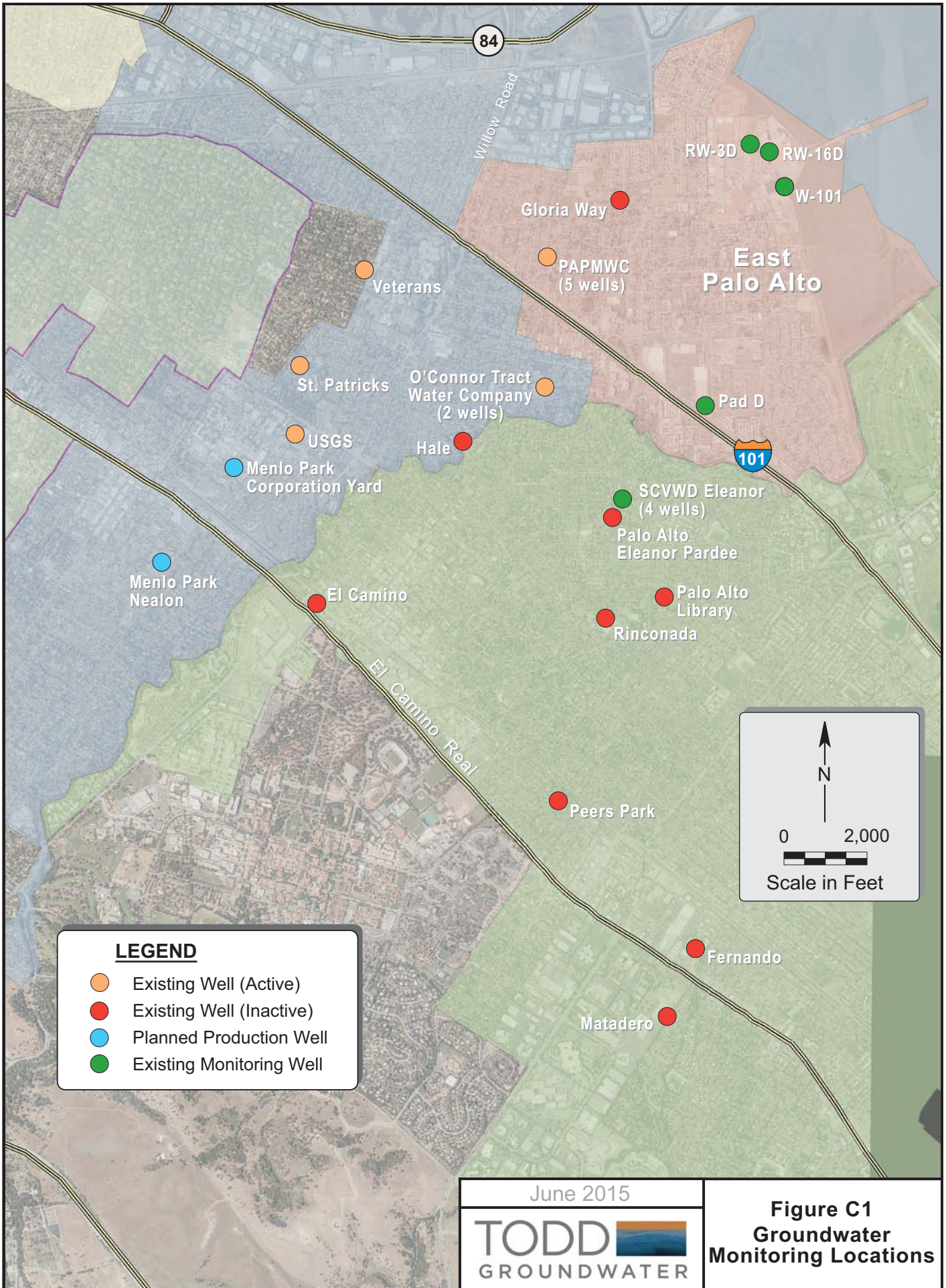
µg/L = micrograms per liter

MCL = Maximum Contaminant Level for drinking water

PHG = Public Health Goal for drinking water

HNO₃ = nitric acid

Appendix C Figures



LEGEND

- Existing Well (Active)
- Existing Well (Inactive)
- Planned Production Well
- Existing Monitoring Well

