CITY OF SEBASTOPOL CITY COUNCIL
AGENDA ITEM REPORT FOR MEETING OF: March 17, 2026

==========

To: Honorable Mayor and City Councilmembers
From: Oriana Hart, Public Works Director
Toni Bertolero, Public Works Engineer
Subject: Well 4 Replacement Project – Phase 1 Preliminary Design Professional Services Agreement

==========

RECOMMENDATION:

That the City Council adopt a resolution to approve the Professional Services Agreement with Luhdorff & Scalmanini Consulting Engineers for the preliminary design of the Well Replacement Project (CIP #0822-24.06) for amount not to exceed $378,095.00 and authorize the Interim City Manager to sign the Agreement and to authorize a contingency of 5 percent, if needed.

EXECUTIVE SUMMARY:

Council approved the Capital Improvement project for the design of the Well 4 Replacement Project in the adopted Fiscal Year 2025-26 Budget. The original scope for the design did not include test hole drilling and installation of a monitoring well and the

The City released a Request for Proposal (RFP) on November 3,2025 and two (2) bids were received: 1) Hazen and Sawyer, and 2) Luhdorff & Scalmanini Consulting Engineers (LSCE). Public Works Staff consisting of the Public Works Engineer, the Public Works Supervisor and the Engineering Technician interviewed both firms on January 12, 2026. While both firms were equally qualified to perform the work, the approach and proposed work plan by LSCE was superior to Hazen and Sawyer's and results in a lower cost for the preliminary and final design of Well 4. In addition, the LSCE team included a highly experienced engineer well versed in water grants and State Revolving Fund (SRF) loans.

The design work consists of two phases. Phase 1 is for the preliminary design of Well 4 with the following scope:

Task 1: Project Management
Task 2: Funding Assistance and Support
Task 3: Permitting Assistance
Task 4: Site Specific Investigation

The Fee Estimate for the Phase 2 work is not-to-exceed $378,095.00. The adopted CIP Fiscal Year 2025-26 budget for the Well 4 Project is $400,000.00.

The future, Phase 2 final design, would commence after the site investigation report is completed. Based on the test hole and monitoring well sampling performed under Task 4, a basis of design for the Well 4 final design can be established. This Phase 2 work, as well as Phase 3 for the construction and installation of the new well, will be included in the future Fiscal Year 2026-27 CIP budget.

This item was presented to the Budget Committee on March 2, 2026. No comments or concerns with this item were raised at the meeting.

BACKGROUND AND DISCUSSION:

The Well 4 Replacement Project (CIP #0822-24.065) was approved in the Fiscal Year 2025-26 CIP budget. The funding source is Water Capital Fund 501. Replacement of this well was originally constructed in 1953 and supplies nearly half of the City's water customers with an annual production of 157 million gallons. Well 4 is equipped with a granular activated carbon (GAC) filtration system that addresses the water quality concerns in the groundwater, namely arsenic and PCE from a nearby old dry cleaner site. The new proposed well will be drilled on the existing site but must be sited at least 50 feet away from the current well.

The City released a Request for Proposal (RFP) on November 3,2025 to six (6) engineering firms with well design experience. The original due date for the Proposals was December 1, 2025 but was extended to December 8, 2025 to allow for more time due to the complexity of the scope. Two (2) bids were received: 1) Hazen and Sawyer, and 2) Luhdorff & Scalmanini Consulting Engineers (LSCE). The proposals were reviewed by the Public Works Engineer, the Public Works Supervisor and a geologist from the Town of Windsor who is currently working on a well installation project for the Town. The interview occurred on January 12, 2026. All three members of the interview panel were in agreement which firm was the best qualified consultant.

While both firms were very qualified to perform the work, the approach and proposed work plan by LSCE was superior to Hazen and Sawyer's and results in a lower cost for the preliminary and final design of Well 4. In addition, the LSCE team included a highly experienced engineer well versed in water grants and State Revolving Fund (SRF) loans. The selection process included multiple phone calls/meetings subsequent to the interview to confirm that the best qualified consultant is selected.

STAFF ANALYSIS:

A Water Rate Study was prepared in June 2024 and the water model for the study accounted for the $400,000 in Fiscal Year 2025-26. The water model estimated that the construction of the new well would be financed through a loan. Staff is currently working on the Fiscal Year 2026-27 CIP budget and the cost of Phase 2 final design is estimated at $261,454 and will be included in the proposed CIP for FY 26-27.

Phase 1 will include the following tasks:

Task 1. Project meetings, coordination and project administration.

Task 2. Preparation of the application including the construction funding package, environmental (CEQA-Plus) documentation, and the financial package. It is assumed that the best loan package will be the SRF loan with the State, however, there may be opportunities for alternate funding sources, if the City chooses another grant or loan package.

Task 3. Preparation of applications for State Water Board, Department of Drinking Water (DDW) water permit for the construction of the well, and the CEQA documentation for the construction.

Task 4. Initial site assessment consisting of well siting, hydrogeologic review and investigation of possible sources of groundwater contamination in the vicinity of the well site; test hole drilling and installation of a monitoring well. The monitoring well will allow for collection of zone-specific water levels and water quality samples. This task will include water quality sampling and analysis. This task includes preparation of a well design report for the basis of the final design (Phase 2).

CITY COUNCIL GOALS/PRIORITIES/ AND OR GENERAL PLAN CONSISTENCY:

This agenda item represents the City Council goals/priorities as follows:
Goal 3 – Infrastructure: Maintaining High Quality Infrastructure, Facilities and Services includes repairing/replacing outdated city facilities, improving streets, stormwater and water and wastewater infrastructure.

- *Priority 7: Well 4 Updates and Funding*

This agenda item represents the City Council General Plan Consistency (if applicable):
Community Services and Facilities (CSF 1-5): Require development, infrastructure, and long-term planning projects to be consistent with all applicable City infrastructure plans, including the Water Master Plan, and the Capital Improvement Program.

FISCAL IMPACT:

There is no fiscal impact with this approval; Cost for this contract is not to exceed $378,095 and is within the adopted CIP budget of $400,000.

The future Phase 2 final design will be included in the proposed Fiscal Year 2026-27 budget. It is estimated that financing will be required for the construction of the replacement well and will be included in the future Fiscal Year 2027-28 budget. The City is negotiating with the parties responsible for the contamination from the former dry-cleaning site to contribute to funding the cost of the well replacement project.

COMMUNITY OUTREACH:

This item has been noticed in accordance with the Ralph M. Brown Act and was available for public viewing and review at least 72 hours prior to schedule meeting date. The City has also used social media to promote and advertise the City Council Meeting Agenda Items.

As of the writing of this agenda item report, the City has not received any public comment. However, if staff receives public comment from interested parties following the publication and distribution of this agenda item report, such comments will be provided to the City Council as supplemental materials before or at the meeting.

RESTATED RECOMMENDATION:

That the City Council adopt a resolution to approve the Professional Services Agreement with Luhdorff & Scalmanini Consulting Engineers for the preliminary design of the Well Replacement Project (CIP #0822-24.06) for amount not to exceed $378,095.00 and authorize the Interim City Manager to sign the Agreement and to authorize a contingency of 5 percent, if needed.

CITY COUNCIL OPTION(S):

City Council could choose not to approve the agreement with Luhdorff & Scalmanini Consulting Engineers and provide direction to staff.

ATTACHMENTS:

1-Resolution
2-Professional Services Agreement with LSCE
3-Request for Proposals (RFP)
4-Proposal from LSCE

APPROVALS:

Department Head Responsible for Agenda Item: Approval Date: 3/5/26
CEQA Determination (Community Development/Planning): Approval Date: 3/5/26
The proposed action is Exempt from CEQA pursuant to §15306.
Administrative Services (Financial): Approval Date: N/A
Costs authorized in City Approved Budget: ☑ Yes ☐ No ☐ N/A
Water Capital Fund 501
City Attorney Approval Approval Date: 3/4/26
City Manager Approval: Approval Date: 3/11/26

RESOLUTION NO. ####-2026

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SEBASTOPOL
APPROVING PROFESSIONAL SERVICES AGREEMENT WITH LUDHORFF & SCALMANINI CONSULTING ENGINEERS
FOR PROFESSIONAL SERVICES IN AN AMOUNT OF $378,095 PLUS 5% CONTINGENCY FOR
PHASE 1 PRELIMINARY DESIGN OF WELL 4 REPLACEMENT PROJECT
CIP #0822-24.06

WHEREAS, the City Council approved the Capital Improvement Project for the Well 4 Replacement Project in the adopted Fiscal Year 2025-26 Capital Improvement Plan; and

WHEREAS, the City released a Request for Proposals to six (6) engineering firms on November 3, 2025; and

WHEREAS, the City received two Proposals and Ludhorff & Scalmanini Consulting Engineers was selected as the most qualified firm for the service and determined to be responsive, fair and reasonable.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Sebastopol does hereby approve the Professional Services Agreement with Luhdorff & Scalmanini for the Phase 1 Preliminary Design of Well Replacement Project (CIP #0822-24.06) for amount not to exceed $378,095.00. and authorizes the Interim City Manager to sign the agreement and amendments to the agreement of up to 5% of the approved amount (if needed).

The above and foregoing Resolution was duly passed, approved, and adopted at a meeting by the City Council on the 17th day of March 2026 by the following vote:

VOTE:
Ayes:
Noes:
Abstain:
Absent:

APPROVED: _____
Mayor Jill McLewis

ATTEST: _____
Mary Gourley, Interim City Manager/City Clerk, MMC

APPROVED AS TO FORM: _____
Alex Mog, City Attorney

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, made and entered into on _____ by and between the City of Sebastopol, located in the County of Sonoma, State of California (City), and Luhdorff & Scalmanini Consulting Engineers (Consultant).

RECITALS:

A. City desires to employ Consultant to furnish professional services in connection with the project described as Phase 1 Preliminary Design of the Well 4 Replacement Project CIP #0822-24.06.

B. Consultant has represented that Consultant has the necessary expertise, experience, and qualifications to perform the required duties.

NOW, THEREFORE, in consideration of the mutual premises, covenants, and conditions herein contained, the parties agree as follows:

SECTION 1 – BASIC SERVICES

Consultant agrees to perform the services set forth in the Consultant's scope of services shown on **Exhibit A, "Proposal"** and made part of this Agreement.

SECTION 2 – ADDITIONAL SERVICES

Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement which are in addition to or outside of those set forth in this Agreement or **Exhibit A**, unless such additional services and compensation are authorized in advance and in writing by the City Council or City Manager of the City.

SECTION 3 – TIME FOR COMPLETION

The time for completion of services shall be as identified in **Exhibit A**.

SECTION 4 – COMPENSATION AND METHOD OF PAYMENT

A. Subject to any limitations set forth in this Agreement, City agrees to pay consultant the amount specified in Exhibit A, Proposal dated February 25, 2026, attached hereto and made a part hereof. Total compensation shall not exceed a total of $378,095.00, unless additional compensation is approved in accordance with Section 2.

B. Consultant shall furnish to City an original invoice for all work performed and expenses incurred during the preceding month. The invoice shall detail charges by the following categories if applicable: labor (by sub-category), travel, materials, equipment, supplies, subconsultant contracts, and miscellaneous expenses. City shall independently review each invoice submitted to determine whether the work performed, and expenses incurred are in compliance with the provisions of this Agreement. If no charges or expenses are disputed, the invoice shall be approved and City will use its best efforts to cause Consultant to be paid within 30 days of receipt of invoice. If any charges or expenses are disputed by City, the original invoice shall be returned by City to Consultant for correction and resubmission. If the City reasonably determines, in its sole judgment, that the invoiced charges and expenses exceed the value of the services performed to date and that it is probable that

the Agreement will not be completed satisfactorily within the contract price, City may retain all or a portion of the invoiced charges and expenses. Within thirty (30) days of satisfactory completion of the project, City shall pay the retained amount, if any, to Consultant.

C. Payment to the Consultant for work performed pursuant to this Agreement shall not be deemed to waive any defects in work performed by Consultant.

SECTION 5 – STANDARD OF PERFORMANCE

Consultant represents and warrants that it has the qualifications, experience and facilities necessary to properly perform the services required under this Agreement in a thorough, competent and professional manner. Consultant shall at all times faithfully, competently and to the best of its ability, experience and talent, perform all services described herein. In meeting its obligations under this Agreement, Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing services similar to those required of Consultant under this Agreement.

SECTION 6 – INSPECTION AND FINAL ACCEPTANCE

City may inspect and accept or reject any of Consultant's work under this Agreement, either during performance or when completed. City shall reject or finally accept Consultant's work within sixty (60) days after submitted to City, unless the parties mutually agree to extend such deadline. City shall reject work by a timely written explanation, otherwise Consultant's work shall be deemed to have been accepted. City's acceptance shall be conclusive as to such work except with respect to latent defects and fraud. Acceptance of any of Consultant's work by City shall not constitute a waiver of any of the provisions of this Agreement including, but not limited to, the sections pertaining to indemnification and insurance.

SECTION 7 – INSURANCE REQUIRED

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, its agents, representatives, or employees.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. Commercial General Liability (CGL): Insurance Services Office Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury, and personal & advertising injury with limits no less than $2,000,000 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.

2. Automobile Liability: Insurance Services Office Form Number CA 0001 covering, Code 1 (any auto), or if Consultant has no owned autos, Code 8 (hired) and 9 (non-owned), with limit no less than $1,000,000 per accident for bodily injury and property damage.

3. Workers' Compensation insurance, as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease. (Not required if consultant provides written verification that it has no employees)

4. Professional Liability (Errors and Omissions) Insurance appropriates to the Consultant's profession, with limit no less than $2,000,000 per occurrence or claim, $2,000,000 aggregate. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Consultant must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the City of Sebastopol for review. If the Consultant maintains broader coverage and/or higher limits than the minimums shown above, the City of Sebastopol requires, and shall be entitled to, the broader coverage and/or higher limits maintained by the Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Sebastopol.

Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions: The City of Sebastopol, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Consultant including materials, parts, or equipment furnished in connection with such work or operations.

General liability coverage can be provided in the form of an endorsement to the Consultant's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.

Primary Coverage

For any claims related to this contract, the Consultant's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City of Sebastopol, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Sebastopol, its officers, officials, employees, or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

Notice of Cancellation

Consultant shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required polices are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Consultant shall forthwith obtain and submit proof of substitute insurance.

Waiver of Subrogation

Consultant hereby grants to the City of Sebastopol a waiver of any right to subrogation which any insurer of said Consultant may acquire against the City of Sebastopol by virtue of the payment of any loss under such insurance. Consultant agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City of Sebastopol has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City of Sebastopol for all work performed by the Contractor, its employees, agents, and subcontractors.

Self-Insured Retentions

Self-insured retentions must be declared to and approved by the City of Sebastopol. The City of Sebastopol may require the Consultant to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the City of Sebastopol.

Acceptability of Insurers

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the City of Sebastopol.

Verification of Coverage

Consultant shall furnish the City of Sebastopol with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to the City of Sebastopol before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Consultant's obligation to provide them. The City of Sebastopol reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

Subcontractors

Consultant shall require and verify that all subcontractors maintain insurance, meeting all the requirements stated herein, and Contractor shall ensure that the City of Sebastopol is an additional insured on insurance required from subcontractors.

Special Risks or Circumstances

The City of Sebastopol reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

SECTION 8 – INDEMNIFICATION

A. Consultant shall indemnify and hold harmless City, its agents, officers, officials, employees, and volunteers from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with this Agreement; and Consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings

brought or instituted against City, its agents, officers, officials, employees and volunteers, or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

B. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, professional engineer, or land surveyor ("design professional"), the provisions of this section regarding Consultant's duty to defend and indemnify apply only to claims that arise out of or relate to the negligence, recklessness, or willful misconduct of the design professional.

C. If any action or proceeding is brought against Indemnitees by reason of any of the matters against which Consultant has agreed to indemnify Indemnitees as provided above, Consultant, upon notice from City, shall defend Indemnitees at Consultant's expense by counsel acceptable to City, such acceptance not to be unreasonably withheld. Indemnitees need not have first paid for any of the matters to which Indemnitees are entitled to Indemnification in order to be so indemnified. The insurance required to be maintained by Consultant shall ensure Consultant's obligations under this section, but the limits of such insurance shall not limit the liability of Consultant hereunder. The provisions of this section shall survive the expiration or earlier termination of this Agreement.

The provisions of this section do not apply to claims to the extent occurring as a result of the City's sole negligence or willful acts or misconduct.

SECTION 9 – INDEPENDENT CONTRACTOR STATUS

A. Consultant is and shall at all times remain a wholly independent contractor and not an officer, employee, or agent of City. Consultant shall have no authority to bind City in any manner, nor to incur an obligation, debt or liability of any kind on behalf of or against City, whether by contract or otherwise, unless such authority is expressly conferred under this Agreement or is otherwise expressly conferred in writing by City.

B. The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall have control over the conduct of Consultant or any of Consultant's officers, employees or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that Consultant or any of Consultant's officers, employees or agents are in any manner officials, officers, employees or agents of City.

C. Neither Consultant, nor any of Consultant's officers, employees or agents, shall obtain any rights to retirement, health care or any other benefits which may otherwise accrue to City's employees. Consultant expressly waives any claim Consultant may have to any such rights.

SECTION 10 – CONFLICTS OF INTEREST

A. Consultant covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, which would conflict in any manner with the interests of City or which would in any way hinder Consultant's performance of services under this Agreement. Consultant further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent, or subcontractor without the express

written consent of the City Manager. Consultant agrees to at all times avoid conflicts with the interests of City in the performance of this Agreement.

B. City understands and acknowledges that Consultant is, as of the date of execution of this Agreement, independently involved in the performance of non-related services for other governmental agencies and private parties. Consultant is aware of any stated position of City relative to such projects. Any future position of City on such projects shall not be considered a conflict of interest for purposes of this section.

SECTION 11 – OWNERSHIP OF DOCUMENTS

A. All original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents prepared, developed or discovered by Consultant in the course of providing any services pursuant to this Agreement shall become the sole property of City and may be used, reused or otherwise disposed of by City without the permission of the Consultant. When requested by City, but no later than three years after project completion, Consultant shall deliver to City all such original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents.

B. All copyrights, patents, trade secrets, or other intellectual property rights associated with any ideas, concepts, techniques, inventions, processes, improvements, developments, works of authorship, or other products developed or created by Consultant during the course of providing services (collectively the "Work Product") shall belong exclusively to City. The Work Product shall be considered a "work made for hire" within the meaning of Title 17 of the United States Code. Without reservation, limitation, or condition, Consultant hereby assigns, at the time of creation of the Work Products, without any requirement of further consideration, exclusively and perpetually, any and all right, title, and interest Consultant may have in the Work Product throughout the world, including without limitation any copyrights, patents, trade secrets, or other intellectual property rights, all rights of reproduction, all rights to create derivative works, and the right to secure registrations, renewals, reissues, and extensions thereof.

SECTION 12 – CONFIDENTIAL INFORMATION; RELEASE OF INFORMATION

A. All information gained or work product produced by Consultant in performance of this Agreement shall be considered confidential, unless such information is in the public domain or already known to Consultant. Consultant shall not release or disclose any such information or work product to persons or entities other than City without prior written authorization from the City Manager, except as may be required by law.

B. Consultant, its officers, employees, agents or subcontractors, shall not, without prior written authorization from the City Manager or unless requested by the City Attorney of City, voluntarily provide declarations, letters of support, testimony at depositions, response to interrogatories or other information concerning the work performed under this Agreement. Response to a subpoena or court order shall not be considered "voluntary" provided consultant gives City notice of such court order or subpoena.

C. If Consultant, or any officer, employee, agent, or subcontractor of Consultant, provides any information or work product in violation of this Agreement, then City shall have the right to reimbursement and indemnity from Consultant for any damages, costs and fees, including attorney's fees, caused by or incurred as a result of Consultant's conduct.

D. Consultant shall promptly notify City should Consultant, its officers, employees, agents or subcontractors be served with any summons, complaint, subpoena, notice of deposition, request for documents, interrogatories, request for admissions or other discovery request, court order or subpoena from any party regarding this Agreement and the work performed thereunder. City retains the right, but has no obligation, to represent Consultant or be present at any deposition, hearing or similar proceeding. Consultant agrees to cooperate fully with City and to provide City with the opportunity to review any response to discovery requests provided by Consultant. However, this right to review any such response does not imply or mean the right by City to control, direct, or rewrite such response.

SECTION 13 – SUSPENSION OF WORK

City may, at any time, by ten (10) days written notice suspend further performance by Consultant. All suspensions shall extend the time schedule for performance in a mutually satisfactory manner and Consultant shall be paid for services performed and reimbursable expenses incurred prior to the suspension date.

SECTION 14 – COMPLIANCE WITH LAW

Consultant shall keep itself informed of and comply with all applicable federal, state and local laws, statutes, codes, ordinances, regulations and rules in effect during the term of this Agreement. Consultant shall obtain any and all licenses, permits and authorizations necessary to perform the services set forth in this Agreement. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall be liable, at law or in equity, as a result of any failure of Consultant to comply with this section.

SECTION 15 – COMPLIANCE WITH CIVIL RIGHTS

During the performance of this contract, Consultant agrees as follows:

A. Equal Employment Opportunity. In connection with the execution of this Agreement, Consultant shall not discriminate against any employee or applicant for employment because of race, religion, color, ancestry, age, sexual orientation, physical handicap, medical condition, marital status, sex, or national origin. Such actions shall include, but not be limited to, the following: employment, promotion, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training including apprenticeship.

B. Nondiscrimination Civil Rights Act of l964. Consultant will comply with all federal regulations relative to nondiscrimination to federally-assisted programs.

C. Solicitations for Subcontractors including Procurement of Materials and Equipment. In all solicitations, either by competitive bidding or negotiations, made by Consultant for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor, supplier, or lessor shall be notified by Consultant of Consultant's obligations under this Agreement and the regulations relative to nondiscrimination.

SECTION 16 – RECORDS

A. Records of Consultant's direct labor costs, payroll costs, and reimbursable expenses pertaining to this project covered by this Agreement will be kept on a generally recognized accounting

basis and made available to City if and when required for a period of up to 3 years from the date of Consultant's final invoice.

B. Consultant's records and design calculations will be available for examination and audit if and as required. The cost of any reproductions shall be paid by City.

SECTION 17 – COOPERATION BY CITY

All public information, data, reports, records, and maps as are existing and available to City as public records, and which are necessary for carrying out the work as outlined in the Exhibit A, "Scope of Services", shall be furnished to Consultant in every reasonable way to facilitate, without undue delay, the work to be performed under this Agreement.

SECTION 18 – NOTICES

All notices required or permitted to be given under this Agreement shall be in writing and shall be personally delivered, or sent by facsimile or first class mail, addressed as follows:

To City: City Manager
7120 Bodega Ave
Sebastopol, California 95472

To Consultant: Luhdorff & Scalmanini Consulting Engineers
500 1st Street
Woodland, CA 95695

Notice shall be deemed effective on the date personally delivered or transmitted by facsimile, or, if mailed, three (3) days after deposit in the custody of the U.S. Postal Service.

SECTION 19 – TERMINATION

City may terminate this Agreement, with or without cause, at any time by giving ten (10) days written notice of termination to Consultant. If such notice is given, Consultant shall cease immediately all work in progress.

If either Consultant or City fail to perform any material obligation under this Agreement, then, in addition to any other remedies, either Consultant, or City may terminate this Agreement immediately upon written notice.