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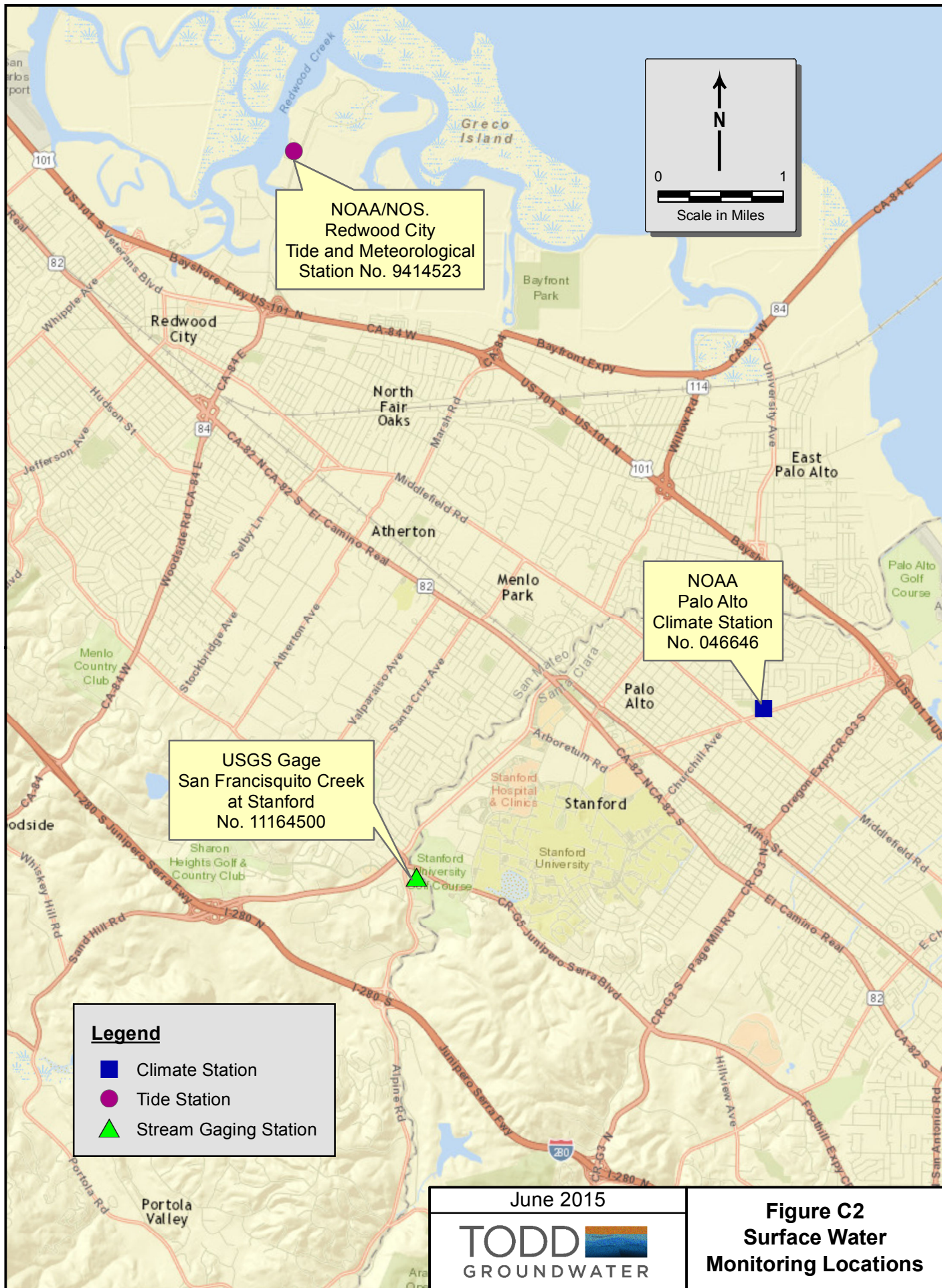