Upon termination of this Agreement by either Consultant or City, all property belonging to City which is in Consultant's possession shall be delivered to City. Consultant shall furnish to City a final invoice for work performed and expenses incurred by Consultant, prepared as set forth in this Agreement.

SECTION 20 – ATTORNEY FEES

If litigation or other proceeding is required to enforce or interpret any provision of this Agreement, the prevailing party in such litigation or other proceeding shall be entitled to an award of reasonable attorneys' fees, costs and expenses, in addition to any other relief to which it may be

entitled. In addition, any legal fees, costs and expenses incurred to enforce the provisions of this Agreement shall be reimbursed to the prevailing party.

SECTION 21 – ENTIRE AGREEMENT

This Agreement, including the attached Exhibits, is the entire, complete, final and exclusive expression of the parties with respect to the matters addressed therein and supersedes all other agreements or understandings, whether oral or written, or entered into between Consultant and City prior to the execution of this Agreement. No statements, representations or other agreements, whether oral or written, made by any party which are not embodied herein shall be valid and binding unless in writing duly executed by the parties or their authorized representatives.

SECTION 22 – SUCCESSORS AND ASSIGNS

This Agreement shall be binding on the heirs, executors, administrators, successors and assigns of the parties. However, this Agreement shall not be assigned by Consultant without written consent of the City.

SECTION 23 – CONTINUITY OF PERSONNEL

Consultant shall make every reasonable effort to maintain the stability and continuity of Consultant's staff assigned to perform the services required under this Agreement. Consultant shall notify City of any changes in Consultant's staff assigned to perform the services required under this Agreement, prior to any such performance.

SECTION 24 – DEFAULT

In the event that Consultant is in default under the terms of this Agreement, the City shall not have any obligation or duty to continue compensating Consultant for any work performed after the date of default and may terminate this Agreement immediately by written notice to Consultant.

SECTION 25 – WAIVER

Waiver by any party to this Agreement of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver by any party of any breach of the provisions of this Agreement shall not constitute a waiver of any other provision, nor a waiver of any subsequent breach or violation of any provision of this Agreement. Acceptance by City of any work or services by Consultant shall not constitute a waiver of any of the provisions of this Agreement.

SECTION 26 – LAW TO GOVERN; VENUE

This Agreement shall be interpreted, construed and governed according to the laws of the State of California. In the event of litigation between the parties, venue in state trial courts shall lie exclusively in the County of Sonoma. In the event of litigation in a U.S. District Court, venue shall lie exclusively in the Northern District of California, in San Francisco.

SECTION 27 – SEVERABILITY

If any term, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and the Agreement shall be read and construed without the invalid, void or unenforceable provision(s).

SECTION 28 – SPECIAL PROVISIONS

This Agreement is subject to the following special provisions: none.

IN WITNESS WHEREOF, the parties hereto have accepted, made, and executed this Agreement upon the terms, conditions, and provisions above stated, the day and year first above written.

City:			Consultant: Luhdorff & Scalmanini Consulting Engineers		
By:	_____	_____	By:	_____	_____
Name:	Mary Gourley	Date	Name:	Scott Lewis	Date
Title:	Interim City Manager		Title:	President	

Approved as to Form:

By:	_____	_____
Name:	Alex Mog	Date
Title	City Attorney	

Agenda Item Number 3

Luhdorff & Scalmanini
Consulting Engineers

February 25, 2026 Project No. 25-2-196

Oriana Hart, Public Works Director
City of Sebastopol
Public Works Department
714 Johnson Street
Sebastopol, CA 95472

SUBJECT: Updated Scope of Work and Budget – City of Sebastopol Well 4 Replacement (CIP #0822-24.06)

Dear Ms. Hart,

Pursuant to discussions between Luhdorff and Scalmanini Consulting Engineers (LSCE) and the City of Sebastopol (City), LSCE has prepared this updated scope of work and budget estimate to provide hydrogeologic and engineering support services for the City's Well 4 Replacement Project. The proposed services are intended to support the planning, design, permitting, funding assistance, and bid-phase support for a replacement municipal supply well that will provide a reliable and sustainable long-term water source for the City. This updated scope and budget reflect LSCE's current understanding of project needs, anticipated technical requirements, and coordination with City staff and applicable regulatory agencies.

DETAILED SCOPE OF WORK

LSCE has reviewed and understands the project as outlined in the City's RFP. The Scope of Work outlined in the tasks below encompasses all the core objectives outlined in the RFP and discussions with the City.

Phase 1

Task 1 – Project Coordination, Meetings, and Administration

Task 1.1 – Kickoff and Information Request

LSCE's work on the project will begin with a kickoff meeting with City staff and key LSCE team members to discuss the various aspects of the project. Items such as contact information, chain of command, the City's project expectations, respective roles and responsibilities, schedule, design preferences and parameters, and site constraints shall be discussed at the kick-off meeting. Following the meeting, LSCE will provide the City with a list of requested information.

Task 1.2 - Project Coordination, Meetings, and Administration

Key LSCE team members will attend regular design meetings with the City to discuss various aspects of the project. For each meeting, LSCE will prepare and distribute meeting agendas, minutes, and summaries of action items. LSCE will also provide frequent updates via email, telephone, or web-based meeting platforms as needed throughout the project. This task also provides project management and administrative activities such as: (a) Contractual Arrangements, (b) Ongoing Examination Regarding Adherence to The Scope, Budget, and Schedule, (c) Coordination of Staff Resources (d) Internal Review of Work Products, (e) Management of Subcontractors, (f) Billing Review, and (g) Scoping and Budgeting.

Task 2 – Funding Assistance

LSCE will assist the City with preparing and submitting a DWSRF funding application, including assembling technical documentation, schedules, preliminary cost estimates, and environmental compliance materials.

TASK 2.1 – DWSRF Construction Funding Application

LSCE will coordinate with the City to incorporate the needed information and data for the proposed Project to complete the DWSRF Construction Funding Application. The Project scope of work, budget, and schedule will be developed in coordination with the City, consistent with the 2025 DWSRF Construction Funding Program guidelines. LSCE will prepare and submit the required DWSRF Construction Funding Application documents, including the application elements, as follows:

- General Package - DWSRF Construction Funding Application Package
- Technical Package - DWSRF Construction Funding Application Package (100% design)
- Environmental Package - DWSRF Construction Funding Application Package (CEQA-Plus)
- Financial Package - DWSRF Construction Funding Application Package

The application elements above will be developed based on information provided by the City. LSCE will develop a comprehensive DWSRF construction funding application, which will contain the four packages outlined above.

LSCE will develop the Project Report required as part of the Technical Package submittal and will incorporate the 100% plans and specifications prepared under Tasks 4 and 5 into the Project Report, as required for a complete DWSRF funding application.

LSCE will submit a draft of the completed DWSRF Construction Funding Application packages to the City for review and comment before submitting the final application. Comments from the City will be incorporated into the final application submitted to the SWRCB.

LSCE will submit the completed DWSRF Construction Funding Application through the SWRCB's online FAAST process. The process of receiving funding approval is anticipated to occur in the fourth quarter of 2026. The funding agency will review applications in 2027, subject to their schedule for processing other funding applications. LSCE will work with the funding agency to submit a complete application and to help coordinate a timely decision for funding approval.

Task 2.2 – DWSRF Environmental Documentation

This task involves preparing the minimum CEQA-Plus requirements outlined in the DWSRF funding policy. This would involve preparing Cultural and Biological Resource Assessments that meet both federal and state environmental requirements. It is LSCE's experience that, at a minimum, these assessments are required for all DWSRF construction applications and must be completed as part of the application approval process. These are in addition to the proposed CEQA compliance documentation for a well replacement, which typically involves preparing and filing a Notice of Exemption. Any additional CEQA-Plus or other compliance documentation required, beyond that described above, would be prepared through an additional task order as agreed upon between the parties. It has been LSCE's experience that the DWSRF funding program often requires the most stringent environmental documentation and processes compared to other funding options. If the DWSRF financing option is not pursued, this task will not be required, and the funds allocated for it can instead be applied toward alternative funding procurement under Task 6.3.

Task 2.3 – Alternate Funding Sources (Optional)

LSCE can also assist the City with the identification of alternate funding opportunities and the City's eligibility for identified funding sources. If the City chooses to pursue an alternative funding source, LSCE would assist with the funding application procurement process and coordination with the funding agency.

Task 6.3(a) would involve reviewing the current City water project funding TM prepared by Hazen-Sawyer and preparing an updated TM that reviews other funding options and recommends best available funding sources to pursue in order to fund the proposed well replacement project in a timely manner.

The deliverables for this task include a draft Project Funding Technical Memorandum for City staff review and comment, followed by a final Project Funding Technical Memorandum suitable for inclusion in City files and for use on the project.

Task Budget = Task 6.3(a). = $ 5,000

Under Task 6.3(b), LSCE will assist the City with the preparation and submittal of recommended best available funding source application and document submittal to the funding agency for review and approval. LSCE will coordinate and collaborate with the funding agency to facilitate funding approval and provide assistance with funding agreement execution.

Task Budget = Task 6.3(b). = $20,175

Note that Task 6 budget is adjusted for elimination of $23,000 budget to prepare DWSRF funding (Tasks 6.1 and 6.2) application assuming the City selects a different funding source that is recommended in the Final Project Funding TM.

Task 3 – Permitting Assistance

Task 3.1 – Permitting Assistance

Through our work on numerous projects in the past, LSCE has developed a good working relationship with the SWRCB and other regional permitting and regulatory entities and can assist in expediting all necessary

applications and supporting permit documents in a cost-efficient manner. LSCE envisions that the following permitting activities will be required to complete the project.

SWRCB-DDW Water Supply Permit Amendment – LSCE will coordinate with the SWRCB-DDW and the City to provide all necessary supporting technical information to complete the water supply permit amendment package, which will be submitted to the SWRCB-DDW. LSCE has completed numerous new and amended water supply permits and has a thorough understanding of the SWRCB-DDW process and the required submittals. A draft water supply amendment will be submitted to the SWRCB-DDW following construction of the production well. Following the completion and acceptance of the project, LSCE will assist the City with the preparation of the final DDW amended water supply permit, which will include updates to the information from the preliminary submittal and the submission of the final As-Built drawings prepared by LSCE.

CEQA – LSCE envisions that the project meets the requirements for a CEQA categorical exemption. LSCE will prepare CEQA documentation consistent with a Class 1 or Class 3 Categorical Exemption, including drafting the exemption form, providing supporting technical rationale, coordinating with City Planning staff, and assisting the City in filing the Notice of Exemption.

Other Permitting Activities – LSCE will contact applicable agencies as needed to establish permitting requirements for well drilling (County of Sonoma), well siting concurrence (Division of Drinking Water), encroachment permits (City), and discharge requirements for development and pump testing fluids (City).

Task 4 – Site Specific Investigation

Task 4.1 – Initial Site Assessment

Well Siting Review – LSCE will complete a thorough onsite inspection/assessment of the site. Specifically, LSCE will evaluate the well site in relation to the siting and constructability of the new well, as well as the DDW setback distances from sanitary features and control zone requirements.

Hydrogeologic Review – The goal of the hydrogeologic review is to determine the probable yield, water quality, anticipated well depth, screen intervals, static and pumping water levels, specific capacity, and potential impacts on nearby wells due to the pumping of the new well.

Evaluation of Potential Impacts to Groundwater Quality – LSCE will investigate possible sources of groundwater contamination in the vicinity of the project site.

Task 4.2 – Test Hole and Monitoring Well

Task 3.2 will include test hole drilling and installation of a nested monitoring well. A test hole will be drilled to collect lithologic samples for analysis and to conduct a downhole geophysical survey that will be used to evaluate subsurface materials and to design a new production well. Based on the results of test hole drilling and geophysical logging, two to three nested casings will be constructed within the test hole. The nested monitoring well will allow for the collection of zone-specific water levels and water quality samples. A preliminary test hole depth of 550 feet, based on LSCE's initial data review, was used for the purposes of the project cost estimation. LSCE will provide subcontracted test hole drilling services from a licensed drilling contractor and will oversee the work to ensure that it is performed in accordance with

our stringent specifications and high expectations. The selected drilling contractor will be required to fully contain and take possession of all drilling fluids and cuttings generated during the project and properly dispose of them offsite. LSCE will ensure that all necessary permits to perform the work will be secured.

LSCE will provide documentation and sampling services during the drilling process, including preparation of a lithologic log, inspection of drilling cuttings at a minimum of 10-foot of borehole advanced, interpretation of geophysical (electric) logs, and grain size distribution analysis of selected samples. Based on the borehole investigation, LSCE will prepare a monitoring well design. A typical nested monitoring site may include up to three, 2-inch-diameter polyvinyl chloride (PVC) monitoring wells, completed in different zones. The screen section(s) of each monitoring well will be isolated from one another using intermediate bentonite seals, allowing for discrete water level measurements and water quality sampling. LSCE will oversee the construction and development of the nested monitoring well.

Task 4.3 – Monitoring Well Sampling

Task 3.3 includes sampling of the nested monitoring well. LSCE will provide technicians and equipment to purge and sample each monitoring well casing. Each casing will be purged before sampling to ensure that the well is fully purged and that representative formation water is being pumped from the monitoring well. LSCE will deliver the samples to a certified ELAP state-certified laboratory. The water quality analysis will include Title 22 Drinking Water constituents and other constituents of concern, including PFAS compounds. The results of the water quality laboratory analysis will be tabulated in a water quality summary table for inclusion in the Task 3.4 deliverable.

Task 4.4 – Well Design Recommendation Report

LSCE will prepare and deliver to the City an *Investigation Summary and Preliminary Well Design Report* that will summarize the findings of the site assessment and site characterization work performed as part of Tasks 3.2 and 3.3. The report will include:

- A summary of all field activities associated with test hole drilling, monitoring well construction and development, and water quality sampling purge logs
- A lithologic log based upon interpretation of collected lithologic samples and the geophysical log
- Geophysical log
- Grain size distribution chart of selected formation samples
- Monitoring well as-built diagram
- Daily inspection sheets
- A summary of water quality results and laboratory analytical report
- Copies of all project permits
- Copy of the Well Completion Report

LSCE will prepare a site-specific preliminary production well design based on data gathered during test hole and monitoring well evaluation, and our experience in the area. The principal design elements to achieve a hydraulically efficient and sand-free well include:

- Borehole and casing depths and diameters
- Casing and screen wall thickness
- Gravel pack gradation
- Screen slot size
- Casing material type(s)
- Screen intervals
- Screen type and material
- Seal depths
- Accessory pipe depth, material, and diameter

The report will include a drafted preliminary well design profile. The design elements of the well and yield estimation will be discussed in the report. A preliminary engineer's estimate for the construction and testing of the well will be included in the report. LSCE will meet with the City to discuss the results and findings of the test hole/monitoring well investigation and new well design recommendations. LSCE will incorporate the City's design comments into the final well design.

Task 4.5 – Siting Concurrence

After the City approves the well design, LSCE will prepare an initial DDW submittal document requesting siting and design concurrence for the new well, based on compliance with DDW and DWR regulations. The initial submittal will include a preliminary well design, site layout, location map indicating location and distances of sanitary features from the proposed well location, delineation of the wellhead control zone, and a preliminary DWSAP.

Phase 2

Task 5 – Production Well Final Design

Task 5.1 – Production Well Construction Specifications

LSCE will prepare specifications that include detailed construction requirements to be followed by the well drilling contractor during every phase of the project, including minimum acceptable methods for drilling fluid control, well development, pump testing, and well performance standards. Other site-specific items will include requirements for the containment and disposal of drill cuttings, as well as the handling of discharge water during development and test pumping, in accordance with applicable local, state, and federal regulations. The production well specifications will include comprehensive design plans, accompanied by an engineer's cost estimate for the City's use.

LSCE will attend up to two regulatory coordination meetings with SWRCB-DDW and the Water Board, supporting the City with technical presentations and responding to regulator questions related to siting, well design, and water supply permit amendments under this task.

LSCE will also support one public outreach meeting under this task by preparing presentation materials, summarizing technical content in accessible formats, and attending meetings with City staff to respond to community questions related to well siting, design, construction sequencing, and water-quality considerations.

LSCE will provide comprehensive bidding support and bid recommendation services, including preparation of bid documents, assistance during the bidding period, responses to contractor questions, and evaluation of submitted bids for completeness, responsiveness, and overall value. LSCE will review the qualifications and proposed costs of each bidder and provide a recommendation to the City to support selection of the most qualified and cost-effective contractor for the project.

Task 6 – Pump Station Final Design

Task 6.1 – Preliminary Pump Station Design Activities

LSCE will meet with and conduct a site visit with City personnel to discuss the overall pump station project design requirements, construction concepts, and site constraints at the existing site. The primary goal of the site visit is to discuss the design elements required to serve the new facility, including water supply connection, storm drain pump-to-waste (overboard) operations, building sewer systems, electrical services, radio communications, access controls, and other relevant aspects. To aid in this preliminary design effort, LSCE will distribute a design basis checklist document to the City, enabling it to quickly obtain a comprehensive understanding of the City's preferences for the functionality, operation, and equipment to be designed.

The LSCE Team will complete a topographic survey basemap in AutoCAD format for the project site. The basemap will be used for the preliminary layout of the pump station, which will, in turn, be used for preparing the final bid set plans. LSCE will incorporate City-provided standard plans, as-builts, and base mapping (as available) into the design process to ensure consistency with existing infrastructure. It is assumed that an existing geotechnical site investigation/study is available from the City for purposes of facilitating the overall project design, including structural foundation and building design elements.

Under this task, LSCE will also develop a Preliminary Design Report (PDR). The report will summarize design criteria, site constraints, and key assumptions established during early coordination with the City. It will present preliminary layouts for the building, site civil improvements, process piping, electrical systems, and instrumentation. The report will also include an evaluation of the City-furnished pump equipment for compatibility with well performance data, along with any recommended adjustments to accommodate the equipment within the pump station design. Additionally, the PDR will outline anticipated permitting needs, identify any remaining data gaps, and provide a preliminary engineer's estimate of probable construction cost. The document will serve as the basis for the development of the initial 50% design submittal (as part of Task 5.2) and will confirm alignment between LSCE and the City on scope, configuration, and design direction before advancing into detailed design.

Task 6.2 – Pump Station Design and Construction Specifications

This task covers the scope of work required to prepare the engineering plans and technical specifications for the project, consisting of a well pump and motor, motor control center, discharge piping, chemical treatment system, instrumentation, electrical control panels, SCADA communication, a wood-framed building to house the above-ground components onsite, and all other required site improvements. The design will also address all other site modifications and improvements, including grading, drainage, paving, fencing, painting, etc. Following submittal of the PDR, the detailed design will be completed at the 50% and 100% stages, and an Engineer's Estimate of project construction costs will be prepared with each

design phase. After the City's review of each design phase, LSCE will prepare the complete set of plans and specifications for the subsequent design stage, incorporating any comments received from the City in the previous design reviews.

LSCE will attend up to two regulatory coordination meetings with SWRCB-DDW and the Water Board to obtain approval for the well pump station plans, the water supply permit amendment, and to coordinate field visits during project startup.

LSCE will also support one public outreach meeting under this task by preparing presentation materials, summarizing technical content in accessible formats, and attending follow-up meetings with City staff to respond to community questions related to the well pump station design and construction scope.

LSCE will provide comprehensive bidding support and bid recommendation services, including preparation of bid documents, assistance during the bidding period, responses to contractor questions, and evaluation of submitted bids for completeness, responsiveness, and overall value. LSCE will review the qualifications and proposed costs of each bidder and provide a recommendation to the City to support selection of the most qualified and cost-effective contractor for the project.

FEE ESTIMATE

LSCE's estimated cost to complete the scope of work outlined in this proposal is based on our current understanding of the project and what would be typically expected to complete the tasks described based on our prior experience. The cost estimate assumes the following:

- A project design duration of 11-16 months.
- General Conditions, Supplemental General Conditions, and other "front-end" specifications will be prepared by the City.
- Design documents will conform to the City's standards.
- Construction-related costs are not included.
- Any additional environmental requirements beyond a Notice of Exemption (Task 2) and Cultural and Biological Resource Assessments (Task 6.2), are not included in the cost estimate

Table 1 summarizes the project cost estimate by task. Attached is a detailed project cost estimate, including hours per LSCE task and subtask, billing rate by employee classification, estimated subconsultant costs, and miscellaneous expenses. LSCE will invoice monthly for labor, subcontracted services, and direct costs only as incurred, in accordance with our 2026 Schedule of Fees for Engineering and Field Services, which is included below.

Fees shall remain in effect for the full contract period. In the event that the City directs LSCE to deviate from the proposed scope, or as dictated by unforeseen field conditions or events beyond LSCE's control, LSCE will provide notification of any potential changes in the estimated cost to complete the work. LSCE will not proceed with any work that deviates from the approved scope and budget until approval to proceed is granted by the City.

Table 1. Estimated Project Budget Summary		
Task	**Level Of Effort (hours)**	**Estimated Budget (dollars)**
Phase 1 – Preliminary Design		
Task 1. Project Coordination, Meetings, and Administration	89	$22,795
Task 2. Funding Assistance*	95	$25,175
Task 3. Permitting Assistance	26	$16,185
Task 4. Site Specific Investigation	258	$313,940
Phase 1 Total Not to Exceed		$378,095
Phase 2 – Final Design and Bid Support		
Task 1. Project Coordination, Meetings, and Administration	89	$22,795
Task 5. Production Well Design	40	$8,490
Task 6. Pump Station Design	648	$230,169
Total Project Hours and Budget	**1,245**	**$639,549**

**Assumes Alternative funding approach to DWSRF will be pursued. Cost of this Task if DWSRF funding is pursued is $44,200.*

SCHEDULE

LSCE's proposed schedule is based on the tasks outlined in this scope of work, with an anticipated project completion date of January 2027.

We appreciate the opportunity to provide the City with this updated scope and budget. We will be happy to respond If you have any questions regarding either.

Sincerely,

Luhdorff & Scalmanini
Consulting Engineers

Charlie Jenkins, P.G.
Senior Geologist

Scott Lewis, P.G.
Senior Principal Geologist | President

Attachments:

Detailed Cost Estimate
2026 Schedule of Fees for Engineering and Field Services
Project Schedule

Client	City of Sebastopol
Project	Well 4 Replacement
Job No.	25-2-196
Est. By	CJ, OS
Date	2/25/2026

Cost Estimate for City of Sebastopol for Well 4 Replacement

Luhdorff & Scalmanini Consulting Engineers

Task	Description	Senior Principal Professional	Supervising Professional	Senior Professional	Staff Professional	Prevailing Wage	Clerical	Water Quality	Bradley and Sons (Drilling)	Frisch (Electrical)	Dokken (CEQA)	PASE (Structural)	Raney (Geotech)	Phelps (Surveying)	Direct Expenses	Summary
		$300	$265	$235	$185	$230	$115	Incurred	Incurred	Incurred	Incurred	Incurred	Incurred	Incurred	Incurred	
Phase 1 - Preliminary Design																
Task 1 – Project Coordination, Meetings, and Administration																
Task 1.1 – Kickoff and Information Request	Task Hours	6	8	6	8	0	0									28
	Task Cost	$1,800	$2,120	$1,410	$1,480	$0	$0									$6,810
	SubTotal	$1,800	$2,120	$1,410	$1,480	$0	$0									**$6,810**
Task 1.2 – Project Coordination, Meetings, and Administration	Task Hours	12	29	20	0	0	0									0
	Task Cost	$3,600	$7,685	$4,700	$0	$0	$0									$15,985
	SubTotal	$3,600	$7,685	$4,700	$0	$0	$0									**$15,985**
															Total Task Cost Estimate	**$22,795**
Task 2 – Funding Assistance																
Task 2.1 – Project Funding Procurement-DWSRF	Task Hours		80													80
	Task Cost	$0	$21,200	$0	$0	$0	$0									$21,200
	SubTotal	$0	$21,200	$0	$0	$0	$0									**$21,200**
Task 2.2 – DWSRF Environmental Documentation	Task Hours		0													0
	Task Cost	$0	$0	$0	$0	$0	$0									$0
	Outside Services										$23,000					$23,000
	SubTotal	$0	$0	$0	$0	$0	$0									**$23,000**
Task 2.3 – Alternative Funding Sources (Optional)	Task Hours		95													95
	Task Cost	$0	$25,175	$0	$0	$0	$0									$25,175
	Outside Services															$0
	SubTotal	$0	$25,175	$0	$0	$0	$0									**$25,175**
															Total Task Cost Estimate	**$69,375**
Task 3 – Permitting Assistance																
Task 3.1 – Permitting Assistance	Task Hours	4	6	4	12	0	0									26
	Task Cost	$1,200	$1,590	$940	$2,220	$0	$0									$5,950
	Outside Services										$10,235					$10,235
	SubTotal	$1,200	$1,590	$940	$2,220	$0	$0									**$16,185**
															Total Task Cost Estimate	**$16,185**
Task 4 – Site Specific Investigation																
Task 4.1 – Initial Site Assessment	Task Hours	8	0	16	24	0	0									48
	Task Cost	$2,400	$0	$3,760	$4,440	$0	$0									$10,600
	SubTotal	$2,400	$0	$3,760	$4,440	$0	$0									**$10,600**
Task 4.2 – Test Hole and Monitoring Well	Task Hours	4	0	16	24	60	0									104
	Task Cost	$1,200	$0	$3,760	$4,440	$13,800	$0									$23,200
	Outside Services								$239,600							$239,600
	SubTotal	$1,200	$0	$3,760	$4,440	$13,800	$0									**$262,800**
Task 4.3 – Monitoring Well Sampling	Task Hours	2	0	4	12	24	0									42
	Task Cost	$600	$0	$940	$2,220	$5,520	$0									$9,280
	Outside Services							$18,000								$18,000
	SubTotal	$600	$0	$940	$2,220	$5,520	$0									**$27,280**
Task 4.4 – Well Design Recommendation Report	Task Hours	8	0	4	24	0	4									40
	Task Cost	$2,400	$0	$940	$4,440	$0	$460									$8,240
	SubTotal	$2,400	$0	$940	$4,440	$0	$460									**$8,240**
Task 4.5 – Siting Concurrence	Task Hours	4	0	8	8	0	4									24
	Task Cost	$1,200	$0	$1,880	$1,480	$0	$460									$5,020
	SubTotal	$1,200	$0	$1,880	$1,480	$0	$460									**$5,020**
															Total Task Cost Estimate	**$313,940**
Phase 2 - Final Design and Bid Suppport																
Task 1 – Project Coordination, Meetings, and Administration																
Task 1.1 – Kickoff and Information Request	Task Hours	6	8	6	8	0	0									28
	Task Cost	$1,800	$2,120	$1,410	$1,480	$0	$0									$6,810
	SubTotal	$1,800	$2,120	$1,410	$1,480	$0	$0									**$6,810**
Task 1.2 – Project Coordination, Meetings, and Administration	Task Hours	12	29	20	0	0	0									0
	Task Cost	$3,600	$7,685	$4,700	$0	$0	$0									$15,985
	SubTotal	$3,600	$7,685	$4,700	$0	$0	$0									**$15,985**
															Total Task Cost Estimate	**$22,795**
Task 5 – Production Well Design																
Task 5.1 – Production Well Construction Specifications	Task Hours	6	0	8	26	0	0									40
	Task Cost	$1,800	$0	$1,880	$4,810	$0	$0									$8,490
	SubTotal	$1,800	$0	$1,880	$4,810	$0	$0									**$8,490**
															Total Task Cost Estimate	**$8,490**
Task 6 – Pump Station Final Design																
Task 6.1 – Preliminary Pump Station Design Activities	Task Hours	0	48	0	88	0	4									140
	Task Cost	$0	$12,720	$0	$16,280	$0	$460									$29,460
	Outside Services											$11,500	$5,750	$4,198		$21,448
	SubTotal	$0	$12,720	$0	$16,280	$0	$460									**$50,908**
Task 6.2 – Pump Station Design and Construction Specifications	Task Hours	0	150	0	350	0	8									508
	Task Cost	$0	$39,750	$0	$64,750	$0	$920									$105,420
	Outside Services									$43,942		$29,900				$73,842
	SubTotal	$0	$39,750	$0	$64,750	$0	$920									**$179,262**
															Total Task Cost Estimate	**$230,169**
SUMMARY	Total LSCE Hours	72	453	112	584	84	20									1325
	Total LSCE Cost	$21,600	$120,045	$26,320	$108,040	$19,320	$2,300									$297,625
	Outside Services							$18,000	$239,600	$43,942	$33,235	$41,400	$5,750	$4,198		$386,124
															Total Cost Estimate	**$683,749**

Luhdorff & Scalmanini
Consulting Engineers
500 FIRST STREET • WOODLAND, CA 95695

2026 SCHEDULE OF FEES

ENGINEERING AND RELATED FIELD SERVICES

Professional*

Senior Principal	$300/hr.
Principal Professional	$280/hr.
Supervising Professional	$265/hr.
Senior Professional	$235/hr.
Project Professional	$208/hr.
Staff Professional	$185/hr.

Technical

Senior DMS/GIS Analyst	$178/hr.
DMS/GIS	$178/hr.
Engineering Assistant	$148/hr.
Technician	$148/hr.

Project Admin Support

Word Processing, Clerical	$115/hr.
Digital Communications Specialist	$130/hr.
Project Admin/Accounting Assistant	$130/hr.

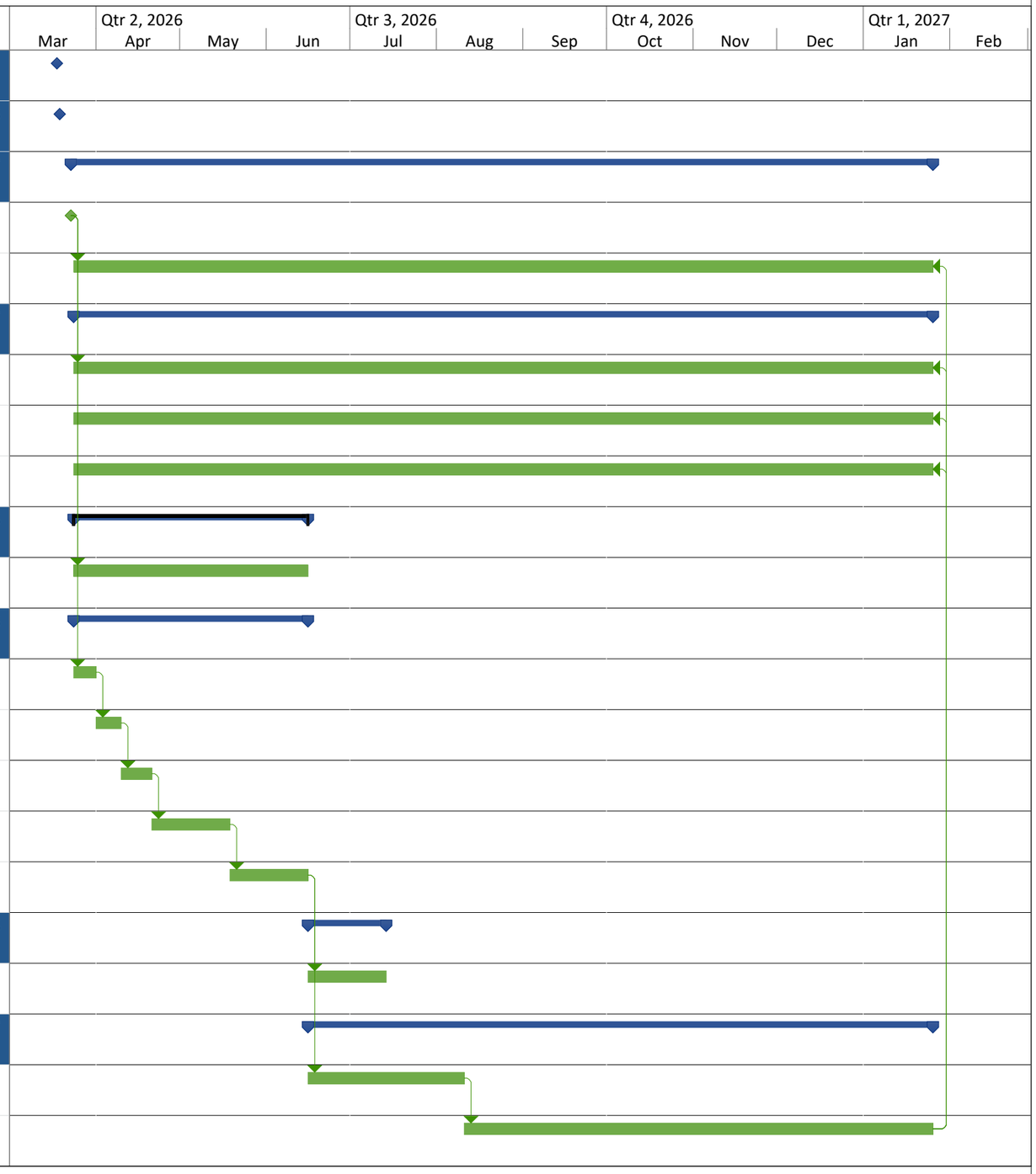
Vehicle Use	$0.70/mi (or curr. IRS rate)
Subsistence	Cost Plus 15%
Groundwater Sampling Equipment (Includes Operator)	$220.00/hr
Copies	$0.20 ea.

Professional or Technical Testimony	200% of Regular Rates
Technical Overtime (if required)	150% of Regular Rates
Outside Services/Rentals	Cost Plus 15%
Services by Associate Firms	Cost Plus 15%
Prevailing Wage Rate	$230/hr until June 30, 2026
Prevailing Wage Rate	$235/hr after July 1, 2026

** Engineer, Geologist, Hydrogeologist, and Hydrologist*

City of Sebastopol Well 4 Replacement
(Rev 2026)

ID	Task Name	Duration	Start	Finish
1	**Council Approval**	**1 day**	**Tue 3/17/26**	**Tue 3/17/26**
2	**Notice to Proceed**	**1 day**	**Wed 3/18/26**	**Wed 3/18/26**
3	**TASK 1 - Project Coordination, Meetings, and Administration**	**11.05 mons**	**Mon 3/23/26**	**Mon 1/25/27**
4	Task 1.1 - Kickoff and Information Request	1 day	Mon 3/23/26	Mon 3/23/26
5	Task 1.2 - Project Coordination, Meetings and Administration	11 mons	Tue 3/24/26	Mon 1/25/27
6	**TASK 2 - Funding Assistance**	**11 mons**	**Tue 3/24/26**	**Mon 1/25/27**
7	Task 2.1 - DWSRF Construction Funding Application	11 mons	Tue 3/24/26	Mon 1/25/27
8	Task 2.2 - DWSRF Environmental Documentation	11 mons	Tue 3/24/26	Mon 1/25/27
9	Task 2.3 - Alternate Funding Sources (Optional)	11 mons	Tue 3/24/26	Mon 1/25/27
10	**TASK 3 - Permitting Assistance**	**3 mons**	**Tue 3/24/26**	**Mon 6/15/26**
11	Task 3.1 - Permitting Assistance	3 mons	Tue 3/24/26	Mon 6/15/26
12	**TASK 4 - Site Specific Investigation**	**3 mons**	**Tue 3/24/26**	**Mon 6/15/26**
13	Task 4.1 - Initial Site Assessment	0.3 mons	Tue 3/24/26	Tue 3/31/26
14	Task 4.2 - Test Hole and Monitoring Well	0.35 mons	Wed 4/1/26	Thu 4/9/26
15	Task 4.3 - Monitoring Well Sampling	0.35 mons	Fri 4/10/26	Mon 4/20/26
16	Task 4.4 - Well Design Recommendation Report	1 mon	Tue 4/21/26	Mon 5/18/26
17	Task 4.5 - Siting Concurrence	1 mon	Tue 5/19/26	Mon 6/15/26
18	**TASK 5 - Production Well Design**	**1 mon**	**Tue 6/16/26**	**Mon 7/13/26**
19	Task 5.1 - Production Well Construction Specifications	1 mon	Tue 6/16/26	Mon 7/13/26
20	**TASK 6 - Pump Station Final Design**	**8 mons**	**Tue 6/16/26**	**Mon 1/25/27**
21	Task 6.1 - Preliminary Pump Station Design Acitivities	2 mons	Tue 6/16/26	Mon 8/10/26
22	Task 6.2 - Pump Station Design and Construction Specifications	6 mons	Tue 8/11/26	Mon 1/25/27



Luhdorff & Scalmanini
Consulting Engineers

City of Sebastopol

REQUEST FOR STATEMENT OF QUALIFICATIONS / REQUEST FOR PROPOSALS

FOR ENGINEERING SERVICES FOR

WELL 4 REPLACEMENT (CIP #0822-24.06)

Proposal Due Date: December 1, 2025, 5:00 P.M.

Addendum 1: Due date extended to December 8, 2025, 5:00 P.M.

Approved for Release:

A. M. Bertolero

Toni Bertolero, Public Works Engineer

November 3, 2025

Date

PUBLIC WORKS DEPARTMENT
714 JOHNSON STREET
SEBASTOPOL, CA 95472
engineering@cityofsebastopol.gov
Phone: 707-823-2151

I) BACKGROUND

The City of Sebastopol is soliciting proposals from qualified engineering firms for the Well 4 Replacement Project CIP #0822-24.06 (Project). Well 4 is located at 710 Petaluma Avenue in Sebastopol at the intersection of Gravenstein Highway and Palm Avenue. Located on the site is a well and pump house, two vertical GAC filter vessels, including process piping, valving, sand removal equipment, and a filter backwash storage/buffer tank.

The well was drilled in 1953 to a depth of 530 feet has a 14-inch steel casing. The well pump is 100 horsepower (HP) vertical turbine pump enclosed within a pump house and rated for 900 gpm capacity. Additional information can be found in the report entitled *Drinking Water Regulatory Compliance Feasibility Project, GHD Inc., November 2012* (see Appendix C).

This RFP is to provide engineering services for the Project as described in paragraph II below.

II) DESCRIPTION OF PROJECT

The Project consists of well drilling and development, well pump and VFD, well building, site work, yard piping, electrical, and controls. The City recently purchased a new pump. Rather than purchasing an additional pump for this replacement well, the City would like to use the one that was previously purchased in the design. This should be discussed further during the design phase. The project will also include assistance with financing and/or grant funding of the construction of the Well 4 replacement. Additional information can found in the document entitled *City of Sebastopol Well #4 Funding Evaluation Technical Memorandum, Hazen and Sawyer, June 30, 2025* (see Appendix D).

III) SCOPE

The selected Consultant must provide and identify an experienced project team who has successfully delivered services on similar projects. The general scope of services include:

Scope

- Project management
- Attending meetings with regulatory agencies such as the Water Board, Office of Drinking Water (up to 4)
- Preliminary design and preliminary cost estimate
- Final design and preparation of plans, specifications, and Engineer's Estimate
- Public presentation and outreach (up to 2 meetings)
- Assistance with financing or grant application
- Documentation and compliance, obtaining necessary permits, and ensuring all regulatory requirements are met

The Proposer shall include an Approach to the Work, and a Detailed Scope of Work in their Proposal.

IV) FEE ESTIMATE

A detailed breakdown of fees, by task, shall be provided in spreadsheet format.

V) PRE-QUALIFICATION

If you are selected and your firm does not currently have a valid Master Services Agreement with the City, you will be required to enter into a Professional Services Agreement (see Appendix B). Please review Standard Terms and Conditions in Section XII.

If your firm is selected and has a valid Master Services Agreement, you will not be required to enter into a Professional Services Agreement with the City, but will be contracted through a Task Order agreement and Purchase Order issued by the City.

VI) SCHEDULE

The Request for Proposals (RFP) was released on the date shown on the cover of this RFP. It is the City's intent that this solicitation will be due on the date shown on the cover of this RFP.

Evaluation of proposals by the City will commence within thirty (30) days of receipt. The City reserves the right to conduct follow-up interviews with Proposer(s). A preliminary schedule of administrative milestones are listed below. The Consultant shall include a schedule in the Proposal that includes key milestones from date of the Notice to Proceed with the work through project completion.

Preliminary schedule:

Release of RFP	See date on front cover
Proposals Due	See date on front cover
Proposal Review/Selection	30 days from Proposal due date
Council Approval	January 20, 2025 (est)
Notice to Proceed	Date when fully-signed contract is executed

VII) CITY'S RESPONSIBILITIES

City will make available standard plans and details, standard contract documents, and general contract provisions for public works contracts for the consultant's use, upon selection. City will also furnish PDF copies of existing City plans, base maps, and other background materials for consultant's use as needed. If only hard-copy versions of the documents are available, a print copy will be provided, at Consultant's costs.

VIII) GUIDELINES FOR PROPOSALS

a. Proposals should not exceed 15 pages in length, excluding cover letter, dividers, appendices, and summary resumes (no more than one page per person).

b. Proposals must be signed by the individual who is authorized to execute the Professional Services Agreement or Task Order, should your firm be selected.

c. Proposals shall include documentation demonstrating that the firm has contracted directly with public agencies located in California within the last five (5) years and successfully completed a minimum of three (3) projects of similar scope and size.

d. Documentation for each referenced project included in your proposal shall include information in the format shown below:

   1) Client Name

   2) Project Name and Description, including if construction project was funded with federal aid grant funds

3) Project Start and End Dates
4) Client Project Manager Name, Phone Number, and email address
5) Key Consultant team members including assigned project manager, Lead design engineer, and finance/grant specialist

e. Proposals shall include a summary section describing your understanding of and approach to the proposed project assignment identified in this RFP, and a detailed Scope of Work to complete the project.

f. Proposals shall include your firm's general billing information as follows:
1) Schedule of hourly rates, including any special rates offered to public agencies, and prevailing wage rates as appropriate.
2) Travel-time charge-out policy (please see item #5 below).
3) Vehicle or equipment charge-out policy.
4) Percentage markup for reimbursable expenses.
5) Lodging expenses, meals, air fare, and other travel expenses (excluding vehicle mileage reimbursement) to and from Consultant's Office to the job site are not allowed.

IX) PROCESS FOR SUBMITTING PROPOSALS

a. Proposals should focus on information requested above. Brochures and promotional materials should not be submitted with your proposal.

b. Submit three (3) paper copies of proposal, one of which is unbound, in a sealed envelope addressed to:

Attn: Elissa Overton, Engineering Technician II
Sebastopol Public Works Department
714 Johnson Street
Sebastopol, CA 95472
RE: RFP for Well 4 Replacement Project

The Fee Estimate, as described in Section IV, shall accompany the Proposal. Proposals shall be submitted in person, or by mail, or delivery service by the due date stated on the front cover of this RFP. In addition to the paper copies, please submit a PDF copy of the Proposal (excluding the Fee Estimate) to engineering@cityofsebastopol.gov. Office hours for receipt of Proposals are:

Monday – Thursday, 7:30 a.m. – 5:00 p.m.
Offices are closed on state and federal holidays

A final Cost Proposal/Fee Estimate will be negotiated with the selected consultant.

X) QUESTIONS

Questions regarding this RFP or its requirements may be submitted, preferably by email, to: engineering@cityofsebastopol.gov. Due to staffing constraints, the City will attempt to respond within two (2) business days of receipt (note Fridays are non-business days for the City). Your email question should include in the Subject Line: "Questions re. RFP for Well 4 Replacement Project". Questions via phone call may be made to Elissa Overton at (707) 823-2151.

Prior to submitting proposals, consultants should not contact any other City personnel, elected or appointed officials. The City reserves the right to reject any proposal for violation of this provision.

XI) EVALUATION CRITERIA

The City's consultant evaluation and selection process is based upon "Qualifications Based Selection" (QBS) for professional services. The following criteria will be used in evaluating the proposals:

a. Responsiveness to solicitation and understanding of project.
b. Proposal documentation of demonstrated relevant experience, particularly with well development and construction of municipal wells for public agencies.
c. General qualifications and experience of the firm, project manager, lead design engineer, and other key individuals assigned to projects.
d. Clarity of proposal.
e. Information obtained from reference checks.

The City may also contact responding firms to clarify information in proposals or to seek and review additional information deemed pertinent to the evaluation process. The evaluation committee shall determine the final Pre-Qualified Consultants "Short-List" in consideration of the best interests of the City. The evaluation committee consists of up to three (3) City staff from one or more of the following departments: Public Works, Planning, City Administration, and Building. The final recommendation to Council will be made by the City Manager.

After written proposals have been reviewed, online or in-person interviews with prospective firms may be conducted by the City. If scheduled, oral interviews will be in an informal question/answer format for the purpose of clarifying the proposal. The individuals who represent your firm in any scheduled interview must include the person who would be directly responsible for carrying out the contract, including the Construction Manager and the Lead Inspector.

A Notification of Intent to Award will be sent to the consultant selected. Award is contingent upon the successful negotiation of final contract terms contained in the Master Services Agreement or Professional Services Agreement, and subject to approval by the City.

Negotiations shall be confidential and not subject to disclosure to competing consulting firms unless an agreement is reached.

XII) STANDARD TERMS AND CONDITIONS

a. This RFP does not commit the City to award a contract or to pay any costs incurred for any services.
b. The City, at its sole discretion, reserves the sole right to determine which consultants are ultimately included in the Pre-Qualified Consultants List.
c. All proposals will become the property of the City of Sebastopol. Any proprietary information contained in the proposal should be clearly identified as such.
d. The City reserves the right to amend this RFQ/RFP from time to time. The current version will be posted on the City website link: bit.ly/SebEng23
e. The cost for developing the proposal is the sole responsibility of the proposer. All proposals submitted become the property of the City.

f. Prior to award, the apparent successful firm(s) may be required to enter into discussions with the City to resolve any contractual differences. If no resolution is reached, the proposal may be rejected.

g. Proposals are subject to the California Public Records Act. The City cannot protect proprietary data submitted in proposals.

h. Insurance Requirements: Successful proposers, who are invited to be included on the Shortlisted Pre-Qualified Consultants List must furnish the City with the Certificates of Insurance proving coverage as specified in Appendix A**.** No exceptions will be made to this requirement.

It is the proposer's responsibility to review these requirements carefully prior to submitting a proposal in response to this solicitation. Your response must indicate your familiarity with the insurance requirements and your willingness to comply with them as they are written. If you take any exceptions to the terms of the contract, these must be included in your proposal in writing. The City will consider this in determining responsiveness to the Request for Proposals.