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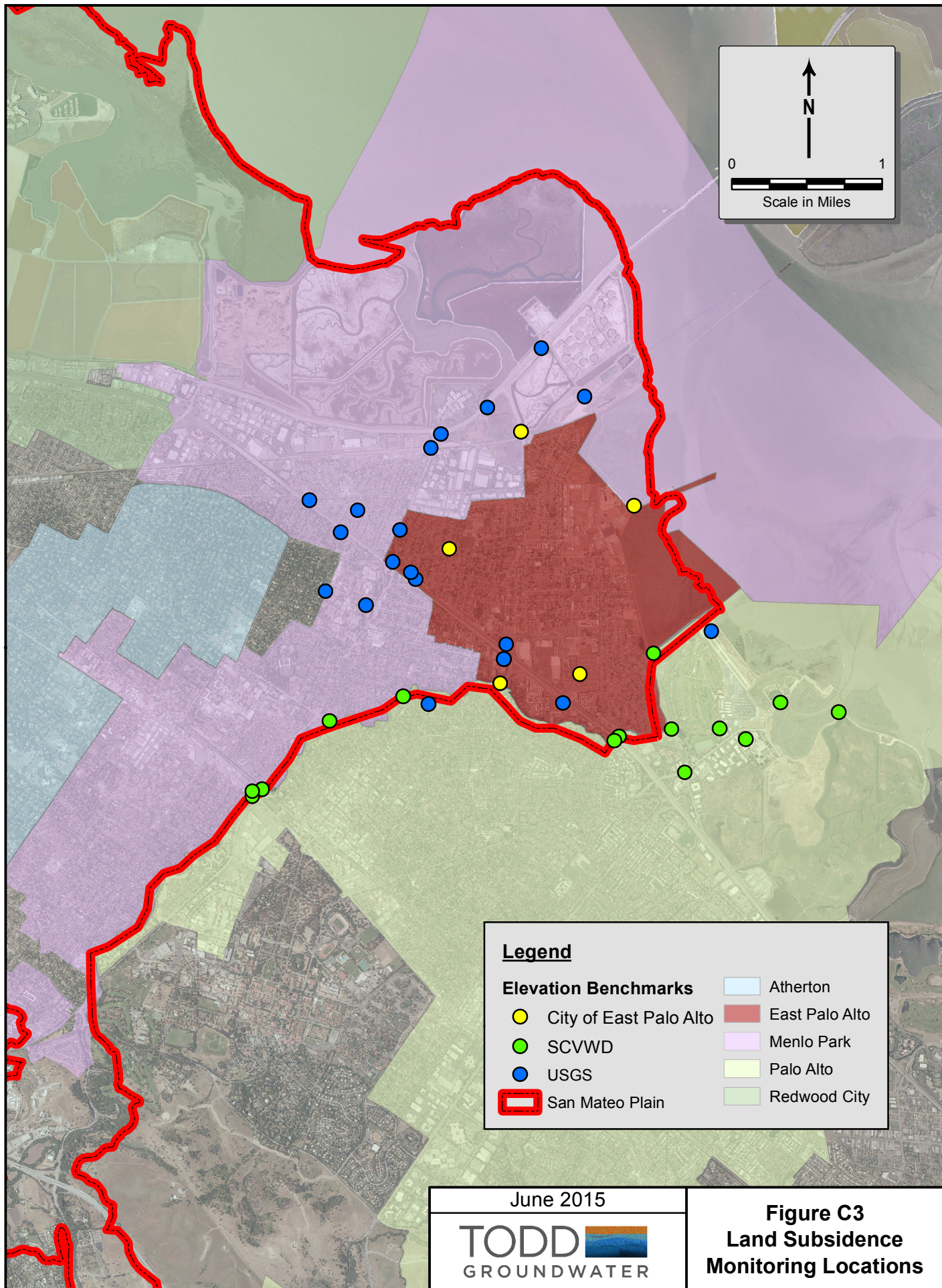
Scale in Feet

June 2015

TODD **GROUNDWATER**

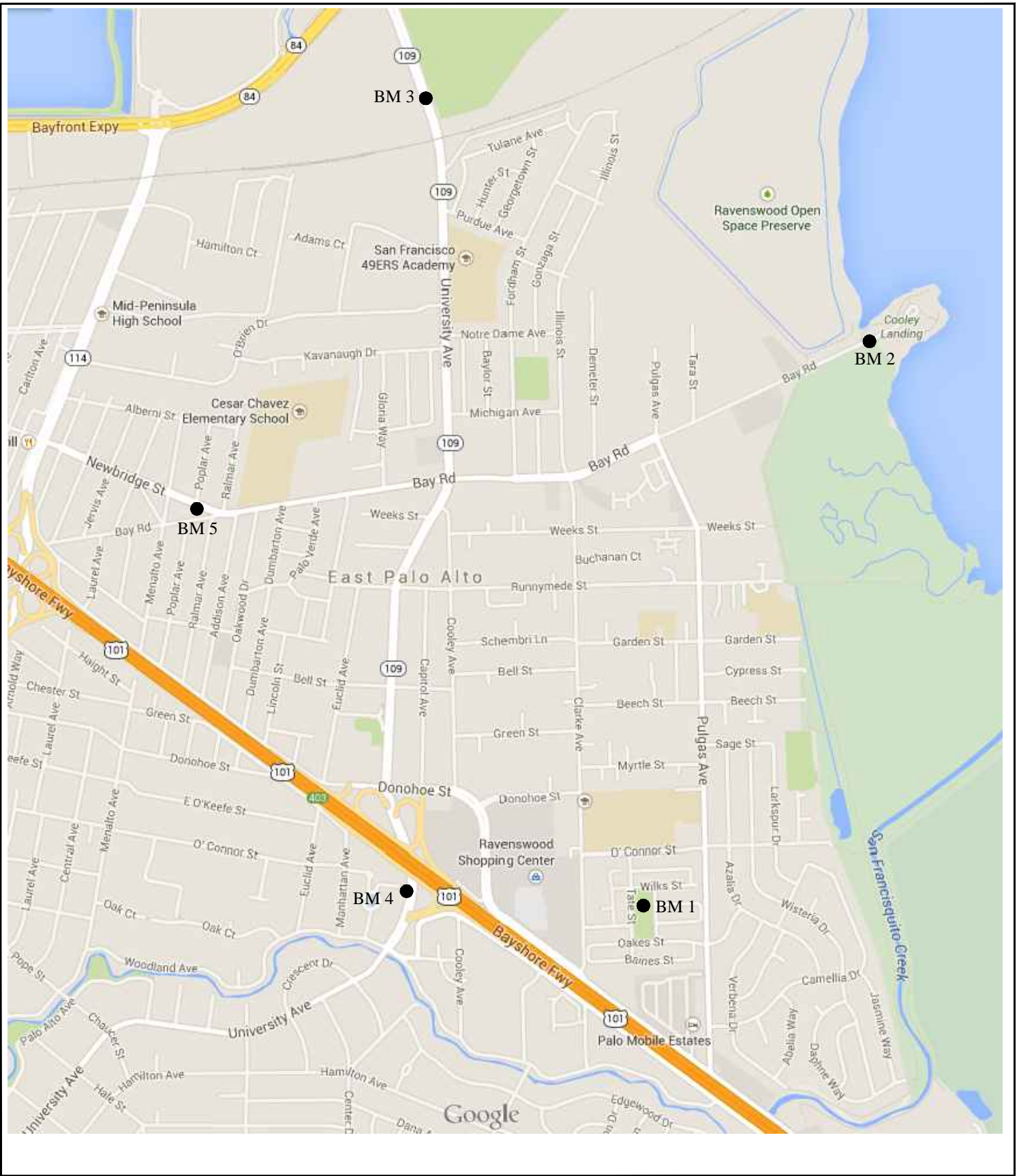
Figure C1
Groundwater
Monitoring Locations





Attachment C1 City Survey Benchmark Information

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WILSEY ■■ HAM

3130 La Selva Street, Suite 100, San Mateo, CA 94403
Phone 650-349-2151 Fax 650-345-4921

PROJECT NUMBER:
702-013

CITY OF EAST PALO ALTO
MONUMENTS

DATE: 11/12/14

SCALE: N.T.S.