APPENDICES:

A. Insurance Requirements
B. Professional Services Agreement
C. GHD Report, November 2012
D. Hazen & Sawyer Technical Memorandum, June 2025

APPENDIX A
City of Sebastopol
Insurance Requirements for Consultants

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, its agents, representatives, or employees.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. Commercial General Liability (CGL): Insurance Services Office Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury, and personal & advertising injury with limits no less than $2,000,000 per occurrence. Ifa general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: Insurance Services Office Form Number CA 0001 covering, Code 1 (any auto), or if Consultant has no owned autos, Code 8 (hired) and 9 (non-owned), with limit no less than $1,000,000 per accident for bodily injury and property damage.
3. Workers' Compensation insurance, as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease.
   (Not required if consultant provides written verification that it has no employees)
4. Professional Liability (Errors and Omissions) Insurance appropriates to the Consultant's profession, with limit no less than $2,000,000 per occurrence or claim, $2,000,000 aggregate. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Consultant must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the City of Sebastopol for review.
   If the Consultant maintains broader coverage and/or higher limits than the minimums shown above, the City of Sebastopol requires, and shall be entitled to, the broader coverage and/or higher limits maintained by the Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Sebastopol.

Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions:

The City of Sebastopol, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Consultant including materials, parts, or equipment furnished in connection with such work or operations.

General liability coverage can be provided in the form of an endorsement to the Consultant's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.

Primary Coverage

For any claims related to this contract, the Consultant's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City of Sebastopol, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Sebastopol, its officers, officials, employees, or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

Notice of Cancellation

Consultant shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Consultant shall forthwith obtain and submit proof of substitute insurance.

Waiver of Subrogation

Consultant hereby grants to the City of Sebastopol a waiver of any right to subrogation which any insurer of said Consultant may acquire against the City of Sebastopol by virtue of the payment of any loss under such insurance. Consultant agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City of Sebastopol has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City of Sebastopol for all work performed by the Contractor, its employees, agents, and subcontractors.

Self-Insured Retentions

Self-insured retentions must be declared to and approved by the City of Sebastopol. The City of Sebastopol may require the Consultant to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the City of Sebastopol.

Acceptability of Insurers

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the City of Sebastopol.

Verification of Coverage

Consultant shall furnish the City of Sebastopol with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to the City of Sebastopol before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Consultant's obligation to provide them. The City of Sebastopol reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

Subcontractors

Consultant shall require and verify that all subcontractors maintain insurance, meeting all the requirements stated herein, and Contractor shall ensure that the City of Sebastopol is an additional insured on insurance required from subcontractors.

Special Risks or Circumstances

The City of Sebastopol reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, made and entered into on _____ by and between the City of Sebastopol, located in the County of Sonoma, State of California (City), and [Consultant Company Name] (Consultant).

RECITALS:

A. City desires to employ Consultant to furnish professional services in connection with the project described as Professional Audit Services.

B. Consultant has represented that Consultant has the necessary expertise, experience, and qualifications to perform the required duties.

NOW, THEREFORE, in consideration of the mutual premises, covenants, and conditions herein contained, the parties agree as follows:

SECTION 1 – BASIC SERVICES

Consultant agrees to perform the services set forth in **Exhibit A, "Scope of Services"** and made part of this Agreement.

SECTION 2 – ADDITIONAL SERVICES

Consultant shall not be compensated for any services rendered in connection with its performance of this Agreement which are in addition to or outside of those set forth in this Agreement or **Exhibit A, "Scope of Services"**, unless such additional services and compensation are authorized in advance and in writing by the City Council or City Manager of the City.

SECTION 3 – TIME FOR COMPLETION

The time for completion of services shall be as identified in **Exhibit A, "Scope of Services"**.

SECTION 4 – COMPENSATION AND METHOD OF PAYMENT

A. Subject to any limitations set forth in this Agreement, City agrees to pay consultant the amount specified in Exhibit A, Proposal dated [date], attached hereto and made a part hereof. Total compensation shall not exceed a total of $[amount], unless additional compensation is approved in accordance with Section 2.

B. Consultant shall furnish to City an original invoice for all work performed and expenses incurred during the preceding month. The invoice shall detail charges by the following categories if applicable: labor (by sub-category), travel, materials, equipment, supplies, subconsultant contracts, and miscellaneous expenses. City shall independently review each invoice submitted to determine whether the work performed, and expenses incurred are in compliance with the provisions of this Agreement. If no charges or expenses are disputed, the invoice shall be approved and City will use its best efforts to cause Consultant to be paid within 30 days of receipt of invoice. If any charges or expenses are disputed by City, the original invoice shall be returned by City to Consultant for correction and resubmission. If the City reasonably determines, in its sole judgment, that the invoiced charges and expenses exceed the value of the services performed to date and that it is probable that

the Agreement will not be completed satisfactorily within the contract price, City may retain all or a portion of the invoiced charges and expenses. Within thirty (30) days of satisfactory completion of the project, City shall pay the retained amount, if any, to Consultant.

C. Payment to the Consultant for work performed pursuant to this Agreement shall not be deemed to waive any defects in work performed by Consultant.

SECTION 5 – STANDARD OF PERFORMANCE

Consultant represents and warrants that it has the qualifications, experience and facilities necessary to properly perform the services required under this Agreement in a thorough, competent and professional manner. Consultant shall at all times faithfully, competently and to the best of its ability, experience and talent, perform all services described herein. In meeting its obligations under this Agreement, Consultant shall employ, at a minimum, generally accepted standards and practices utilized by persons engaged in providing services similar to those required of Consultant under this Agreement.

SECTION 6 – INSPECTION AND FINAL ACCEPTANCE

City may inspect and accept or reject any of Consultant's work under this Agreement, either during performance or when completed. City shall reject or finally accept Consultant's work within sixty (60) days after submitted to City, unless the parties mutually agree to extend such deadline. City shall reject work by a timely written explanation, otherwise Consultant's work shall be deemed to have been accepted. City's acceptance shall be conclusive as to such work except with respect to latent defects and fraud. Acceptance of any of Consultant's work by City shall not constitute a waiver of any of the provisions of this Agreement including, but not limited to, the sections pertaining to indemnification and insurance.

SECTION 7 – INSURANCE REQUIRED

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Consultant, its agents, representatives, or employees.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. Commercial General Liability (CGL): Insurance Services Office Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury, and personal & advertising injury with limits no less than $2,000,000 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.

2. Automobile Liability: Insurance Services Office Form Number CA 0001 covering, Code 1 (any auto), or if Consultant has no owned autos, Code 8 (hired) and 9 (non-owned), with limit no less than $1,000,000 per accident for bodily injury and property damage.

3. Workers' Compensation insurance, as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease. (Not required if consultant provides written verification that it has no employees)

4. Professional Liability (Errors and Omissions) Insurance appropriates to the Consultant's profession, with limit no less than $2,000,000 per occurrence or claim, $2,000,000 aggregate. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Consultant must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the City of Sebastopol for review. If the Consultant maintains broader coverage and/or higher limits than the minimums shown above, the City of Sebastopol requires, and shall be entitled to, the broader coverage and/or higher limits maintained by the Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Sebastopol.

Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions: The City of Sebastopol, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Consultant including materials, parts, or equipment furnished in connection with such work or operations.

General liability coverage can be provided in the form of an endorsement to the Consultant's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.

Primary Coverage

For any claims related to this contract, the Consultant's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City of Sebastopol, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Sebastopol, its officers, officials, employees, or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

Notice of Cancellation

Consultant shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required polices are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Consultant shall forthwith obtain and submit proof of substitute insurance.

Waiver of Subrogation

Consultant hereby grants to the City of Sebastopol a waiver of any right to subrogation which any insurer of said Consultant may acquire against the City of Sebastopol by virtue of the payment of any loss under such insurance. Consultant agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City of Sebastopol has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City of Sebastopol for all work performed by the Contractor, its employees, agents, and subcontractors.

Self-Insured Retentions

Self-insured retentions must be declared to and approved by the City of Sebastopol. The City of Sebastopol may require the Consultant to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the City of Sebastopol.

Acceptability of Insurers

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the City of Sebastopol.

Verification of Coverage

Consultant shall furnish the City of Sebastopol with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to the City of Sebastopol before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Consultant's obligation to provide them. The City of Sebastopol reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

Subcontractors

Consultant shall require and verify that all subcontractors maintain insurance, meeting all the requirements stated herein, and Contractor shall ensure that the City of Sebastopol is an additional insured on insurance required from subcontractors.

Special Risks or Circumstances

The City of Sebastopol reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

SECTION 8 – INDEMNIFICATION

A. Consultant shall indemnify and hold harmless City, its agents, officers, officials, employees, and volunteers from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with this Agreement; and Consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings

brought or instituted against City, its agents, officers, officials, employees and volunteers, or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

B. When Consultant under this Agreement is duly licensed under California Business and Professions Code as an architect, landscape architect, professional engineer, or land surveyor ("design professional"), the provisions of this section regarding Consultant's duty to defend and indemnify apply only to claims that arise out of or relate to the negligence, recklessness, or willful misconduct of the design professional.

C. If any action or proceeding is brought against Indemnitees by reason of any of the matters against which Consultant has agreed to indemnify Indemnitees as provided above, Consultant, upon notice from City, shall defend Indemnitees at Consultant's expense by counsel acceptable to City, such acceptance not to be unreasonably withheld. Indemnitees need not have first paid for any of the matters to which Indemnitees are entitled to Indemnification in order to be so indemnified. The insurance required to be maintained by Consultant shall ensure Consultant's obligations under this section, but the limits of such insurance shall not limit the liability of Consultant hereunder. The provisions of this section shall survive the expiration or earlier termination of this Agreement.

The provisions of this section do not apply to claims to the extent occurring as a result of the City's sole negligence or willful acts or misconduct.

SECTION 9 – INDEPENDENT CONTRACTOR STATUS

A. Consultant is and shall at all times remain a wholly independent contractor and not an officer, employee, or agent of City. Consultant shall have no authority to bind City in any manner, nor to incur an obligation, debt or liability of any kind on behalf of or against City, whether by contract or otherwise, unless such authority is expressly conferred under this Agreement or is otherwise expressly conferred in writing by City.

B. The personnel performing the services under this Agreement on behalf of Consultant shall at all times be under Consultant's exclusive direction and control. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall have control over the conduct of Consultant or any of Consultant's officers, employees or agents, except as set forth in this Agreement. Consultant shall not at any time or in any manner represent that Consultant or any of Consultant's officers, employees or agents are in any manner officials, officers, employees or agents of City.

C. Neither Consultant, nor any of Consultant's officers, employees or agents, shall obtain any rights to retirement, health care or any other benefits which may otherwise accrue to City's employees. Consultant expressly waives any claim Consultant may have to any such rights.

SECTION 10 – CONFLICTS OF INTEREST

A. Consultant covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, which would conflict in any manner with the interests of City or which would in any way hinder Consultant's performance of services under this Agreement. Consultant further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent, or subcontractor without the express

written consent of the City Manager. Consultant agrees to at all times avoid conflicts with the interests of City in the performance of this Agreement.

B. City understands and acknowledges that Consultant is, as of the date of execution of this Agreement, independently involved in the performance of non-related services for other governmental agencies and private parties. Consultant is aware of any stated position of City relative to such projects. Any future position of City on such projects shall not be considered a conflict of interest for purposes of this section.

SECTION 11 – OWNERSHIP OF DOCUMENTS

A. All original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents prepared, developed or discovered by Consultant in the course of providing any services pursuant to this Agreement shall become the sole property of City and may be used, reused or otherwise disposed of by City without the permission of the Consultant. When requested by City, but no later than three years after project completion, Consultant shall deliver to City all such original maps, models, designs, drawings, photographs, studies, surveys, reports, data, notes, computer files, files and other documents.

B. All copyrights, patents, trade secrets, or other intellectual property rights associated with any ideas, concepts, techniques, inventions, processes, improvements, developments, works of authorship, or other products developed or created by Consultant during the course of providing services (collectively the "Work Product") shall belong exclusively to City. The Work Product shall be considered a "work made for hire" within the meaning of Title 17 of the United States Code. Without reservation, limitation, or condition, Consultant hereby assigns, at the time of creation of the Work Products, without any requirement of further consideration, exclusively and perpetually, any and all right, title, and interest Consultant may have in the Work Product throughout the world, including without limitation any copyrights, patents, trade secrets, or other intellectual property rights, all rights of reproduction, all rights to create derivative works, and the right to secure registrations, renewals, reissues, and extensions thereof.

SECTION 12 – CONFIDENTIAL INFORMATION; RELEASE OF INFORMATION

A. All information gained or work product produced by Consultant in performance of this Agreement shall be considered confidential, unless such information is in the public domain or already known to Consultant. Consultant shall not release or disclose any such information or work product to persons or entities other than City without prior written authorization from the City Manager, except as may be required by law.

B. Consultant, its officers, employees, agents or subcontractors, shall not, without prior written authorization from the City Manager or unless requested by the City Attorney of City, voluntarily provide declarations, letters of support, testimony at depositions, response to interrogatories or other information concerning the work performed under this Agreement. Response to a subpoena or court order shall not be considered "voluntary" provided consultant gives City notice of such court order or subpoena.

C. If Consultant, or any officer, employee, agent, or subcontractor of Consultant, provides any information or work product in violation of this Agreement, then City shall have the right to reimbursement and indemnity from Consultant for any damages, costs and fees, including attorney's fees, caused by or incurred as a result of Consultant's conduct.

D. Consultant shall promptly notify City should Consultant, its officers, employees, agents or subcontractors be served with any summons, complaint, subpoena, notice of deposition, request for documents, interrogatories, request for admissions or other discovery request, court order or subpoena from any party regarding this Agreement and the work performed thereunder. City retains the right, but has no obligation, to represent Consultant or be present at any deposition, hearing or similar proceeding. Consultant agrees to cooperate fully with City and to provide City with the opportunity to review any response to discovery requests provided by Consultant. However, this right to review any such response does not imply or mean the right by City to control, direct, or rewrite such response.

SECTION 13 – SUSPENSION OF WORK

City may, at any time, by ten (10) days written notice suspend further performance by Consultant. All suspensions shall extend the time schedule for performance in a mutually satisfactory manner and Consultant shall be paid for services performed and reimbursable expenses incurred prior to the suspension date.

SECTION 14 – COMPLIANCE WITH LAW

Consultant shall keep itself informed of and comply with all applicable federal, state and local laws, statutes, codes, ordinances, regulations and rules in effect during the term of this Agreement. Consultant shall obtain any and all licenses, permits and authorizations necessary to perform the services set forth in this Agreement. Neither City, nor any elected or appointed boards, officers, officials, employees or agents of City, shall be liable, at law or in equity, as a result of any failure of Consultant to comply with this section.

SECTION 15 – COMPLIANCE WITH CIVIL RIGHTS

During the performance of this contract, Consultant agrees as follows:

A. Equal Employment Opportunity. In connection with the execution of this Agreement, Consultant shall not discriminate against any employee or applicant for employment because of race, religion, color, ancestry, age, sexual orientation, physical handicap, medical condition, marital status, sex, or national origin. Such actions shall include, but not be limited to, the following: employment, promotion, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training including apprenticeship.

B. Nondiscrimination Civil Rights Act of l964. Consultant will comply with all federal regulations relative to nondiscrimination to federally-assisted programs.

C. Solicitations for Subcontractors including Procurement of Materials and Equipment. In all solicitations, either by competitive bidding or negotiations, made by Consultant for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor, supplier, or lessor shall be notified by Consultant of Consultant's obligations under this Agreement and the regulations relative to nondiscrimination.

SECTION 16 – RECORDS

A. Records of Consultant's direct labor costs, payroll costs, and reimbursable expenses pertaining to this project covered by this Agreement will be kept on a generally recognized accounting

basis and made available to City if and when required for a period of up to 3 years from the date of Consultant's final invoice.

B. Consultant's records and design calculations will be available for examination and audit if and as required. The cost of any reproductions shall be paid by City.

SECTION 17 – COOPERATION BY CITY

All public information, data, reports, records, and maps as are existing and available to City as public records, and which are necessary for carrying out the work as outlined in the Exhibit A, "Scope of Services", shall be furnished to Consultant in every reasonable way to facilitate, without undue delay, the work to be performed under this Agreement.

SECTION 18 – NOTICES

All notices required or permitted to be given under this Agreement shall be in writing and shall be personally delivered, or sent by facsimile or first class mail, addressed as follows:

To City:
City Manager
7120 Bodega Ave
Sebastopol, California 95472

To Consultant:
[Consultant Name]
[Address]
[City, State, Zip Code]

Notice shall be deemed effective on the date personally delivered or transmitted by facsimile, or, if mailed, three (3) days after deposit in the custody of the U.S. Postal Service.

SECTION 19 – TERMINATION

City may terminate this Agreement, with or without cause, at any time by giving ten (10) days written notice of termination to Consultant. If such notice is given, Consultant shall cease immediately all work in progress.

If either Consultant or City fail to perform any material obligation under this Agreement, then, in addition to any other remedies, either Consultant, or City may terminate this Agreement immediately upon written notice.

Upon termination of this Agreement by either Consultant or City, all property belonging to City which is in Consultant's possession shall be delivered to City. Consultant shall furnish to City a final invoice for work performed and expenses incurred by Consultant, prepared as set forth in this Agreement.

SECTION 20 – ATTORNEY FEES

If litigation or other proceeding is required to enforce or interpret any provision of this Agreement, the prevailing party in such litigation or other proceeding shall be entitled to an award of reasonable attorneys' fees, costs and expenses, in addition to any other relief to which it may be

entitled. In addition, any legal fees, costs and expenses incurred to enforce the provisions of this Agreement shall be reimbursed to the prevailing party.

SECTION 21 – ENTIRE AGREEMENT

This Agreement, including the attached Exhibits, is the entire, complete, final and exclusive expression of the parties with respect to the matters addressed therein and supersedes all other agreements or understandings, whether oral or written, or entered into between Consultant and City prior to the execution of this Agreement. No statements, representations or other agreements, whether oral or written, made by any party which are not embodied herein shall be valid and binding unless in writing duly executed by the parties or their authorized representatives.

SECTION 22 – SUCCESSORS AND ASSIGNS

This Agreement shall be binding on the heirs, executors, administrators, successors and assigns of the parties. However, this Agreement shall not be assigned by Consultant without written consent of the City.

SECTION 23 – CONTINUITY OF PERSONNEL

Consultant shall make every reasonable effort to maintain the stability and continuity of Consultant's staff assigned to perform the services required under this Agreement. Consultant shall notify City of any changes in Consultant's staff assigned to perform the services required under this Agreement, prior to any such performance.

SECTION 24 – DEFAULT

In the event that Consultant is in default under the terms of this Agreement, the City shall not have any obligation or duty to continue compensating Consultant for any work performed after the date of default and may terminate this Agreement immediately by written notice to Consultant.

SECTION 25 – WAIVER

Waiver by any party to this Agreement of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver by any party of any breach of the provisions of this Agreement shall not constitute a waiver of any other provision, nor a waiver of any subsequent breach or violation of any provision of this Agreement. Acceptance by City of any work or services by Consultant shall not constitute a waiver of any of the provisions of this Agreement.

SECTION 26 – LAW TO GOVERN; VENUE

This Agreement shall be interpreted, construed and governed according to the laws of the State of California. In the event of litigation between the parties, venue in state trial courts shall lie exclusively in the County of Sonoma. In the event of litigation in a U.S. District Court, venue shall lie exclusively in the Northern District of California, in San Francisco.

SECTION 27 – SEVERABILITY

If any term, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and the Agreement shall be read and construed without the invalid, void or unenforceable provision(s).

SECTION 28 – SPECIAL PROVISIONS

This Agreement is subject to the following special provisions: none.

IN WITNESS WHEREOF, the parties hereto have accepted, made, and executed this Agreement upon the terms, conditions, and provisions above stated, the day and year first above written.

City:			Consultant: [Company]		
By:	_____	_____	By:	_____	_____
Name:	Mary Gourley	Date	Name:	[Name]	Date
Title:	Interim City Manager		Title:	[Title]	

Approved as to Form:

By:	_____	_____
Name:	Alex Mog	Date
Title	City Attorney	

Drinking Water Regulatory Compliance Feasibility Project

City of Sebastopol
Public Works Department

November 2012

DRINKING WATER REGULATORY COMPLIANCE FEASIBILITY PROJECT

CITY OF SEBASTOPOL, PUBLIC WORKS DEPARTMENT

Project No. 02061-12001-32003

Prepared for:

City of Sebastopol

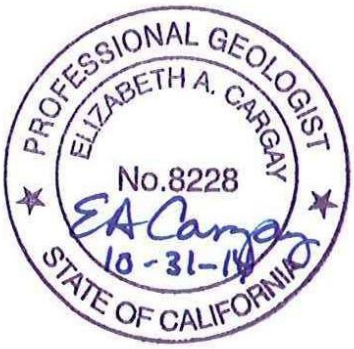
Prepared by:

Aaron Sullivan, PE
Project Engineer

Reviewed by:

Elizabeth Cargay

Elizabeth Cargay, PG
Senior Geologist



GHD Inc.

2235 Mercury Way Suite 150 Santa Rosa CA 95407 USA

T 1 707 523 1010 **F** 1 707 527 8679 **E** santarosa@ghd.com **W** www.ghd.com

November 30, 2012

Contents

1. Executive Summary 1
   - 1.1 Introduction 1
   - 1.2 Section 2 – Well Site Assessments and Treatment Options 1
   - 1.3 Section 3 – Alternatives analysis 2
   - 1.4 Section 4 – Implementation Plan 2
2. Well Site Assessments and Treatment Options 4
   - 2.1 Introduction 4
     - 2.1.1 Purpose 4
   - 2.2 Background 4
     - 2.2.1 System Overview and Historical Water Quality 4
   - 2.3 Hydrogeologic Conditions 6
   - 2.4 Well Site Assessments 7
     - 2.4.1 Well 4 7
     - 2.4.2 Well 5 9
     - 2.4.3 Well 6 11
     - 2.4.4 Well 7 13
     - 2.4.5 Well 8 14
   - 2.5 Treatment Options and Technologies 15
     - 2.5.1 Treatment for Arsenic Removal 15
     - 2.5.2 VOC Removal 17
     - 2.5.3 Import Water 17
   - 2.6 New Well Source 17
3. Alternatives Analysis 18
   - 3.1 Introduction 18
     - 3.1.1 Purpose 18
     - 3.1.2 Development of Alternatives 18
   - 3.2 Treatment and Supply Alternatives Analysis 18
     - 3.2.1 Independent Zone Analysis 18
     - 3.2.2 System-Wide Analysis 25
   - 3.3 Alternatives Analysis 28
   - 3.4 Alternatives Analysis Recommendations 30
   - 3.5 Alternatives Analysis Conclusion 31
4. Implementation Plan 32

Figure:

Figure 1 – Well Location Map

Contents (continued)

Tables:
Table 1 – Historical Summary of Supply Well Analytical Data
Table 2 – Water Supply Well Construction Data
Table 3 – Water Supply Well Yield, Water Quality Issues and Treatment

Appendices:
Appendix A – Various Figures from PES's Water Supply Assessment Report, Northeast Area Specific Plan, June 27, 2007
Appendix B – Various Figures from ECM Group's Remedial Action Plan for 501 S. Main Street, May 7, 2012
Appendix C – Various Figures from CSS Environmental Feasibility Study and Comprehensive Remedial Action Plan, April 24, 2009
Appendix D – Arsenic Speciation Laboratory Report and BESST Zone Test Report
Appendix E – Various Figures from Streamborn's Installation of Groundwater Monitoring Wells and Groundwater Monitoring, December 19, 2005
Appendix F – Copy of Letter from City of Sebastopol PWD to Sonoma County Water Agency
Appendix G – Alternative Net Present Value Calculation
Appendix H – Reconnaissance Level Estimates of Probable Cost

1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

The City retained the services of GHD to conduct a Drinking Water Regulatory Compliance Feasibility Study with the goal of assessing various feasible groundwater system treatment options available to the City in order to:

1. Achieve and maintain long-term compliance with existing and new regulatory requirements, primarily for arsenic and tetrachloroethylene (PCE) in municipal drinking water;
2. Maintain flexibility and redundancy of water supply sources in order to assure long-term production capacity to serve customers; and
3. Assess the opportunities, constraints, and costs of various strategies.