EXHIBIT BM KEY MAP

SHEET 1 OF 6

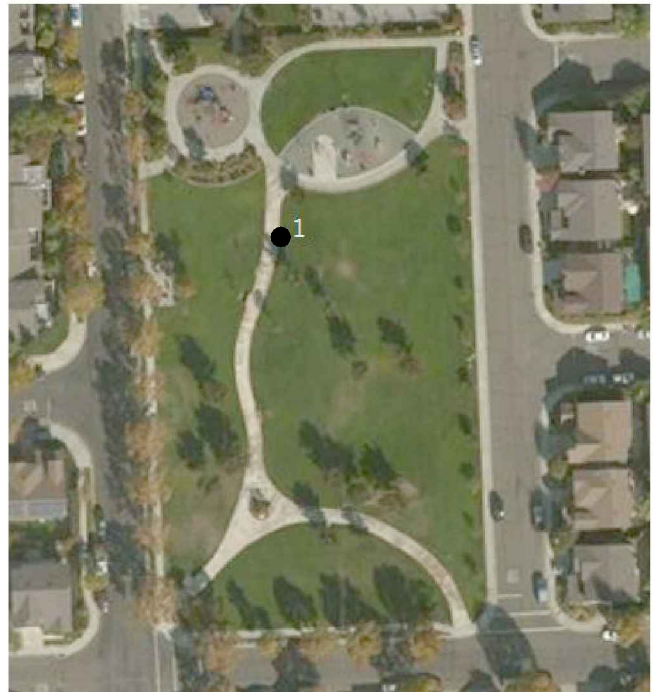
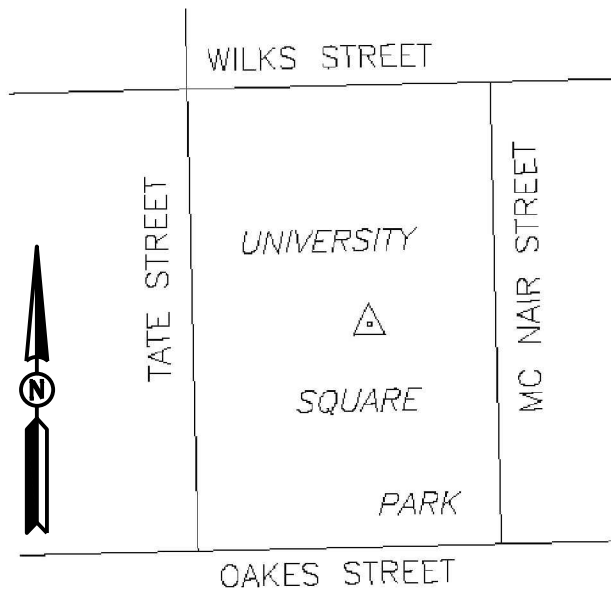
CITY OF EAST PALO ALTO BENCH MARK BM 1

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 1	1993704.80	6087885.94	13.17

The horizontal coordinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in the lawn in University Square Park at Tate and Oakes Streets in the City of East Palo Alto located at east side of a concrete path



NOTE: MONUMENT WAS SET IN AUGUST 2014

WILSEY HAM

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Phone 650-349-2151 Fax 650-345-4921

PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14
<h2>EXHIBIT BM 1</h2>		SCALE: N.T.S.
		SHEET 2 OF 6

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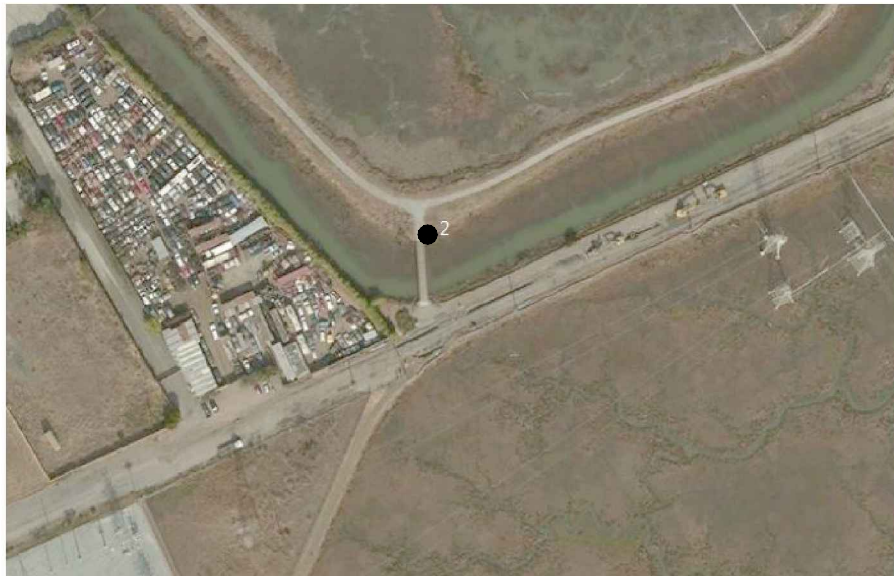
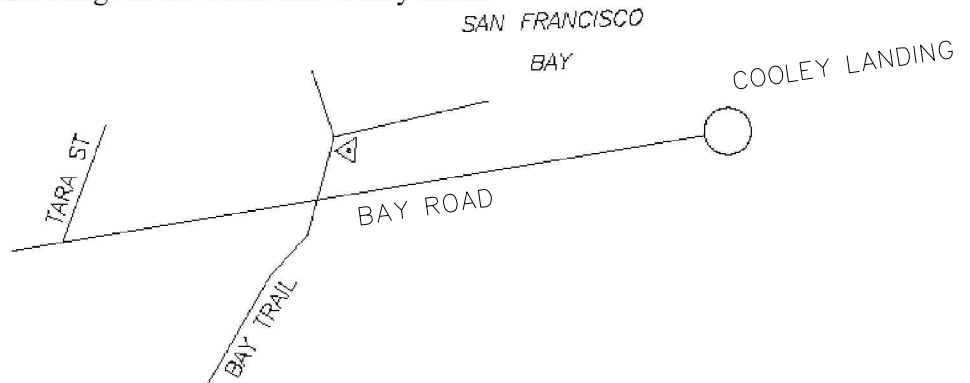
CITY OF EAST PALO ALTO BENCH MARK BM 2

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 2	1999609.22	6089767.25	10.06

The horizontal coordinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

A 2" aluminum disc stamped "East Palo Alto Bench Mark" in wetlands on the northeasterly headwall of a Bay Trail bridge at the north side of Bay Road.



NOTE: MONUMENT WAS SET IN AUGUST 2014

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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14
<h2 style="margin: 0;">EXHIBIT BM 2</h2>		SCALE: N.T.S.
		SHEET 3 OF 6

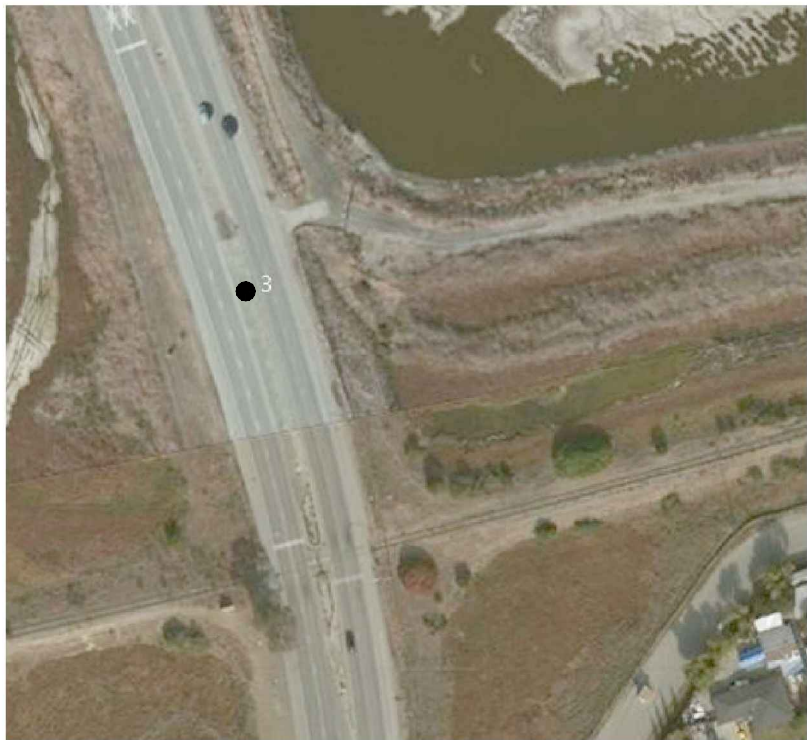
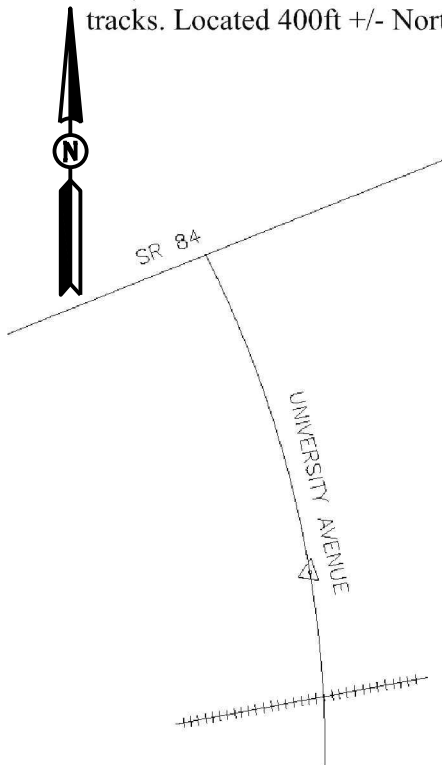
CITY OF EAST PALO ALTO BENCH MARK BM 3