GHD completed this Feasibility Study in three separate task elements with the goal of identifying the best treatment options for the City's drinking water system as a whole. The Study analyzed various combinations and overall costs of treatment to keep the City in compliance with water quality standards of the State. The three Feasibility Study tasks were to:

1. Summarize historical well data, complete well site assessments and identify treatment options (Section 2);
2. Complete an Alternatives Analysis with various options and compare costs (Section 3); and
3. Summarize and Prepare an Implementation Plan (Section 4).

Once each task was completed, a Technical Memorandum was prepared. Upon City approval, the Technical Memorandum was converted into a Chapter of this Final Report. A summary of each of the three tasks is presented below with the final recommendations at the end.

1.2 SECTION 2 – WELL SITE ASSESSMENTS AND TREATMENT OPTIONS

Section 2 contains the well assessments and treatment options. The well assessment portion gives an understanding of the design, operation, and contaminants (if applicable) impacting each of the City's five wells.

The City of Sebastopol's (City) municipal groundwater system is supplied by five wells feeding two pressure zones, but only three wells (Wells 4, 6 and 8) are currently active. Wells 4, and if activated, 5 and 7, supply Pressure Zone 1. Wells 6 and 8 supply Pressure Zone 2.

Wells 4 and 5 have been impacted by chlorinated hydrocarbons but are currently below the maximum contaminant levels (MCL). Naturally occurring arsenic is prevalent in Wells 6 and 7 above the MCL. Well 4 is currently fitted with a granular activated carbon (GAC) treatment system and Well 6 uses blending of Zone 1 water to lower arsenic concentrations. Well 7 is currently not in production due to slightly elevated, but stable, arsenic concentrations above the MCL.

A discussion of the treatment options is given to identify various treatment technologies and operational changes that are available to limit, reduce, or remove the contaminant(s) present in the well water. For the initial identification of treatment options in this section, all available known options were identified regardless of their cost or feasibility for implementation at the City's well sites. Treatment options included reviewing blending, adsorptive media (e.g. granular ferric hydroxide (GFH)), oxidation, coagulant-assisted coprecipitation/ filtration, lime softening, high pressure membranes, ion exchange, electrodialysis reversal, and advanced oxidation (ozone/UV) with hydrogen peroxide. Well options included new well sources to replace wells and/or enhancing the existing well.

1.3 SECTION 3 – ALTERNATIVES ANALYSIS

Section 3 contains information on the treatment alternatives to examine the various options available at each of the well sites to select a preferred alternative for each well with the most cost-effective treatment for meeting State and Federal drinking water standards. The preferred alternative includes elements that would result in a robust City water supply system that is operationally flexible with sufficient redundancy to provide long term solutions with the lowest overall life cycle cost.

The various options and alternatives were developed based on meeting three criteria: operational flexibility, operational redundancy, and life cycle cost. In developing the various alternatives, the two individual pressure zones (Zone 1 and Zone 2) were first analyzed independently from one another; then the entire system was analyzed as a whole (Zone 1 and Zone 2 combined) to develop the list of alternatives for consideration and final selection.

The recommended best alternative is Alternative Z2D-2 which includes:

1. Well 4 GAC media changeout, when required;[1]
2. Well 7 modifications possibly including:, lowering of pump, and reducing pump output and then if necessary, double packer or add swages to well casing;
3. Well 6 Iron coprecipitation treatment system installation, assuming Well 7 modifications are successful; and
4. Well 7 blending after a partial treatment with GFH adsorptive media.

1.4 SECTION 4 – IMPLEMENTATION PLAN

The Implementation Plan is described in Section 4 and details the recommended sequence of steps to implement the recommended alternative. Greater detail of the steps and a flow chart are presented in Section 4. In summary, the Implementation Plan is as follows:

1. Implement modifications to Well 7 including lowering the pump and flow output and monitor arsenic levels.

[1] Here and elsewhere in the report, Well 4 GAC media changeout is included for discussion as part of overall strategy; however, this eventual need is known and partial funds remain available for this purpose as a result of the well litigation settlement.

2. If modifications at Well 7 do not result in lowering of the arsenic concentrations to below the MCL, consider sealing off additional sections of the well screen with sweges or multiple packers.

3. Following improvements at Well 7, improvements to Well 6 are recommended, specifically in the installation of an iron co-precipitation treatment system. GFH treatment is also acceptable at Well 6 as an alternative. The suitability of GFH as a treatment technology is dependent on the expected frequency of the media change out. To determine the expected frequency of the media change out, complete testing of the water accompanied by a pilot study is recommended regardless of the selected technology. Prior to implementation of any technology at full-scale, pilot testing of the chosen technology is strongly recommended to validate the process, develop design criteria, accurate life-cycle costs and operational familiarity with the process.

4. Even if immediate modifications at Well 7 are successful, it is still recommended that the partial treatment system employing GFH or similar adsorptive media be designed and installed because the arsenic-impacted groundwater may still bypass the packer through the sand pack over time and raise the arsenic level again. If the immediate modifications do not work, then partial treatment employing GFH should be considered prior to Well 6 treatment.

2. WELL SITE ASSESSMENTS AND TREATMENT OPTIONS

2.1 INTRODUCTION

Information presented in this section is taken from Technical Memorandum 1 originally submitted to the City on August 1.

2.1.1 PURPOSE

Through meetings with Sebastopol Department of Public Works (DPW) staff, well design and performance data review, well water quality data collection and review, and a site visit conducted on June 14, 2012, GHD performed an assessment of the City wells to determine well condition, pumping performance, and water quality. This information was then used to develop treatment options related to the wells and their particular performance and water quality issues.

2.2 BACKGROUND

2.2.1 SYSTEM OVERVIEW AND HISTORICAL WATER QUALITY

The City's municipal water system is supplied by five wells feeding two pressure zones (Figure 1). Three wells are currently active and two wells are inactive. Well 5 is inactive due to past contamination from dry cleaning chemicals and Well 7 has recently been placed on inactive status due to arsenic concentrations over the MCL. Well 4 is impacted by chlorinated hydrocarbons and Arsenic is prevalent in Wells 6 and 7. Wells 4 and 7 supply Zone 1 while Wells 6 and 8 supply Zone 2. Table 1 includes both historic and the most current water quality data for the contaminants of concern and Table 3 includes specific information on each well's yield, water quality issues, and treatment. In general, the following Table below summarizes the basic information and issues with each well.

Well Summary

Zone	Zone 1					Zone 2	
Well No.	4		5		7	6	8
Status	Active		Inactive since 1987		Active	Active	Active
Year installed	1953		1960		1996	1968	2007
Current Treatment	Granular Activated Carbon (GAC)		none		Packer installed at 395-400' to seal off upper screens	Blending Zone 1 water with Well 6 water to prior to distribution to Zone 2	none
Contaminant(s) of Concern	1,2 DCA	PCE	PCE (from dry cleaner (which has since been <5 in well since 1993)	BTEX and MTBE nearby	As in the form of As(III)	As in the form of As(V)	none
Recent Contaminant Level in City Well (2011-12)	<5 µg/L	0.49 µg/L (0.29 treated)	0.52 µg/L	<0.5	12 µg/L (Annual Avg)	19-24 µg/L	none
MCL	5 µg/L	5 µg/L	5 µg/L	B=1 µg/L T=150 µg/L E=300 µg/L X=1,750 µg/L MTBE Primary = 13 µg/L (Secondary = 5 µg/L)	10 µg/L	10 µg/L	none
Comments	1, 2 DCA currently not present above detection limit; PCE has been detected, up to 0.49 µg/L; and, As (V) is below MCL.		Prior to putting well back online, City should consider treatment for BTEX and MTBE due to nearby contaminate source.		As (III) concentrations were above the MCL due to failing packer and Arsenic likely moving through the sand pack.	As (V) concentrations continue to rise, reducing the effectiveness of blending.	Well 8 replaced Well 2 at same site; Arsenic was above MCL in old Well 2

Acronyms:

As	Arsenic
As (III)	Arsenic (III), naturally occurring, at a valance of +3
As (V)	Arsenic (V), naturally occurring, at a valence of +5
BTEX	benzene, toluene, ethyl benzene, and xylene (petroleum derived volatile organic compounds)
MCL	maximum contaminant level (drinking water standard)
MTBE	Methyl tertiary-butyl ether, primary MCL with secondary MCL in parentheses
ND	non-detect (level)
PCE	Perchloroethylene, or aka tetrachloroethylene
µg/L	micrograms per liter (or parts per billion, ppb)
1, 2-DCA	1, 2 Dichloroethane

- Well 4 has been impacted by chlorinated hydrocarbons (1, 2-DCA) and more recently low levels of PCE and a Granular Activated Carbon (GAC) treatment system was installed to effectively address these contaminants.
- Well 5 has been impacted with Volatile Organic Compounds (VOCs) associated with dry cleaning chemicals, e.g., tetrachloroethylene (PCE) and trichloroethylene (TCE), and is in close proximity to a petroleum plume.
- Historically arsenic has been detected at Well 4 ranging between 2-7.9 µg/L and is currently at levels below the MCL of 5 µg/L.
- Wells 6 has arsenic concentrations above the MCL. Well 6 has the highest concentration of arsenic of the Sebastopol well field and is blended with water supplied from Zone 1.
- Well 7 has historical arsenic concentrations at the MCL. Recently, Well 7's current annual average concentration of arsenic is above the MCL.
- Well 8, the newest, active well, is providing water with acceptable quality, and was constructed only in the lower aquifer zone to avoid the arsenic in the upper aquifer zone. Well 2, which has since been decommissioned and abandoned, was located adjacent to the Well 8. It had arsenic concentrations above the MCL because it was screened in the upper and lower aquifer zones.

2.3 HYDROGEOLOGIC CONDITIONS

The City is located in western Sonoma County, California, within the Santa Rosa Valley. The City lies on two different hydrologic basins: the Santa Rosa Valley Groundwater Basin (SR Valley) and the Wilson Grove Formation Highlands (WG Highlands). The eastern portion of the City is located in the midwestern margin of the SR Valley. It is located in a northwest trending, structural depression and the City extends from the plains, into the low hills west of the City and into the Coast Range on the east. The steeper portion of the City is within the WG Highlands and is characterized by gently rolling hills between the Santa Rosa Plain and the Pacific Ocean. The City wells extend to depths of 500 to 700 feet deep into the WG Highlands.

According to California Department of Water Resources, *California's Groundwater Bulletin No. 118, Santa Rosa Valley, Santa Rosa Plain Sub basin,* 2004 Update, and the *USGS Geologic Map of the 7.5 minute Sebastopo*l, 2008, groundwater source is identified in three major units:

Alluvial deposits cover most of the Santa Rosa Plain and consist of up to 100 feet thick of poorly sorted coarse sand and gravel interbedded with moderately sorted fine sand, silt and clay. Alluvial deposits have a specific yield of 8 to 17%.

Glen Ellen Formation is the principal aquifer in the basin and is situated below the alluvial deposits. This unit consists of partially cemented stream channels and terrace deposits with lenses of poorly sorted gravel, sand, silt and clay with fossiliferous sandstone that vary widely in thickness and extent, but ranges in thickness from 300 to 2,000 feet thick. Wells in this unit can produce more than 500 gallons per minute (gpm), but the average specific yield is 3 to 7% and is the formation where most domestic and irrigation wells are installed. Water quality is generally very good but it may occasionally exceed the secondary MCLs for iron and manganese.

Wilson Grove Formation (formerly Merced) is the major aquifer in the basin, with a thickness of 300 feet to more than 1,500 feet. It is predominantly a marine sandstone and pebbly sandstone. It is fine to very fine grained, well sorted, massive to poorly bedded, fossiliferous sand and sandstone. Water quality is generally very good but it may occasionally exceed the secondary MCLs for iron and manganese. Wells yield from 100 to 1,500 gpm with specific yields ranging from 10 to 20%.

Below these units is the Petaluma Formation which includes sandstone and conglomerates with sub-angular to sub-rounded clasts of greywacke and other basement rocks and volcanic material. The Franciscan Complex basement rock is below the Petaluma Formation and is composed of massive, white to greenish gray, brown and orange-weathering sandstone and can include argillite and shale with disrupted bedding. These units outcrop in the hills of the City. The Sebastopol Fault is a northwest trending strike slip fault that runs to the southeast of Sebastopol. Other lineaments also run parallel to the Sebastopol Fault and extend through the northeastern portion of the City. The City wells are all to the west of these faults, approximately 1,500 feet away.

Geologic Maps of these units are shown in a report prepared for the City in June 2007 by PES Environmental, Inc. (PES), entitled *Water Supply Assessment, Northeast Area Specific Plan*. Copies of the pertinent figures are included in Appendix A for reference. These include a Basin Map, Geologic Map, and a Geologic Cross Section across the City.

2.4 WELL SITE ASSESSMENTS

This section describes a summary of current and pertinent well data provided by the City for their five City wells. The purpose of presenting this information is to provide additional details of the well sites to better understand and thus determine the best treatment options.

2.4.1 WELL 4

2.4.1.1 Site Conditions

Well 4 site is located at 710 Petaluma Avenue in Sebastopol at the intersection of Gravenstein Highway and Palm Avenue (Figure 1). Located on the site is a well and pump house, two vertical GAC filter vessels including process piping, valving, sand removal equipment, and a filter backwash storage/buffer tank. The GAC system became operational in late 2006. The site is sufficiently large enough to support vehicle parking and equipment removal and maintenance.

2.4.1.2 Well and Pump Construction

The well was drilled in 1953 to a depth of 530 feet, has a 14-inch steel casing, and is screened between 237 and 468 feet. The well pump is a 100 horsepower (HP) vertical turbine pump enclosed within a pump house, and rated for 900 gpm capacity. The construction details are summarized on Table 2.

2.4.1.3 Well Impacts

GHD completed a search of data and documents on the GeoTracker website created by the California State Water Quality Control Board for sites with contamination. The website contains copies of reports from open and closed sites in the last 10 years or so. The following open cases were identified near the Well 4 site.

1. Valero (former Alliance Station), 720 South Main Street;
2. Sebastopol Shell, 778 South Gravenstein Highway;
3. Exxon, 840 Gravenstein Highway;
4. Old Dry Cleaners/Talmadge Wood, 250 South Main Street; and
5. Frees Development Co. Bldg., 501 South Main Street.

Of these sites, the Valero station has impacted the City's Well 4 at Spooner Park, some 200 feet east, with 1,2-Dichloroethane (1,2-DCA). According to the Third Quarterly Monitoring Report for Valero prepared in 2011, the site has an open North Coast Water Quality Control Board (NCRWQCB) case that indicates total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethyl benzene and xylenes (BTEX), as well as 1,2-DCA are all potential contaminants of concern at 80 to 100 feet deep. The underground storage tanks (USTs) were removed from the gas station site in 1986 and three double-walled fuel USTs were then installed in place of them. According to reports available for review on the website, groundwater flows in a northeasterly direction at a gradient of 0.01 to 0.008 ft/ft, but moves towards the City Well 4 in a southerly to southwesterly direction as it gets closer to the City well. The soils encountered in the borings were defined as silty sands to sand with silt in the aquifer zones. In 2006, a soil vapor extraction/air sparge system was installed, but was inadequate for the influent concentrations of gasoline. An additional vapor extraction well was installed and is currently being permitted to be added to the current extraction system. Shallow monitoring wells are installed at the edge of the park, between the City well and the Valero station, but none of the monitoring wells have been impacted. Pertinent figures from CSS Environmental' s (CSS) Remedial Action Plan are included in Appendix B and depict the comingled plumes.

In recent correspondence to the City from Ms. Jan Goebel at the NCRWQCB, it was confirmed that PCE has also been steadily climbing at low levels in the groundwater at Well 4 that had not existed prior. Ms. Goebel completed a search of other sites and well data in the area and has requested that the site located at 250 South Main Street, known to the NCRWQCB as the Old Dry Cleaners/Talmadge Wood site, where a dry cleaning business once existed. The NCRWQCB has instructed the owners at the site to begin response to interim remedial action to abate the contamination moving into the radius of influence of Well 4. This is the same site that contaminated the City's Well 5.

At the Frees Site, there is TPH-G and BTEX contamination that has extended beyond the parcel limits approximately 150 feet, but is not fully defined. It appears to be moving in a south-southwesterly direction and contamination has been detected as deep as 80-100 feet. This is in the same path as the other plumes, but appears to originate on the Site. A Groundwater Contour Map and Isoconcentration maps from the Remedial Action Plan prepared by the ECM Group in May 2012 are included in Appendix C for reference. Currently, they are planning on installing a soil vapor extraction treatment system at the site.

2.4.1.4 Contaminants of Concern

Historically, the contaminant of concern has been 1, 2-DCA, but TPH-G and BTEX are also potential contaminants of concern that are in the nearby Valero station. Recent data is also indicating a rise in concentrations of PCE.

2.4.1.5 Treatment Discussion

Well 4 is fitted with a GAC treatment system to address groundwater contamination from 1, 2-DCA. Since its installation, levels of contamination have steadily and continually dropped below the MCL. TPH-G and BTEX are still potential contaminants of concern, but have not been detected in the groundwater from City Well 4. While the water is still processed through the GAC, the water quality at this point sufficiently meets drinking water standards such that filtration of GAC may no longer be necessary for treating the 1,2 DCA. However, with the contaminant levels of nearby plumes and if the concentration of PCE continues to rise, the GAC is necessary as it is an effective method for the removal of PCE and other VOCs. In the most recent samples, PCE levels were detected at 0.41 µg/L in the raw water and 0.24 µg/L in the groundwater collected from the 50% through the first GAC filter port.

2.4.2 WELL 5

2.4.2.1 Site Conditions

Well 5 is located on a small triangular parcel one block east of Gravenstein Highway at 6860 Fannen Avenue, Sebastopol (Figure 1). Immediately north of the site is the Joe Rodota Trail. At the site there is a small pump house and a large, baffled settling tank for the removal of sand. The site has limited area, for vehicle parking and appears sufficient to facilitate equipment removal and maintenance.

2.4.2.2 Well and Pump Construction

Well 5 was constructed in 1960, and is of the same type and construction as Well 4. The pump is a vertical turbine fitted with a 60 HP motor, and pump control equipment housed in the pump house. The pump has a capacity to pump 900 gpm and is set at 250 feet below the ground, and is screened between 138 and 528 feet.

2.4.2.3 Well Impacts

In 1987, PCE was discovered in Well 5. After several investigations, it was determined that the PCE originated from the Em's Chevron/Old Dry Cleaners/Talmadge Wood Site area located to the northwest of Well 5. In 1987, Well #5 was taken out of service. According to an April 2009 report, *Feasibility Study and Comprehensive Remedial Action Plan for 250-280 South Main Street, Sebastopol, CA*, *completed* by CSS, "*since cessation of pumping at City Well 5, the natural groundwater flow from the Site has consistently been to the south-southeast instead of towards southeast"*, towards Well 5. A description of the geology of the area was described in the same report and is summarized below:

> *"CSS installed a deep monitoring well, designated as MW-17. Logs of well MW-17, to a depth of 120 feet bgs, show that the saturated water table zone soils consist of permeable granular materials including coarse and fine-grained sands and gravels. This alluvial pattern is consistent with the 1960 test hole for City Well 5, located ¼ mile southeast of the site on Fannen Avenue. Logs of City Well 5 indicate that alluvial sands and gravels predominate to a depth of 112 feet where hard sandstone is reported. This sandstone is a potential confining layer at the base of the shallow unconfined water table. The sandstones are marine deposits and are described alternately as hard and soft, some with marine shells present. They predominate the test hole's log from 112 feet to a depth of almost 300 feet. Clay with various amounts of sand and or gravel appears from about 300 to a depth of about*

340 feet. Sands and sandstones predominate to the total depth of the test hole at 646 feet with yellow and blue clay with sand noted between 560 and 590 feet. City Well 5 is screened from 138 to 528 feet, with an annular seal of 120 feet. Another municipal well in the site vicinity, City Well 4, located approximately 1,200 feet downgradient, is screened from 237 feet to 468 feet with an annular seal of 135 feet. Sandstone was encountered in this well at a depth interval of about 135 to 270 feet with underlying clay to about 370 feet."

Since then, the PCE has decreased to the point that the City has been considering options to reactivate the well. In order to assess this possibility, GHD reviewed GeoTracker for nearby sites that could potentially impact this well. The following sites were reviewed:

1. Em's Chevron, 280 Main Street;
2. Old Dry Cleaner/Talmadge Wood; 250 Main Street, South;
3. Angelo Giusti Class III Disposal Site, East of Highway 12, between Burnett and Bodega Ave;
4. J&W Foreign Auto Repair, 401 Main Street, South;
5. Nelson Site , 327 Petaluma Avenue; and
6. Wyatt's Tire Service, 100 Brown Street.

At the Chevron and Old Dry Cleaner sites, a combined workplan has been approved by the NCRWQCB in March 2012. This workplan is for additional drilling to be completed in an attempt to gain information regarding the vertical distribution of groundwater contaminants in the subsurface and assess their diffusion from varying strata within the shallow water-bearing zone. However, it was noted in May 2012 by Analytical Sciences, that PCE was now being detected consistently in Well 4, at 0.49 µg/L in 2012. The Old Dry Cleaner site's monitoring well MW-14 is a shallow screened well [from 25 to 40 feet below ground surface (bgs)] and is located between the site aLabnd Well 4. MTBE was detected in this monitoring well in August and December of 2011, and in December 2011 it had detectable levels of PCE.

In-situ chemical oxidation has been identified as a remedy for cleanup of the groundwater for VOCs on and near the site. Further downgradient of the Site, VOCs are comingled with petroleum hydrocarbon releases from the J&W Foreign Auto Repair site located at 401 South Main Street, South. Different treatment processes (permanganate and persulfate injections) have been identified to further cleanup the comingled VOCs and petroleum hydrocarbons. This treatment would involve injecting approximately 9,000 gallons of a 2% Permanganate (MnO_4) solution at the Site and approximately 8,000 gallons of a 2% persulfate (S_2O_8) solution near J&W Foreign Auto Repair.

The NCRWQCB has requested that the sites define the extent of MTBE in the groundwater and provide a workplan from these comingled plume owners. To date, a workplan for extent definition has not been implemented.

At the Giusti Disposal site, GeoTracker indicates that there is a solvent investigation going on in 1987, but no other information is given. Additional information is needed to assess the implications on the City wells.

The Nelson site appears to have had a gasoline leak, but no enforcement has been placed on this site. There was no additional information on this site on GeoTracker. Additional information is required to assess the impacts on the City wells.

At the Wyatt's Tire Service site, TPH-G, BTEX, and MTBE are all contaminants of concern due to fuel tank leaks in the 1990s. The solvent 1, 2-DCA has also been detected in the groundwater at varying levels. Most of the known contamination appears to exist in the very shallow groundwater zones, above a locally observed, shallow, clay aquitard and appears to be increasing in concentration in the monitoring wells. Shallow wells are 10 to 10.5 feet deep and groundwater flow has varied considerably, but has tended to move in a southerly to a southeastern direction. An interim soil vapor extraction system was installed in 2011 and ran for a brief time and a Site Conceptual Model and Corrective Action Plan are currently being prepared.