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 3	2002206.13	6085811.80	9.78

The horizontal coordinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in the concrete median of University Avenue between SR 84 and the Union Pacific Railroad tracks. Located 400ft +/- North of Railroad.



NOTE: MONUMENT WAS SET IN AUGUST 2014

WILSEY HAM

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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14
<h2>EXHIBIT BM 3</h2>		SCALE: N.T.S.
		SHEET 4 OF 6

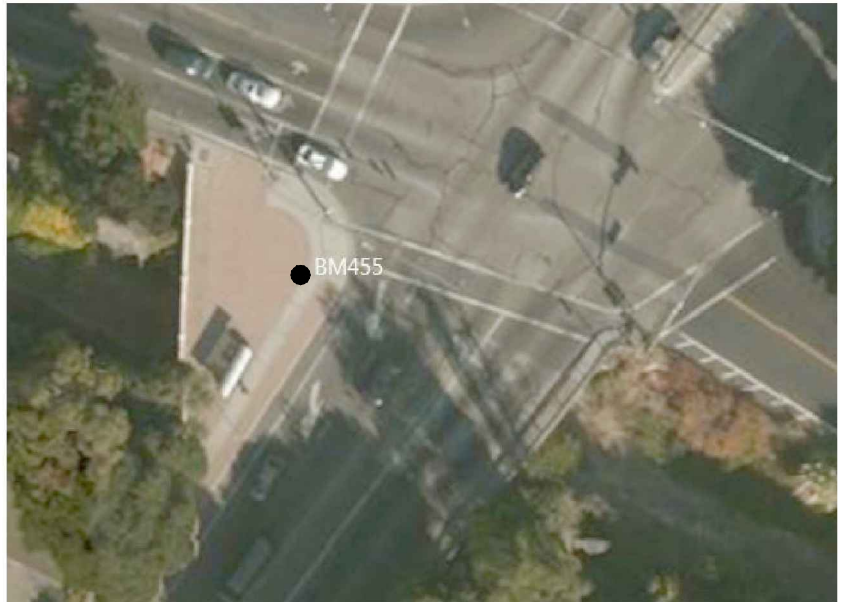
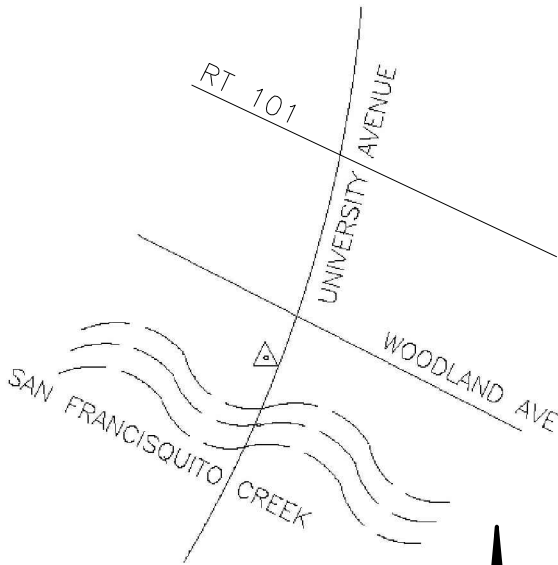
CITY OF EAST PALO ALTO BENCH MARK BM 4

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 4	1993379.43	6085090.94	37.21

The horizontal coordinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

A brass disc in the walkway in the northeast quadrant of the University Avenue Bridge over San Francisquito Creek. It is 35 feet easterly of a 3.3 tall concrete headwall and 19 feet southerly of a traffic light pole. This is Santa Clara Valley Water District Bench Mark BM455.



NOTE: MONUMENT WAS RECOVERED IN AUGUST 2014

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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14
EXHIBIT BM 4		SCALE: N.T.S.
		SHEET 5 OF 6

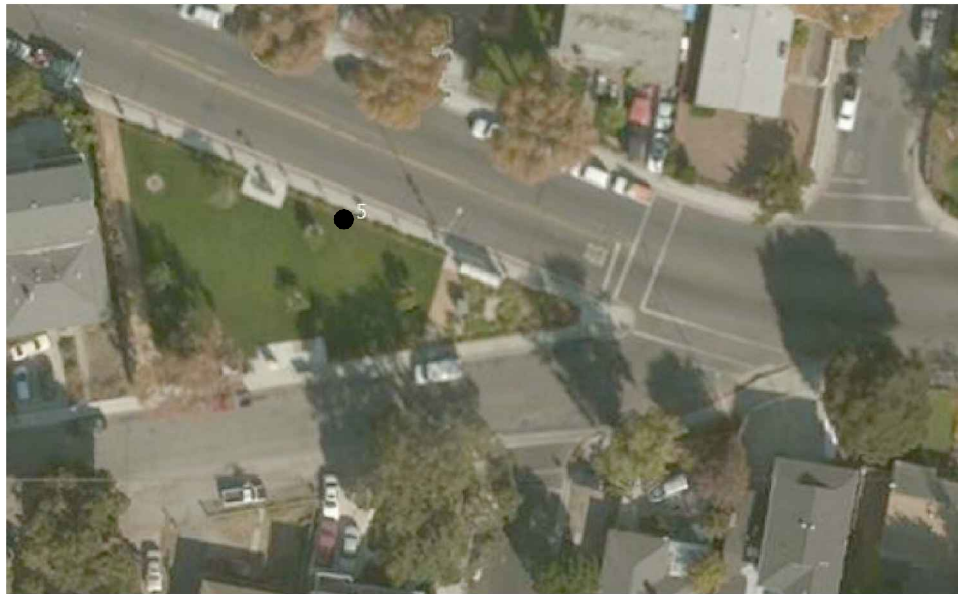
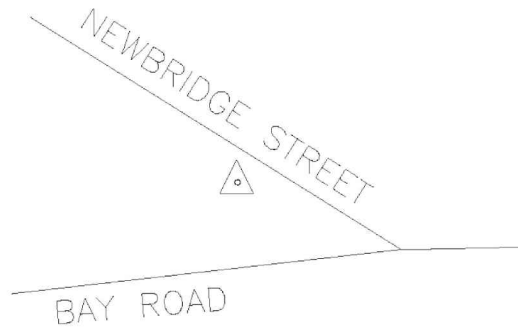
**CITY OF EAST PALO ALTO BENCH MARK
BM 5**

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 5	1998092.34	6083303.85	16.81

The horizontal coordinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in landscaping at south edge of Newbridge Street sidewalk near intersection with Bay Road and 100' westerly of bus stop.



NOTE: MONUMENT WAS SET IN AUGUST 2014

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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14
EXHIBIT BM 5		SCALE: N.T.S.
		SHEET 6 OF 6