2.4.2.4 Contaminants of Concern

Well 5 has been out of service since 1987 due to PCE contamination in concentrations exceeding MCL standards resulting from the Old Dry Cleaners site upgradient of the site. However, there are several potential sources of contamination that could affect Well 5 as indicated above. VOCs: TPH-G, BTEX, MTBE and 1, 2 DCA are all potential sources of contamination. Currently, the City Well 5 is inactive but the City has continued monitoring the contamination. As present time PCE concentrations are below the MCL, at 0.5 µg/L, and the City would like to consider placing the well back into active status. The treatment for this well should consider all the VOCs and MTBE as potential contaminants of concern.

2.4.2.5 Treatment Discussion

No treatment currently exists at the well site. While the PCE concentrations are currently below the MCL, it is likely that contaminant concentrations will increase when actively pumping on the aquifer and may bring in the other VOCs listed above. For the purposes of this study, it should be assumed that the concentration has the potential to increase and should therefore be treated prior to entering the distribution system. Similar to Well 4, the process by which PCE and the other VOCs are typically and effectively removed is adsorption employing GAC.

2.4.3 WELL 6

2.4.3.1 Site Conditions

Well 6 is located at 991 Gravenstein Highway near Hazel Cotter Court to the south and Redwood Avenue to the north (Figure 1). This well replaced Well 1 and 3. The large, triangular property contains a pump house, well, booster/blending pumps, a cyclone type sand separator, and electrical gear. A significant portion of the site is unpaved and unimproved.

2.4.3.2 Well and Pump Construction

The well was installed in 1968 to 572 feet deep and screened between 172 to 552 feet. The well has a 125 HP submersible pump and has a capacity to pump 750 gpm. The City has just finished installing a booster pump/blending station that blends groundwater from Well 6 with water from one of the City reservoir tanks (Zone 1) at an approximate ratio of 1:3 to reduce Arsenic that appears to be naturally occurring.

2.4.3.3 Well Impacts

Arsenic has been steadily increasing in this well. In a Spinner Test completed in December 2004, depth discrete sampling indicated that the Arsenic appears to be elevated in the shallower aquifer zones (above the MCL of 10 µg/L) in the upper approximate 350 feet (Upper Aquifer), with Arsenic below the MCL below in the lower aquifer zones (Table 1) (Lower Aquifer). In 2008, the City installed an inflatable packer to attempt to isolate the shallow elevated Arsenic zones, but it did not work as intended.

At least one recent test from 2008/2009 for Title 22 constituents detected elevated Aluminum and Manganese above the Secondary MCL; however, subsequent tests reported concentrations well below the Secondary MCL and therefore do not appear at this time to be contaminants of concern.

A review of the GeoTracker website was completed for the area surrounding Well 6. No open cases were indicated near the Well 6, but it is approximately 2,000 feet south of Well 4, which is impacted with VOCs. Although downgradient, it is not expected that the comingled plumes affecting Well 4 would reach Well 6.

2.4.3.4 Contaminants of Concern

Groundwater collected from Well 6 contains elevated, naturally occurring Arsenic above the MCL. Arsenic has been detected below 50 µg/L in the groundwater around the Santa Rosa Basin and has been linked to naturally occurring Arsenic of the Glen Ellen Formation. According to a USGS study for the neighboring Sonoma Valley Groundwater Basin completed in 2006 (Scientific Investigation Report 2006-5092), thermal water and upwelling fault-zone water contain higher concentrations of dissolved elements because mineral solubility generally increase with temperature. The temperature in the City wells does not appear to be disproportionately higher than the temperature in other City wells. Manganese and iron have also been noted to be detected in other cities in the Santa Rosa Plain associated with naturally occurring solubles, but do not appear to be occurring in Sebastopol.

With Arsenic being the contaminant of concern, further analysis of Arsenic (As) to determine the valance was conducted on July 30, 2012 by the City. A sample was collected in specially prepared containers prepared by the testing laboratory. Results indicate that the groundwater collected from Well 6 contains mostly pentavalent arsenic (As [V]) valance water (Appendix D). Arsenic in this valance state is more readily removable than trivalent arsenic (As [III]), which would require oxidation pretreatment to convert to As [V] before effective treatment by many of the most commonly used methods. Additional information on the treatment options and technologies are presented later in the memorandum.

2.4.3.5 Treatment Discussion

Well 6 has recently been fitted with a booster pump/blending station which blends water supplied from Zone 1 with water supplied from Well 6 before supplying the blended water to Zone 2. This method has been successful in lowering the concentration of Arsenic, but current blended water quality remains close to the 10 µg/L concentration for Arsenic. Should levels continue to rise, the blending of Zone 1 water with Well 6 water will become less effective for the same production volume. Well 6 would then require a reduction in production volume prior to blending or will require a treatment step at the well head to maintain concentrations at or below the MCL.

2.4.4 WELL 7

2.4.4.1 Site Conditions

Well 7 is located at 1157 Village Way, Sebastopol, on a small parcel located on the corner of Cooper Road and Village Way (Figure 1). The site is completely built upon and contains a pump house.

2.4.4.2 Well and Pump Construction

The well was installed in 1996 with multiple screen intervals between 270 and 670 feet deep. The well pump is a 100 HP submersible pump, set at 420 feet deep with a capacity of 800 gpm. An inflatable packer is installed at 395-400 feet.

2.4.4.3 Well Impacts

Arsenic has been detected above the MCL in this well since 2004. In a Spinner Test completed in November 2006, depth discrete sampling indicated that the Arsenic appears to be elevated in the shallower zones (above the MCL of 10 µg/L) in the upper approximate 350 feet, with Arsenic below the MCL in the lower zones (Table 1). In 2008, the City installed an inflatable packer to isolate the shallow elevated Arsenic zones. The packer was then moved to 395 feet and inflated. The level of arsenic was below the MCL for several years, but slowly increased until the level was above the MCL.

In October 2012, the City determined the packer pressure was too low and the packer was likely leaking. They fully inflated the packer and the arsenic level dropped but was still above the MCL. The City had to take the well off-line.

In November 2012, a dye test was completed by BESST Inc, where dye was placed in the well at several depths just above the inflated packer, and tests completed to assess if the dye was passing through. The dye was not detected below the packer, but BESST verbally indicated that the dye could stick to the gravel. They also verified that when dye was injected below the packer, it was detected. This test, although verifying that the packer was effectively sealing off the upper aquifer within the well casing, it was inconclusive at determining how quickly the groundwater is passing from the upper aquifer to the lower aquifer through the gravel pack.

A review of the GeoTracker website was completed for the area surrounding Well 7. One open case was indicated to the west and up/crossgradient of Well 7 and one active gas station was noted nearby.

1. Private Residence, 7156/7176/7160 Witter Road, Sebastopol, Cleanup Status: Open - Site Assessment, RB Case # : 1NSO732; and
2. Ultramar Station, 1080 South Gravenstein Highway, Sebastopol, No open case at current gas station.

In 2008, the NCRWQCB compiled data from many domestic wells located near Witter Road and Elphick Road, named the Witter/Elphick Study Area due to a detection of VOCs in a private well nearby. In 2002, NCRWQCB staff sampled over 65 domestic wells and identified VOCs above the MCLs in 19 wells; specifically, PCE and carbon tetrachloride. In 2005, an investigation determined that groundwater was moving in a north-northeast direction and that VOCs and Nitrate/Nitrite were detected above the MCLs in the groundwater at this site. Since then, the NCRWQCB has determined that a former machine shop once

existed on the 7176/7160 property and had a dry well that may be associated with the contaminants. Pertinent figures are attached as Appendix E, which show the location of the private wells and the contamination in relation to the City well. A workplan has been requested to investigate the plume, but has not been completed as of the review in GeoTracker. Additional information is needed to assess the potential future implications on the Well 7, but to date, no VOC contamination has been detected in this well.

Well 7 is approximately 3,000 feet south of Well 4, which is impacted with VOCs. Although likely downgradient, it is not expected that the comingled plumes affecting Well 4 would affect Well 7.

2.4.4.4 Contaminants of Concern

The latest Well 7 water quality test data in 2012 indicates Arsenic concentrations are around the MCL (10 µg/L). Any subsequent increase in Arsenic concentration will place the water from the well above the MCL. Furthermore, historical water quality data shows several reported concentrations well above 10 µg/L with subsequent tests taken showing concentrations below the MCL. This would appear to indicate that potentially as the well “rests”, concentrations of Arsenic increase in the groundwater at the well. Then, when pumping commences, the Arsenic concentration diminishes over time until a steady state concentration is reached. It is important to note that the Arsenic concentration increases over time when pumping occurs after the resting period. With the current concentration at the MCL, it is likely that future of Well 7 water will be at or above the MCL.

2.4.4.5 Treatment Discussion

No treatment currently exists at Well 7. Due to the small size of the well site, coupled with the fact that the well site, and the surrounding parcels have effectively been built out, treatment options are limited at this site. Options include blending using water from Zone 2 and partial treatment of the water using adsorption media to lower arsenic concentrations. Additional discussion is in the Treatment Options section below.

2.4.5 WELL 8

2.4.5.1 Site Conditions

Well 8 is located at 351 Jewell Avenue at the corner of Jewell and Calder Avenues, on the same site as the former Well 2 (Figure 1). The decommissioned Well 2 resided inside the pump house. Well 8 is outside the pump house located in a precast concrete structure located 50 feet from the former Well 2. Also located in the pump house, is a booster pump station similar to Well 6, but it is not used for blending. Its sole purpose is to facilitate inter-zone water transfers.

2.4.5.2 Well and Pump Construction

Installed in 2007, Well 8 is the most recently constructed municipal well in the City. It is a 125 HP submersible pump. Well 8 is screened between 320 and 560 to avoid the naturally occurring Arsenic observed in the shallower zones (<350 feet) seen in other wells.

2.4.5.3 Well Impacts

A GeoTracker review was completed for the area surrounding Well 8. There are no sites with contamination that affect the Well 8 site, but it is approximately 1,500 to 2,000 feet away from Main Street where the

comingled VOC/TPH-G/MTBE plume is being investigated near Well 4. It appears that Well 8 is upgradient and has not pulled these contaminants into its radius of influence.

2.4.5.4 Contaminants of Concern

Review of water quality data indicates that there are currently no constituents measured at concentrations that would be the cause of concern. It should be noted that the decommissioned Well 2 did indicate elevated Arsenic concentrations in shallower screened zones (<350 feet) while in operation, but not in the deeper zones.

2.4.5.5 Treatment Discussion

With no contaminants of concern indicated in Well 8, water treatment is not required. Should Arsenic become a constituent of concern, there is sufficient land at the site to support a treatment system and the well house does contain booster pumps that could be used as a blending station.

2.5 TREATMENT OPTIONS AND TECHNOLOGIES

There is a myriad of treatment options, technologies, and scenarios that could be applied the City's wells. The treatment options that could be implemented at the City's municipal wells depend on several factors, specifically:

1. The contaminant or contaminants needing removal;
2. The volume of water requiring treatment, both in terms of the pump's instantaneous production capability as well as the well's total volumetric production;
3. Site and space constraints of the particular well site as well as conveyance systems;
4. The relative cost and effectiveness of the treatment equipment relative to other treatment options; and
5. The cost and ease of operation and maintenance and the final selection(s) of treatment options at the other wells.

For the purposes of this section, GHD will evaluate all options including non-existing well specific options such as importing water from the Sonoma County Water Agency (SCWA) aqueduct intertie, installation of a new source well, compared to taking no action at all. Since this is also a study of options, all options shall be listed regardless of their feasibility. In the Section 3, Alternatives Analysis, GHD will review all of the options discussed below to determine the right mix of alternatives to meet the long-range water quality goals of the City of Sebastopol.

2.5.1 TREATMENT FOR ARSENIC REMOVAL

Wells 6 and 7 contain Arsenic levels at or above the MCL and must therefore be addressed. The following Table identifies the leading Arsenic removal technologies for Wells 6 and 7, their relative cost to one another, and the well to which they could be applied. Life cycle costs refer to the cost to purchase, install, operate, and maintain the equipment over the functional life of the equipment. The relative ranking is from 1 to 5, with 1 being the best. Additional discussion on life cycle costs will be included in the Section 3.

Treatment Process	Applicable to Well	Ranked Cost to Install and Operate	Comments
Blending	7	1	Reduced effectiveness at Well 6. Applicable to 7, especially when considering space constraints.
Adsorptive Media (e.g. granular ferric hydroxide)	6, 7	3	Moderate life cycle cost. Requires regular replacement of media once exhausted. Good candidate for Well 6 based on water production and site conditions
Oxidation	6, 7	2	Moderate life cycle cost, low operating cost. Particularly useful if other contaminants are present requiring oxidation (Fe, Mn, etc.)
Coagulant-assisted Filtration/ Coprecipitation	6, 7	2	Moderate to low life cycle cost. Particularly effective if As is in As[V] form. If As is in As[III] form, pre-oxidation will be necessary. Disposal of backwash concentrate presents possible issues.
Lime Softening/Enhanced Lime Softening	6, 7	2	Moderate capital cost, high operating cost and chemical cost. Unless hardness is an issue with raw ground water other technologies are better suited.
High Pressure Membranes	6, 7	5	High life cycle cost. Depending on other water constituents, fouling of membrane possible.
Ion Exchange	6, 7	4	Moderate to High life cycle cost, selection of resin critical, brine disposal could present likely industrial discharger designation.
Electro dialysis Reversal	6, 7	5	High life cycle cost, energy and labor intensive. Disposal of concentrate can be an issue.
Advanced Oxidation (ozone/UV) with hydrogen peroxide)	6, 7	5	High life cycle cost, complex to operate. More appropriate to use when contaminants are present that are difficult to remove (e.g. NDMA)
New Well Source to replace Wells	6, 7	3	High capital cost to design, permit, drill, and install. Once installed no guarantee that contamination won't present itself.

While Section 3 will vet this further, based upon the available information, site constraints, well size, and production data, Well 6 is a candidate for adsorptive media and coagulant assisted filtration. Well 7 lists these treatment options as well, since those technologies are applicable to the removal of Arsenic. However, due to site constraints, there is insufficient room to locate well head treatment technologies at the well with the possible exception of adsorptive media employed to partially treat the well water to below the MCL. Well 7 will be examined further during alternatives analysis.

2.5.2 VOC REMOVAL

Wells 4 and 5 are historically impacted by VOCs. Well 4 is currently fitted with a GAC adsorption process unit. Well 5 is currently not fitted with any well head treatment system, but is a candidate based on its history. The following Table is a summary of treatment options for Wells 4 and 5:

Treatment Process	Applicable to Well	Ranked Cost to Install and Operate	Comments
Blending	4, 5	1	With present, low concentrations blending is a viable option at Well 5. Should Well not be brought back on line, it should be monitored to see if concentrations rise to the point where blending becomes ineffective.
Air Stripping	4, 5	2	Low to Moderate life cycle cost. Easy to operate, but additional mechanical and power costs associated with air source. Requires infrequent but regular cleaning of packed column media. Possible site noise and aesthetic issues.
GAC adsorptive media	4, 5	3	Moderate life cycle cost. Requires media changeout once exhausted. Aesthetic concerns at Well 5 site. Already in place at Well 4.

While all technologies listed above are applicable to Well 4, the well has the GAC technology already successfully installed at this well site and the Table just indicates possible future treatment options for comparison. All the above technologies are applicable to Well 5. The limiting factor at Well 5 is location and site constraints. Section 3 will explore this is greater detail. The initial assessment shows that the site is large enough to support the installation and operation of a well head treatment system of the types named above; but its location, street access to the site, site aesthetics, and possible noise are of concern.

2.5.3 IMPORT WATER

The City currently does not import treated domestic water nor does it have the necessary piping and infrastructure to do so. The City is partially in the Russian River watershed and could be listed as a possible recipient of water from SCWA. The importing of water may be an option available to the City. This option will be examined in greater detail for feasibility and programmatic costs during the alternatives analysis presented in Section 3.

2.6 NEW WELL SOURCE

The comparison of treatment versus installation and permitting a new well source as a replacement well will be identified in the following section to understand the overall costs.

3. ALTERNATIVES ANALYSIS

3.1 INTRODUCTION

Information presented in this section is taken from Technical Memorandum 2 originally submitted to the city on October 19, 2012.

3.1.1 PURPOSE

The purpose of the Alternatives Analysis is to analyze the various options available at each of the well sites and identify and determine a preferred alternative with the most cost-effective treatment or operational scenario for meeting State and Federal drinking water standards. The preferred alternative will include elements that would result in a robust City water supply system that is operationally flexible with sufficient redundancy to provide long term solutions with the lowest overall life cycle cost.

3.1.2 DEVELOPMENT OF ALTERNATIVES

The various options and alternatives were developed and ranked based on meeting three criteria: operational flexibility, operational redundancy, and life cycle cost. In developing the various alternatives, the two individual zones (Zone 1 and Zone 2) were first analyzed independently from one another; then the entire system (Zone 1 and Zone 2 combined) was analyzed as a whole to develop the list of alternatives for consideration and final selection.

3.2 TREATMENT AND SUPPLY ALTERNATIVES ANALYSIS

This section describes the alternatives for each zone when evaluating separately, first with Zone 1 then with Zone 2, as separate and independent systems. This section also includes analysis of alternatives with the two zones interacting as parts of a combined, single system. By examining the City's wells in this manner, various alternatives are evaluated in a systematic manner and a recommendation at each well site is made at the end of the analysis. Also included in this section, is a discussion regarding the possibility of importing water from the Sonoma County Water Agency. The final section will examine planning-level estimates of probable costs for installation and life cycle costs.

3.2.1 INDEPENDENT ZONE ANALYSIS

3.2.1.1 Zone 1 Analysis (Wells 4, 5 and 7)

The following Table on page 4 is a summary of all the options available to Zone 1. The discussion of each of these options follows the Table.

Zone 1 Options		
Well Site	**Option**	**Comments/Issues/Concerns**
Well 4	No Improvements, GAC adsorption to remain	Well 4 has a GAC system installed to remove VOCs. GAC media may need changeout in the near future.
Well 5	Air stripping	Applicable treatment process, however equipment noise undesirable due to proximity to residential housing. Public acceptance a concern.
	GAC adsorption media	Applicable treatment process, site modification likely needed to minimize visual impact of process vessels and equipment. Visual impact concerns for public acceptance.
	Connection to Well 4 GAC Unit	Requires dedicated pipeline to Well 4 GAC site. Requires modification to controls system.
	Install dedicated Well 5 GAC system at Well 4 site	Permits independent operation of the wells. Wasting backwash/waste cycle from both units may cause sewer system surcharging. Not considered further.
	Maintain inactive status	No pumping allows nearby plume to remain outside well's area of influence. Any required remediation of plume by 3rd party may reduce the likelihood of treatment necessary by City.
Well 7	Additional Packer or Swage Lower pump intake and Reduce pump output	Semi-permanent/permanent solution for current arsenic concentration above MCL. If additional packer or swaging or pump reconfiguration are ineffective, arsenic concentrations likely to continue rising.
	Blending	Blending is only an option if additional water is available. Option would require bringing Well 5 on line and would require piping modifications or bringing water into Zone 1 from Zone 2.
	Replace with New Well	Addition of well possible but insufficient data to determine if similar issues would not present itself; other options are more cost effective. Technically feasible but may not be practical or publicly acceptable. Consider other more cost-effective options first.
	Partial Treat using GFH Adsorptive Media	Sufficient space at site to accommodate enough media cells to partially treat arsenic and re-blend to lower arsenic concentrations
Any Well	No Action	Zone 1 would effectively remain a one well zone lacking redundancy or reliability.

3.2.1.2 Well 4

As previously stated in Section 2, Well 4 is fitted with a GAC treatment system to address groundwater contamination from 1,2-DCA. Since its installation, levels of contamination have steadily and continually dropped below the MCL. Solvents are still potential contaminants of concern as well as TPH-G and BTEX are still a concern within nearby plumes but have not been detected in the groundwater at City Well 4. While the water is still processed through the GAC, the water quality sufficiently meets drinking water standards such that adsorption using GAC may no longer be necessary. However, with the recent and continued movement and rise in PCE contaminant levels from a nearby plume, the GAC system remains an excellent precautionary and effective method for the removal of PCE and other VOCs. It is recommended that the City

continue to closely monitor concentrations of contaminants prior to GAC treatment and compare to post-treatment. this will help the City determine when the adsorptive media has been exhausted and should be replaced. From discussions with the City, the media has never been replaced since the unit was first installed. After analyzing pre- and post-treatment water quality it could not be determined whether or not the GAC media needs changeout or that it may not be adsorbing effectively when the contaminant concentration levels are low. However, if data indicating breakthrough develops then changeout is recommended. Based on the age of the media it is not an unreasonable assumption that media replacement may be warranted in the next one to three years. City staff is monitoring the water quality and is ready to have the media replaced when needed.

3.2.1.3 Well 5

Well 5 has been out of service since 1996 due to PCE contamination. Furthermore, available data from the North Coast Water Quality Control Board (NCRWQCB) files indicates that there are several potential sources of contamination that could affect Well 5 if it were put into active status, specifically TPH-G, BTEX, MTBE and 1,2 DCA along with the current PCE contaminant that was the initial cause of well deactivation. The sources of contamination have been determined to be from an old dry cleaner that is no longer in operation and from a petroleum hydrocarbon plume from a nearby auto repair facility. From recent conversations with the NCRWQCB, recently acquired data indicates that a plume of contaminants is moving towards Wells 4 and 5. While Well 4 is adequately equipped to handle these contaminants via the GAC system should VOC contaminants enter its area of influence, Well 5 presently is not equipped and would require treatment.

The treatment options at Well 5 are limited due to physical site constraints and aesthetic concerns. The two most cost effective treatment options available to the City are GAC adsorption and air stripping. However, based on the site constraints and proximity to the public, air stripping is not feasible, particularly because of noise associated with the blowers required for treatment. Aesthetic concerns would also need to be addressed related to the visual impacts of air stripping.

GAC adsorption is a viable treatment option and does not have the noise impacts that air stripping does. However, it would still require site modifications to reduce visual impacts and is therefore recommended only if there are no other feasible options available. Possible approaches to address any site impacts are to either house the GAC system in a structure designed to blend with the surroundings or to place the GAC system pad below street level and erect a vegetative barrier such as a fence with plants to screen the system. A building designed to enclose the system would likely be the most expensive option due to the GAC unit's size and the need to maintain accessibility for maintenance. However, enclosing the GAC unit may have the greatest chance to be acceptable to the public. Conversely, a site design that reduces the visual impact without fully enclosing the system will be less costly but may prove challenging in obtaining public acceptance.

An alternative to adding GAC units for Well 5 is to utilize the existing GAC unit at Well 4. This alternative would require piping from the Well 5 site to the Well 4 site. A new pipeline between the two sites would be installed or existing abandoned water mains could be utilized with rehabilitation of a portion of the pipeline. This option would also require modifications to the well controls at both sites since only one well should be permitted to pump to the Well 4 GAC unit at a time.

An alternative to using the existing Well 4 GAC units for Well 5 treatment as described above is to install additional dedicated GAC units at the Well 4 site specifically for Well 5 water treatment. The additional units would permit independent operation of the wells. However, as discussed with Public Works staff, due to the configuration of the sewer system downstream of the existing Well 4 GAC site, installing a complete second GAC unit for Well 5 has the potential to cause surcharging of the sewer system should both GAC units be required to discharge waste at the same time. Any concern of surcharging can be avoided however, by simply requiring coordination of the backwash operation at the different well sites.

A final option that was evaluated for Well 5 is to keep the well in an inactive status for a few more years while the nearby contaminant plumes are remediated and cleaned. While contaminants in Well 5 water are below their MCL's, active and repeated pumping at Well 5 may draw in contaminants from the nearby plumes. The NCRWQCB has requested that the responsible parties for the nearby plumes take immediate action for cleanup of the plumes. In discussions with Jan Goebel of the NCRWQCB, if immediate additional remedial action is taken on the responsible party's part, the plume may be significantly reduced in the next 3-5 years and then there may not be any need to treat the groundwater at Well 5 and the cost could be avoided. Because the City has other treatment options and additional costs to consider at other well sites, it is recommended that the City delay pumping at Well 5 until the nearby plumes have been sufficiently abated.

3.2.1.4 Well 7

Water from Well 7 is currently impacted with arsenic. Arsenic (As) can be found in two forms in groundwater: As (III) or As (V), but the MCL is based on Total Arsenic, regardless of valance state. Both contribute to contaminant levels with arsenic (V) easier to treat with coagulation/coprecipitation/filtration technology. Recent analysis indicates that the valence of arsenic in the groundwater from Well 7 is trivalent, As(III), and is entering the well from the upper portion of the screened interval, the Upper Aquifer. At the time of writing this report, the arsenic annual average level at Well 7 exceeded the MCL and the use of Well 7 has been discontinued until the arsenic concentration is reduced to below the MCL. No treatment system currently exists at Well 7.

Immediate modifications options at Well 7 include, lowering the pump intake and reducing output from the well. Adding packers or swaging one or multiple zones in the upper screen could also be completed. Swaging represents a longer term, permanent solution compared to the packers and is the process of closing off one or multiple sections of well screen using two half-sections of pipe that are 'swaged' and held in place via an interference fit. The two half-pieces of pipe are in 5 foot lengths and are inserted into the well to the appropriate depth. The pieces are then joined to create a 'whole' piece of pipe. Similar in function to a packer, the sections are permanently installed to block screened intake sections of the well to isolate those zones of contaminated water without worrying about a packer failing. Theoretically, multiple screens in the zones of the arsenic contamination can be blocked off and, providing that there is no path of bypassing the swaged inlet screens, arsenic is isolated from the pump suction. However, if pumping hard in very permeable materials, i.e. coarse grained sand pack and alluvial deposits, the arsenic laden groundwater can be pulled around the swage or packer, outside of the casing, through the sand pack or the surrounding formation soil, and into the pump inlet below. It is possible that this is what is occurring in Well 7 since the formation soils around the casing are very permeable and the sand pack used in the well is pea gravel. It was noted that over 70% of the groundwater was being pulled from the upper screened intervals before the packer was installed, and no change in pumping flow rate occurred after the packer was installed. At the time of this

report writing, the City determined that the inflatable packer was not inflated properly and increased the nitrogen to further inflate it. The City hired BESST Inc. to complete a dye test to determine if the packer was effectively sealing off the upper aquifer. The field dye test was completed in November 2012 and indicated that the packer was effective in isolating the upper zone from the lower zone in the well casing once completely inflated but the arsenic was still above the MCL. The arsenic impacted groundwater is likely going around the packer, through the sand pack. A report prepared by BESST Inc. is included in Appendix D.

The pump intake is currently located just below the packer and may be located too close to the packer and too close to the screen intervals containing arsenic. By lowering the pump and decreasing the pump flow, there may be less of a pull on the water entering upper screens and less of a likelihood of pulling in the arsenic. This option, if implemented, will have a water production impact since over half of the water supplied by the well comes from the aquifer most affected by the arsenic. If the pump were lowered but pumping volume continues to not be reduced accordingly, the arsenic is likely being pulled down into the pump intake by the process mentioned in the preceding paragraph, negating the effects of the pump lowering.

Lowering of the pump intake and reducing pump output are quickly implementable, short-to-midterm solutions that may immediately address the recent exceedance of the MCL for arsenic. By lowering the pump intake to a level either deeper in the screened interval (>100 ft deeper) or to a depth below the screen interval, a decreased volume of water from the arsenic-contaminated aquifer would be pumped. With a higher volume of water from the uncontaminated lower zone with the decreased volume of arsenic impacted water would result in an overall reduction in the arsenic concentration for the total volume of water pumped.

Similarly, pumping less water by reducing pump output will theoretically have a similar effect. However, these two options alone may only present temporary solutions. Without the ability to fully isolate the upper aquifer zone and no other means to dilute the water from Well 7 (i.e. blending) lowering the intake and reducing pump output may only provide interim solutions. While current concentrations of arsenic are holding steady at 12 µg/L, concentrations may change in the future and negate any improvements to water quality achieved with the implementable modifications. City staff has stated that the pump must be started at a high rotation speed to prevent bearing damage. To be able to start the pump at this high speed and then reduce the rotation would require a variable frequency drive (VFD). In order to restrict pump flow without a VFD, a restrictor plate would need to be fitted.

Blending is a more permanent option for Well 7. Blending at Well 7 can be accomplished by one of two variants. The first is blending using water from a second source (i.e. Zone 2), or second by treating a partial flow from Well 7 then blending with the remaining flow. For the first variant, since Well 4 is the only currently active well in Zone 1, Well 5 would need to be placed back into service to permit sufficient volume to blend with Well 7 water while still having ample water to meet customer water demands in the zone. It is also likely that modifications would need to be made to the distribution system to permit proper blending at the site. Therefore, blending without an alternate source (i.e. Zone 2, addressed further in this Section), is likely not viable.

The second variant for blending at Well 7 (by treating a portion of the flow) is viable and relatively easy to implement, but would require some modifications and improvements to the site to accommodate a treatment technology. Of the treatment technologies available, the most promising, due to space constraints and the valence of arsenic, is adsorptive media. Treating one-third to one-half of the total flow from Well 7, then blending the treated stream with the untreated stream prior to delivery into the distribution system will lower

the overall arsenic concentration of the Well 7 water. Confirmation with CDPH regarding their acceptance of this option should also be investigated, noting however that this methodology for lowering contaminant concentrations is generally accepted by CDPH personnel. All the other treatment technologies for arsenic removal, which are discussed in detail below in the section on Well 6, are not viable due to space constraints and cost.

3.2.1.5 Zone 1 - Addition/Deletion of Wells

For Zone 1, the addition and abandonment of wells is an option. Based on the current status of the wells in the zone, this option means the abandonment of Well 7 and replacement with a new well screened in the lower zone where arsenic is not present. Identifying a well site may prove challenging with many factors such as, well siting, permitting, land acquisition, and a sufficient parcel size to allow for well head treatment or additional/replacement wells if needed. Drilling a new well at the current site of Well 7 is likely not possible due to the size of the parcel and its proximity to underground utilities, specifically sewer as California Department of Public Health requires a minimum 50 foot setback of new wells from sewers.

Depending on the site(s) selected, public opposition to new wells may be encountered. Furthermore, there is no guarantee that after completion of the new well similar water quality issues to those that are presently cause for concern would not present itself. With other more feasible, less costly options available, this option is included for comparative purposes, but not likely to be the preferred alternative.

3.2.1.6 Zone 1 - No Action

For Zone 1, “no action” is not a viable option. With only one well reliably operating without contamination, the zone lacks redundancy and operational flexibility.

3.2.1.7 Zone 2 Analysis (Wells 6 and 8)

The following Table is a summary of all the options available to Zone 2. A discussion of each option is followed below:

Zone 2 Options		
Well Site	**Treatment Option**	**Comments/Issues/Concerns**
Well 6	Install GFH adsorptive media	Lead candidate for arsenic removal at Well 6. Low to moderate life cycle cost, minimal operator attention except for media replacement when required.
	Coagulant Assisted Coprecipitation and Filtration	Low to moderate life cycle cost, more staff requirements for operations related to coagulant storage and dosing. Unit backwashing potentially results in arsenic rich backwash hazardous waste.
	Add well to replace Well 6	Addition of well possible but over time similar issues may occur. Technically feasible but may not be practical or cost effective. Seen as a last resort.
	No Action	Not a viable option; without Well 6, there would only one well in Zone 2, thus negatively impacting reliability and redundancy.
Well 8	No treatment required	Booster station may be suitable to serve as a blending station if future water quality degrades.

3.2.1.8 Well 6

Well 6 is the City's most productive well with an operating flow rate of 750 gpm and a capacity of 1,500 gpm when running at full speed. It is also the most impacted with arsenic, specifically pentavalent arsenic As(V), with concentrations at approximately twice the MCL (~20 µg/L). Blending with Zone 1 water is the current treatment used at Well 6 to lower concentrations of arsenic of supplied water in Zone 2. Blending at Well 6, however, has steadily been less effective since the blending station was installed due to the rising concentration of arsenic in Well 6. Blending operations have recently been further impacted with Well 7's current status of arsenic above the MCL. Recovery of Well 7 by lowering arsenic levels would extend the ability to blend at Well 6. While blending is a viable option for treatment, it presents a risk to operational flexibility since it requires water from the neighboring Zone 1 to perform the blending operation and is therefore dependent on the operational status of other wells. Should wells be taken off line, whether due to scheduled or unscheduled interruptions, as well as variability in customer demand for water during those same times, can significantly affect the ability of Well 6 to produce water that is compliant with drinking water standards. Conversely, treatment at the well using technology that is not dependent upon additional water such as those discussed below, would be immune to the effects of the production status of other wells.

To address arsenic at Well 6, well treatment should be considered. From the discussion in Section 2, the well treatment options are:

- Adsorptive Granular Ferric Hydroxide (GFH) media
- Coagulation-sedimentation-filtration or coagulation-filtration
- Ion exchange
- Electro-dialysis Reversal (EDR)
- Coagulant assisted membrane process
- High pressure membrane processes (NF/RO)
- Advanced oxidation processes (AOP)

Of the treatment options, adsorptive media, specifically GFH, is the most promising as it effectively removes trivalent (As (III)) or pentavalent arsenic (As (V)). Similar to GAC used for VOC removal at Well 4, GFH removes arsenic by adsorption onto the media. The media is therefore consumed by the process and must be replaced once the media is exhausted. However, since the arsenic is captured on the surface of the media, backwashing and other unit maintenance operations do not result in an arsenic rich waste stream that must be disposed of. Since the unit is self-contained and can be fully automated, attention by maintenance staff is relatively minimal. The biggest maintenance requirement is the monitoring and implementation of media replacement.

Similarly, coprecipitation/filtration treatment would also be very effective for the removal of As (V) which has an industry removal rate of 60 to 90 percent. This treatment process also has a low to moderate life cycle cost with lower capital cost when compared to GFH, but a bigger footprint and a higher operational cost in the form of coagulant chemical delivery, storage, dosing, and maintenance. The maintenance and operation

of a coprecipitation/filtration treatment process requires more operator involvement as compared to a GFH treatment system due to the use of coagulant chemicals. Also, the filter unit for this type of treatment process does potentially create an arsenic laden backwash waste that must be disposed of as hazardous waste. The ability to discharge this waste stream to a municipal wastewater treatment facility is possible and common. However, to determine if that is possible at this site, the local treatment facility should be consulted.

Of the remaining treatment options – Ion Exchange, Electro-Dialysis Reversal, Coagulant Assisted Membrane process, High Pressure Membrane processes (Nano Filtration/Reverse Osmosis (NF/RO)) and Advance Oxidation process – have higher life-cycle costs than GFH or coprecipitation/filtration treatment and are more complex to operate as well. Therefore, the remaining treatment options listed above warrant mentioning as treatment options but are not seen as viable long term solutions due to their cost and complexity.

Treatment at Well 6 would result in a robust and redundant zone with two wells capable of providing water needs in the zone without the need for an additional water source from Zone 1. The installation of a treatment system at the Well 6 site results in the blending station becoming obsolete but can still be used for inter-zone transfers, which is recommended as discussed in more detail in the next section.

Finally if no action is taken at Well 6, the well will likely need to be inactivated and potentially abandoned. With Well 7 currently facing similar issues, taking no action at Well 6 is not a viable option.

3.2.1.9 Treatment Analysis at Well 8

As stated in Section 2, with no contaminants of concern currently known or identified in Well 8, water treatment is not presently required. Should arsenic become a constituent of concern, there is sufficient land at the site to support a treatment system and the well house does contain booster pumps that could be used as a blending station should future needs require it.

3.2.1.10 Zone 2 - Addition/Deletion of Wells

For Zone 2, this option is seen primarily in abandoning Well 6 and replacing it with a new well, screened deeper. However, the location of that well, the real estate to support it, as well as the potential for well head treatment, presents a challenge. The cost to install a new well including permitting, land acquisition, construction, and needed improvements/connections to the existing distribution system would likely exceed the cost of adding a treatment process to the existing well.

3.2.1.11 Zone 2 - No Action

Taking no action for Zone 2 results in one well (Well 6) being unable to supply water compliant with Federal and State water quality standards. This would leave Well 8 as the sole Zone 2 supply source; therefore, some action, whether treatment at Well 6 or the addition of a new well, is recommended.

3.2.2 SYSTEM-WIDE ANALYSIS

In the previous section, the two zones were analyzed independent of one another. However, the City's system is comprised of two zones that can be cross-connected to provide water from one zone to the other, if situations warrant. In fact, that is currently being accomplished at Well 6 for blending and at the booster station at Well 8. By analyzing the system together as a whole, it allows for treatment systems or other

improvements to one zone to benefit the other zone. By analyzing the system as a whole, the overall life cycle cost can be reduced and an implementation plan can be developed.

3.2.2.1 Zone 1

Zone 1 (Z1) is comprised of Wells 4, 5, and 7. Of the three wells, only Well 4 is both active and producing water that meets Federal and State drinking water standards. Well 5 is inactive, but could be placed into active status. Doing so however will require some form of treatment at Well 5 due to PCE contamination. Well 7 has recently exceeded the MCL for arsenic and must therefore be addressed by modifications and/or adding treatment to Well 7. Finally, there is insufficient Zone 1 water that could be used for treatment blending in Zone 1 unless Zone 2 water is available. With Well 6 water above the MCL for arsenic, Zone 2 water is not available for blending.

To provide system robustness and redundancy, it is recommended that either (i) at least two wells be fully operational and compliant in Zone 1 with the capability and flexibility to transfer water back and forth between Zone 1 and Zone 2 or (ii) have all three wells operational and compliant within Zone 1 with the ability to do one-way zone transfers from Zone 1 to Zone 2. It should be noted that the ability to transfer water from Zone 1 to Zone 2 is already possible at the blending and boosting stations.

Based on the analyses conducted, the following alternatives are considered:

Alternative Z1A:

1. Well 4 GAC media replacement;
2. Well 5 GAC system installation at Well 5 site;
3. Well 7 modifications including: double packering, swaging, lowering of pump, reducing pump output.

Alternative Z1B

1. Well 4 GAC media replacement;
2. Well 5 GAC system installation at Well 5 site;
3. Deactivation of Well 7;
4. Improvement/treatment to be determined to a Zone 2 well to permit two-way transfer. (See Option Z2B below)

Alternative Option Z1C

1. Well 4 GAC media replacement;
2. Well 5 GAC system installation at Well 5 site;
3. Deactivate and/or abandon Well 7;
4. Installation of new well to replace Well 7.

Alternative Option Z1D

1. Well 4 GAC media replacement;
2. Improvement/Treatment to be determined to Zone 2 water source to permit two-way transfer; (See Option Z2D Below)
3. Well 7 modifications including: double packering, swaging, lowering of pump, and/or reducing pump output;
4. Well 7 blending with treated Zone 2 water.

3.2.2.2 Zone 2

Zone 2 (Z2) is comprised of Wells 6 and 8. Both wells are active and producing water with arsenic above the MCL present in Well 6. Well 6 water is compliant because water from Zone 1 is added in order to lower the arsenic concentration below the MCL. This blending operation, while currently sufficient, is now complicated by the current level of arsenic in Zone 1's Well 7 water which is above the MCL.

For Zone 2, to provide system robustness and redundancy, it is recommended that either a minimum of two wells be operational and compliant in Zone 2 with the capability and flexibility to transfer water back and forth between Zone 2 and Zone 1 or one well be operational and compliant in Zone 2 provided that all three wells in Zone 1 are operational (options Z1A and Z1C) and inter-zone transfer capability to do one-way zone transfers from Zone 1 to Zone 2 remains available. Based on the analyses conducted, the following alternatives are considered:

Alternative Z2A:

1. Deactivate Well 6; and
2. Includes all improvements in Alternative Z1A.

Alternative Z2B:

1. Well 6 GFH system installation; and
2. Includes all improvements in Alternative Z1B which allows the option to send Well 5 water to Well 4 GAC site for treatment via dedicated pipeline.

Alternative Z2C:

1. Deactivate Well 6; and
2. Includes all improvements in Option Z1C.

Alternative Z2D-1:

1. Well 6 GFH system installation; and
2. Includes all improvements in Option Z1D

Alternative Z2D-2:

1. Well 6 Iron Co precipitation system installation;
2. Well 7 GFH partial treat; and
3. Includes all improvements in Option Z1D

3.2.2.3 Import of SCWA Water

Another other option for consideration is the possibility of importing Sonoma County Water Agency (SCWA) water. Depending on the available/necessary import volumes, intended use of the water (normal or emergency), seasonality of the imports, and the infrastructure needed to make the transfers possible, the ability to receive SCWA water would increase the robustness of the City's system and may allow for several of the alternatives identified above be modified in that such that the SCWA connection could be viewed and counted as replacement for one well, multiple wells, or the entire system.

A meeting was conducted on September 5, 2012, with representatives from SCWA, GHD and the City. SCWA indicated that although the City is included in SCWA's Restructured Agreement from 2006 as one of the "other users" for water supply, the aggregate allocation of 2.7 million gallons per day (mgd) to all other agencies is 100 percent allocated. This contractual constraint along with the high cost of constructing a connection over a mile long and crossing the Laguna de Santa Rosa leads to this option being infeasible at this time for the City. A letter summarizing the discussion is presented in Appendix A.

3.3 ALTERNATIVES ANALYSIS

To determine the best alternative or combination of alternatives, the feasibility analysis also factors the life cycle cost

To facilitate this analysis, the following assumptions are made:

1. New improvement/equipment assumed to have a 30 year life cycle;
2. Interest rate assumed to be 4% annually
3. GAC Media assumed to require replacement every 10 years, noting that actual replacement is a function of contaminants adsorbed;
4. GFH Media is assumed to be as short as 1 year and as long as 3 years;
5. Install Cost and Life Cycle Costs are reported in Net Present Value Dollars (Net Present Value includes the initial capital purchase plus consumables plus capital expenditures for maintenance and upkeep (i.e. Media changeout) over an assumed 30 year operational life. Energy is also not included in calculation because the difference in energy consumed between alternatives is expected to be negligible.)
6. All equipment related to alternatives is assumed new unless noted otherwise;
7. Costs listed below are estimates of probable estimated costs, as the Associateion for Advancement of cost Engineering, International (AACE) defines a Class 4 estimate, and do not necessarily represent the actual cost associated with a particular option or project due to market conditions and other variables present.
8. Manpower costs for operation is not estimated. Normal day to-day-operation labor is not expected to increase significantly over current levels, although the cost of a Grade III Operator would also need to be considered depending upon which treatment technologies are ultimately selected.[2]

The Table below is a summary of the install and life cycle costs for the eight alternatives identified in the section above. Also included for comparative purposes is Alternative Z2D with coprecipitation/filtration arsenic removal technology employed at Well 6 instead of GFH. Life cycle calculations are included in Appendix B and reconnaissance level estimates of probable costs are included in Appendix C.

[2] Additional staffing costs could be incurred with options where there is a Treatment Operator grade level that currently is not staffed.

Alternative	Alternative Summary	Installation Cost	Life Cycle Cost*	Comments
Zone 1				
Z1A	Well 4 Media changeout; Well 5 GAC system install; Well 7 Modifications	$1,887,000	$2,548,000	Assumes Well 7 modifications successful
Z1B	Well 4 Media changeout Well 5 GAC system install; Well 7 Deactivation; Zone 2 Well Improvement / Treatment			See Option Z2B below
Z1C	Well 4 Media Changeout Well 5 GAC system install Well 7 Deactivation / Abandonment; New Well to Replace Well 7	$3,482,000	$4,143,000	Assumes well is not impacted by contaminants over the lifetime of the well
Z1D	Well 7 Modifications Well 7 Blending with Zone 2 Water Zone 2 Well Improvement / Treatment; Well 4 Media Changeout			See Option Z2D below
Zone 2				
Z2A	Well 5 GAC System Install; Well 6 Deactivation; Well 7 Modifications; Well 4 Media Changeout.	$1,887,000	$2,548,000	Effectively the same option as Z1A. Assumes Well 7 modifications successful
Z2B	Well 6 GFH System Installation; Well 5 GAC System Install or Well 5 Pipeline to Well 4 GAC; Well 7 Deactivation; Well 4 Media Changeout	$3,112,500	$7,525,000**-$17,643,000	Annual replacement of media if required makes GFH an unacceptable option
Z2C	Well 6 Deactivation; Well 5 GAC system install; Well 7 Deactivation / Abandonment; New Well to Replace Well 6; Well 4 Media Changeout	$3,482,500	$4,143,000	Assumes well is not impacted by contaminants over the lifetime of the well
Z2D-1	Well 6 GFH System Installation; Well 7 Modifications; Well 7 Blending with Zone 2 Water; Well 4 Media Changeout	$3,207,500	$7,610,000**-$17,738,000	Annual replacement of media if required makes GFH an unacceptable option. Blending only needed if modifications are unsuccessful at Well 7

Alternative	Alternative Summary	Installation Cost	Life Cycle Cost*	Comments
Z2D-2	Well 6 Iron Coprecipitation System Installation; Well 7 GFH Partial Treat Well 7 Modifications; Well 4 Media Changeout	$2,325,500	$9,461,000	Life cycle cost assumes all improvements made and GFH media replaced biannually

Notes:
* = Net Present Worth of initial capital purchase plus consumables plus capital expenditures for maintenance and upkeep (i.e. Media changeout) over an assumed 30 year operational life. This includes an AACE Class 4 Estimate. It does not include normal day to-day-operation labor since alternatives are not expected to increase operational labor significantly over current levels. The possible exception is alternative Z2D-2 which may require additional staffing costs which cannot be determined at present
Energy is not included in calculation because the difference in energy consumed between alternatives is negligible.
** = Triennial GFH replacement compared to annual replacement
GFH = Granulated Ferric Hydroxide
GAC = Granulated Activated Carbon

3.4 ALTERNATIVES ANALYSIS RECOMMENDATIONS

Based on analysis of the estimated costs in the preceding Table, the following general observations are noted:

1. Alternative Z2A has both the lowest install costs and life cycle costs. It also however depends greatly on successfully reducing arsenic in well 7 with modifications to the well. If the modifications are not successful the result is only 3 reliable wells within the City's system.

2. Alternative Z2A also includes installation of GAC at Well 5. From a contamination abatement standpoint it is preferable to delay pumping whilst third parties responsible for the cleanup are required to provide abatement services thereby delaying, minimizing, and possibly eliminating the City's need to provide wellhead treatment at Well 5.

3. Alternative Z2C has a highest install costs but the second lowest life cycle cost after Alternative Z2A. Of concern however is that this alternative is dependent upon a new well and that well to remain contamination free for its lifetime. In light of the current status of all the wells, GHD does not feel that this is assumption is appropriate.

4. Alternatives Z2B and Z2D-1 both include GFH treatment at Well 6, have moderate installation costs, but have the potential for significant life cycle costs. This is due entirely on the media and its life expectancy. If life expectancy is assumed to be as brief as 1 year, annual media replacement costs are prohibitive. GFH is only an acceptable treatment alternative should the media life can be determined to be between 2 and 3 years. Pilot testing of the technology would be appropriate and recommended to determine the media replacement interval.

5. Of the two alternatives that identify treatment at the Well 6 site (Z2B and Z2D), option Z2D is preferable, particularly if modifications at Well 7 are successful, as this reduces or eliminates the need to blend water at Well 7.

6. For Alternative Z2D-1, a viable alternative to GFH is iron coprecipitation/filtration treatment technology (Alternative Z2D-2). It represents a modest installation cost and life cycle cost and is cheaper than GFH. One element of the process that must be examined further is whether or not the backwash can be discharged to the local municipal wastewater treatment facility.

7. All alternatives except for Z2D and Z1C result in a total of 4 operational wells. Of those two options Z2D has a lower install cost and addresses arsenic contamination at Well 6 well site. Z1C in turn still relies on blending at Well 6.

3.5 ALTERNATIVES ANALYSIS CONCLUSION

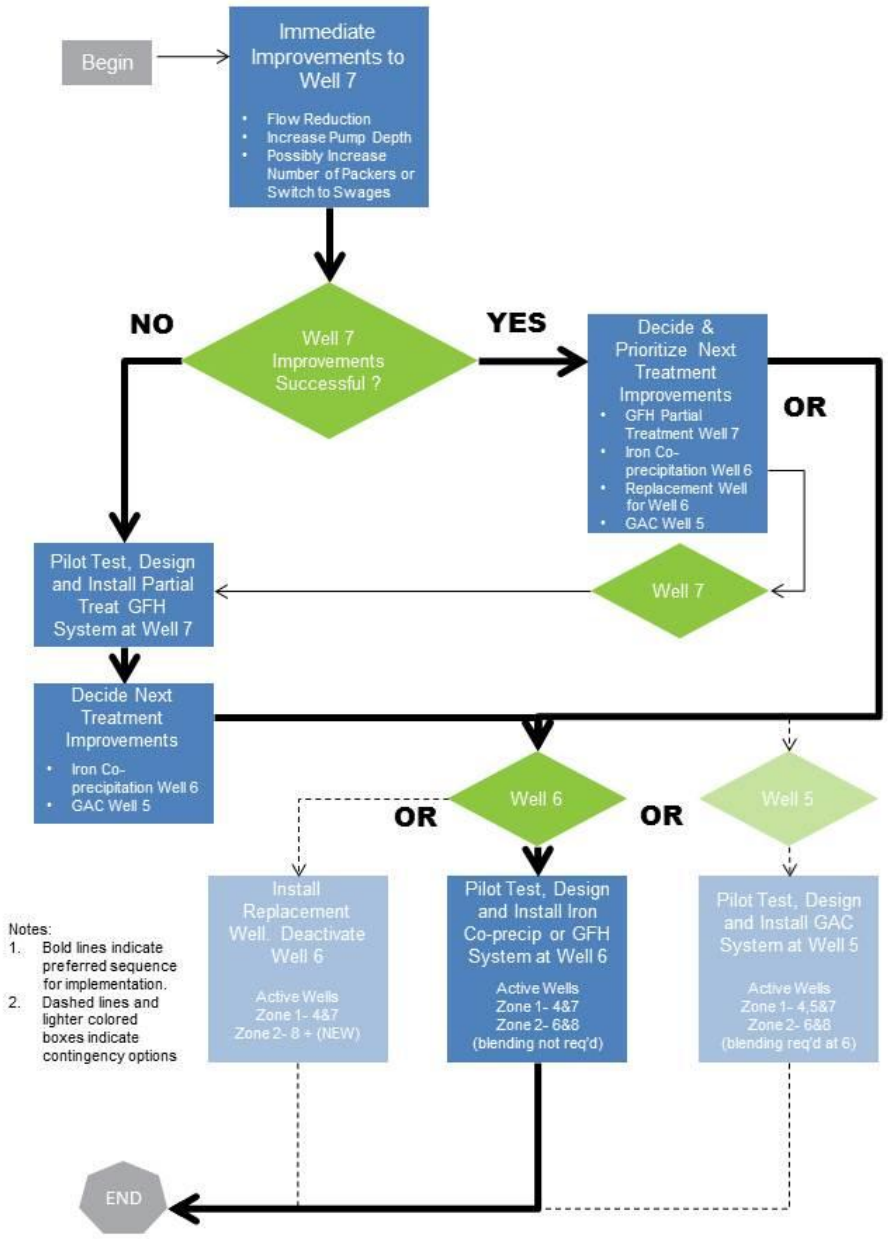
Based on the analysis above, GHD recommends Alternative Z2D-1 employing iron coprecipitation for the removal of pentavalent arsenic at Well 6. First to be addressed however is the modifications at Well 7. Should the improvements at Well 7 be successful, the urgency of treatment at the Well 6, while still present, would be reduced. Furthermore, of all the alternatives examined it is only one of two that still maintains the availability of all 5 City wells while simultaneously addresses treatment of arsenic in Well 6 at the well site. While iron-coprecipitation is not the lowest overall cost option in terms of installation cost and life cycle cost, it is a lower cost option as compared to many of the other alternatives and maintains a higher level of redundancy and operational flexibility as compared to the other alternatives.

4. IMPLEMENTATION PLAN

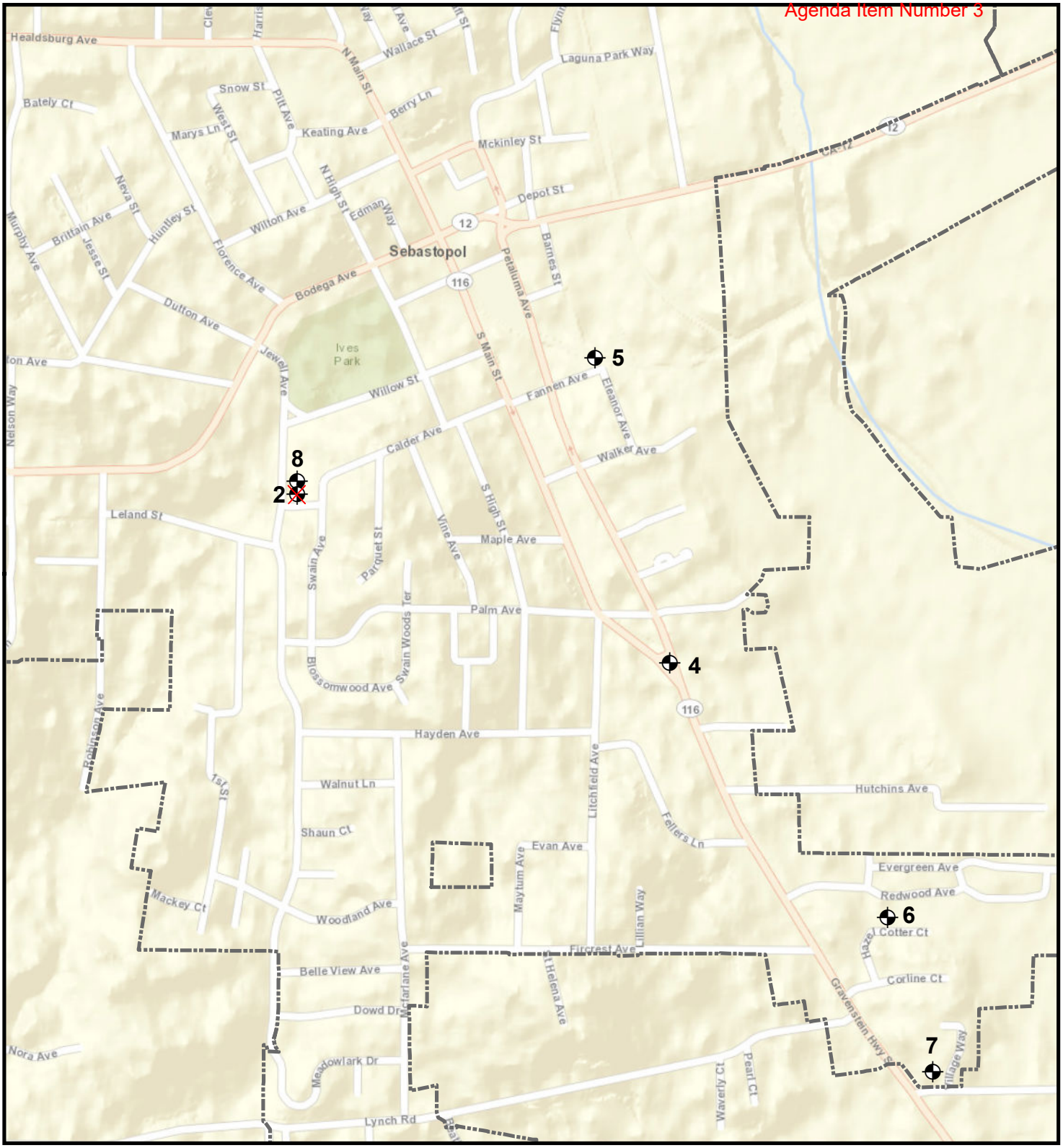
With well site assessments, treatment options, and alternatives analysis complete, and with communication and in cooperation with City of Sebastopol Public Works Department, the following plan for implementation is recommended from Alternative Z2D:

1. Implement modifications to Well 7. These include pump flow reduction and lowering of the well pump. It may be appropriate to install double packers in the well or switch the packers to swages, and swage multiple zones in the upper aquifer zone, but depending on the success of the lowering of the pump, it may be best to begin partial treatment of the well groundwater.
2. Following well 7 modifications, improvements to Well 6 are recommended as proposed in Alternative Z2D. Since Well 6 represents both the largest producing well in the City's system as well as the well with the highest concentration of arsenic, the treatment system is recommended to treat the entire production volume of well water. Since space constraints are not a significant factor to the type of treatment system installed, an iron co-precipitation system is the treatment system expected to be the best option when considering both capital and life cycle cost. However, GFH is suitable but the frequency of the media change out should be determined first which will affect the costs. To determine that expected frequency, complete testing of the water accompanied by pilot-studies is required and in fact is recommended regardless of the selected technology.
3. If modifications at Well 7 do not result in lowering of the arsenic concentrations to below the MCL, it is recommended that the design and installation of a partial treatment system for Well 7 using GFH or similar adsorptive media be implemented with Well 7 in a non-production status until the treatment system is online. The partial treatment system would be a relatively quick and inexpensive means to remove a sufficient quantity of arsenic from Well 7 to below the MCL. This lower concentration in Zone 1 water has the additional benefit of increasing production at Well 6 since Zone 1 water is used at the Well 6 blending station. Furthermore, the system at Well 7 would be designed so that it is expandable in the future should arsenic concentrations over the operational lifetime of the well continue to rise.
4. Barring the ability to installing treatment at Well 6, two other options are possible as a contingency to meet the intent of the preferred alternative. They are the installation of GAC at Well 5 or installation of a new well which effectively replaces Well 6, even though Well 6 could still be operated if blending of Well 6 water with Zone 1 water continues. Both of these options are taken from other alternatives proposed during the alternatives analysis but they effectively result in the desired final supply and distribution system configuration. They also have their own challenges to implement. For example GAC installation likely has site constraints as well as visual impacts that would need to be addressed. The new well option has challenges stemming from finding suitable locations to install the well. They should however remain as part of the conversation as standby alternatives.

   The implementation plan is presented as a flow chart below:


Begin
Immediate Improvements to Well 7
Flow Reduction
Increase Pump Depth
Possibly Increase Number of Packers or Switch to Swages
NO
Well 7 Improvements Successful ?
YES
Decide & Prioritize Next Treatment Improvements
GFH Partial Treatment Well 7
Iron Co-precipitation Well 6
Replacement Well for Well 6
GAC Well 5
OR
Pilot Test, Design and Install Partial Treat GFH System at Well 7
Well 7
Decide Next Treatment Improvements
Iron Co-precipitation Well 6
GAC Well 5
Well 6
OR
OR
Well 5
Install Replacement Well. Deactivate Well 6
Active Wells
Zone 1- 4&7
Zone 2- 8 + (NEW)
Pilot Test, Design and Install Iron Co-precip or GFH System at Well 6
Active Wells
Zone 1- 4&7
Zone 2- 6&8
(blending not req'd)
Pilot Test, Design and Install GAC System at Well 5
Active Wells
Zone 1- 4,5&7
Zone 2- 6&8
(blending req'd at 6)
Notes:
1. Bold lines indicate preferred sequence for implementation.
2. Dashed lines and lighter colored boxes indicate contingency options
END

Figure



LEGEND

- Municipal Well
- Destroyed Municipal Well
- City Limits

Paper Size ANSI A

0 500 1,000

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

N

City of Sebastopol
Water Quality Feasibility Study

Job Number 0206112001
Revision
Date 30 Jul 2012

Well Location Map

Figure 1

2235 Mercury Way Suite 150 Santa Rosa CA 95407 US T 707 523 1010 F 707 527 8679 E santarosa@ghd.com W www.ghd.com

G:\02061 - City of Sebastopol\02061-12-001 - Drinking Water Feas Study\08-GIS\Maps\Figures\Well Location Map.mxd

Tables

Table 1 - City of Sebastopol Historic Summary of Supply Well Analytical Data

Well ID	Sample Date	Notes	Metals									Volatile Organic Compounds (VOCs)								
			Arsenic						Iron	Aluminum	Manganese	PCE		TCE	VC	MTBE	TBA	Benzene	1,2-DCA	Toluene	TPH
			µg/L									µg/L									
MCLs/SMCLs			10						300	1000/200	50	5		5	0.5	13/5	12	1	0.5	150	varies
Well 4			Raw									Raw	Treated								
	Apr-12											<0.5	<0.5	<0.5	<0.5	<3	<2	<0.5	<0.5		
	Mar-12											0.36-0.49	0.08-0.29								
	Jun-11									<50	<20	0.24-0.34									
	Dec-10		3.6									0.018-0.28									
	2009											0.13-0.21	<0.5	<0.5	<0.5	<3	<2	<0.5	<0.5		
GAC Treatment System Installed in 2006																					
	2008											0.03-0.11	<0.5	<0.5	<0.5	<3	<2	<0.5	<0.5		
	Dec-07/Jan-08		3.2									0.03	<0.5	<0.5	<0.5	<3	<2	<0.5	<0.5		
	Aug-07		3.1							5.3	1.3	0.02	0.03								
Spinner Test, Depth Discrete Sampling	Jan-07	**Surface**	3.9									<1		<1	<1	<1	<1.2				
		237/ 260'	3.4/7.5																		
		312/ 358'	7.9/5.1																		
		404/ 450'	2.2/<2.0																		
	Apr-06											<0.5		<0.5	<0.5	<3	<2	<0.5	<0.25		
	Oct-05											<0.5		<0.5	<0.5	<3	<2	<0.5	<0.25		
	May-05											<0.5		<0.5	<0.5	<3	<2	<0.5	<0.25		
	2005									120	<20					ND			<0.25		
	2004															ND			<0.25		
	2003															ND			<0.25-**0.62**		
	2002		3.2							<50	30					ND			<0.25-0.38		
	2001															ND			<0.25-0.48		
	2000															ND			<0.25-**0.72**		
	1998															ND		ND	0.18-**0.81**		
	1997																	ND	0.083-**0.72**		
	1996															<1		ND-0.44	ND-**1.3**		

Table 1 - City of Sebastopol Historic Summary of Supply Well Analytical Data

Well ID	Sample Date	Notes	Metals									Volatile Organic Compounds (VOCs)									
			Arsenic						Iron	Aluminum	Manganese	PCE		TCE	VC	MTBE	TBA	Benzene	1,2-DCA	Toluene	TPH
			µg/L									µg/L									
MCLs/SMCLs			10						300	1000/200	50	5		5	0.5	13/5	12	1	0.5	150	varies
Well 5												Lo-Hi	Average								
	Jul-12									<50	<20			<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	
Inactive	Aug-09		2.2							<50	<20	0.52	<0.5								ND
	Nov-06											1.1	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5
	Oct-04		4.8								**16**	2.67	0.4								
	Jan-04											1.5	<0.5	<0.5	<0.5	<0.5	<0.5				<0.5
	1993											4.8	4.80								
	1992											**5.9**	5.90								
	1991											**4.5-7.1**	6.75								
	1990											**4.6-8.6**	6.60								
	1989											**<0.5-10**	4.63	0.6-0.8							
	1988											**<0.5-6.3**	3.98								
	1987											**1.2-13**	4.51								
	1986											**3.4-25**	**11.73**								
			Total Arsenic (Raw)	**Arsenic III (Raw)**	**Arsenic V (Raw)**	**Arsenic (Blended)**	**Arsenic Zone 1 Inlet**	**Arsenic (Blend Special)**													
Well 6	Jul-12		**19.6**	**0.54**	**19.1**																
	Jul-12		**24**			8.7	5.8	**11**													
	Jun-12		**23**			8.9															
	Jun-12		**21**			7.6															
Blending Zone 1 water in reservoir with Well 6	May-12		**19**							<50	<20	<0.5		<0.5	<0.5	<0.5	<0.5				<0.5
	Feb-09		**17**																		
	Mar-09										**140**	0		0	0	0					
	Dec-08		**19**																		
	Nov-08		**12**																		
	Jul-08									**410**											
	Dec-07/Jan-08		**13**							<50	<20	0		0	0	0		0	0		
Spinner Test, Depth Discrete Sampling	Dec. 2004	**well head**	**16**																		
		180'	**14**																		
		248/ 275'	**12/7.5**																		
		300/ 380'	**7.1/6.9**																		
		450/ 500'	**4.4/4.9**																		

Table 1 - City of Sebastopol Historic Summary of Supply Well Analytical Data

Well ID	Sample Date	Notes	Metals									Volatile Organic Compounds (VOCs)								
			Arsenic						Iron	Aluminum	Manganese	PCE		TCE	VC	MTBE	TBA	Benzene	1,2-DCA	Toluene	TPH
			µg/L									µg/L									
MCLs/SMCLs			10						300	1000/200	50	5		5	0.5	13/5	12	1	0.5	150	varies
Well 7	Sep-12		**13**																		
	Mar-12		**10**																		
	Nov-11		**12**																		
	Jun-11									<5.0	<20.0	<0.5		<0.5	<0.5	<0.5	<0.5				<0.5
	Jun-09		3.0																		
	Mar-09		8.2																		
	Dec-08		4.3																		
	Nov-08		**12**/6.8																		
	Sep-08		**49**/5.7							<50	37					<3					
	Jul-08		**14**																		
2008, started quarterly sampling of Arsenic and switched lab and method from 502.2 to 200.9	Jun-08		**13**/7.1																		
	Jan-08		**26**							<50	33.00										
Spinner Test, Depth Discrete Sampling	Nov-06	**Well head**	14									<0.5		<0.5	<0.5	<0.5	<2				<0.5
		321/ 350'	29/13																		
		395/ 453'	<2.0/<2.0																		
		506'	<2.0																		
		625'	<2.0																		
	Jan-06		**14**																		
	Jul-05		**20**							<50	33										
	Jun-05		**25**																		
	Mar-05		9.3																		
	Sep-04		4.8																		
	Jul-04											<0.5		<0.5	<0.5	<0.5	<2				<0.5
	Jun-04		7.1									<0.5		<0.5	<0.5	<0.5	<2				<0.5
	Dec-03		6.4																		
	Sep-03		7.3									<0.5		<0.5	<0.5	<0.5	<2				<0.5
	Jul-03		2.4									<0.5		<0.5	<0.5	<0.5	<2				<0.5
	Mar-03		4.0																		
	Dec. 2002		3.5																		
	Sep-02		3.5																		
	Jun-02		<2.0									<0.5		<0.5	<0.5	<0.5	<2				<0.5
	Mar-02		3.1							<50	<30										
	Jun-01		2.0							<50	<30										
	Apr-99											<0.5		<0.5	<0.5	<0.5	<2				<0.5

Table 1 - City of Sebastopol Historic Summary of Supply Well Analytical Data

Well ID	Sample Date	Notes	Metals									Volatile Organic Compounds (VOCs)								
			Arsenic						Iron	Aluminum	Manganese	PCE		TCE	VC	MTBE	TBA	Benzene	1,2-DCA	Toluene	TPH
			µg/L									µg/L									
MCLs/SMCLs			10						300	1000/200	50	5		5	0.5	13/5	12	1	0.5	150	varies
			Raw			Post Sand Separator	Soluble														
Well 8 Well #8 Installed in 2007 in same location as Well 2	Jul-12								<100									<0.5		<0.5	
	Feb-11		<2						<100	<50	<20					0				0	
	Apr-08																			<0.5	
	Feb-08		3						**410**	<50	24	<0.5	<0.5	<0.5	<0.5	<3	<2	<0.5	<0.5	**0.93**	
	2007																				
Former Well 2 (destroyed)	Oct-04		**22**																		
	Sep-04		**15**																		
	Feb-04		4.5			6.8	4														
	Dec-03		3.5																		
	Sep-03		7.4																		
	Jun-03		3.9																		
	Mar-03		**13**																		
	Dec-02		**14**																		
	Sep-02		**18**																		
	Mar-99		**13**																		

Abbreviations:

MCL = Maximum contaminant level
SMCL = Secondary maximum contaminant level
PCE = Tetrachloroethene
TCE = Trichloroethene
VC = Vinyl chloride
MTBE = Methyl tert-butyl ether
TBA = Tert-butyl alcohol
1,2-DCA = 1,2-Dichloroethane
TPH = total petroleum hydrocarbons
µg/L = micrograms per liter
<x = denotes analyte not detected at, or above the detection limit of x.

Notes:

This table is a summary of pertinent data indicating specific historic contaminants of concern. Data was obtained from various laboratory reports and data provided by the City of Sebastopol Public Works Department.

Table 2 - City of Sebastopol Water Supply
Well Construction Data

Well ID	Location	Top of Casing Elevation NGVD 29 NAVD 88 Conv	Depth of Well	Diameter Well	Screen Interval, Type and Size	Sand Pack Size and Interval	Cement Seal Interval	Pump Size	Pump Depth (intake depth)	Operating/ Pump Capacity
		MSL	feet	inches	feet					
Well 4	710 Petaluma Ave at Palm Ave	98.57	530	14	237-468		0-135	100 HP	250	950/1000
1953 Installed		101.35								
Well 5	6860 Fannen Ave	83.3	528	14	138-528		0-120	60 HP	250	900
1960 Installed		86.08								
Well 6	991 Gravenstein Hwy South next to Mobile Home Park	103.71	572	14	172-552	Pea	0-140	125 HP	250	750
1968 Installed		106.49				0-572				
Well 7	1157 Cooper Road Cooper Road and Village Way	123.56	710	14/26	270-300	12x20	0-200	100 HP	320	750/900
1996 Installed		126.34			320-380	200-710				
					400-560					
					630-670					
Well 8	351 Jewell Ave	107.91	580	16	320-560	2/12	0-200	125 HP	320	500/1150
2007 Installed and replaced Well #2 but screened deeper to avoid As.		110.69				330-580				

Abbreviations:

MSL = Mean Sea Level

HP = Horsepower

As = Arsenic

Note: Data collected from the 2012 Annual Inspection Report from the California Department of Public Health, and other city provided information

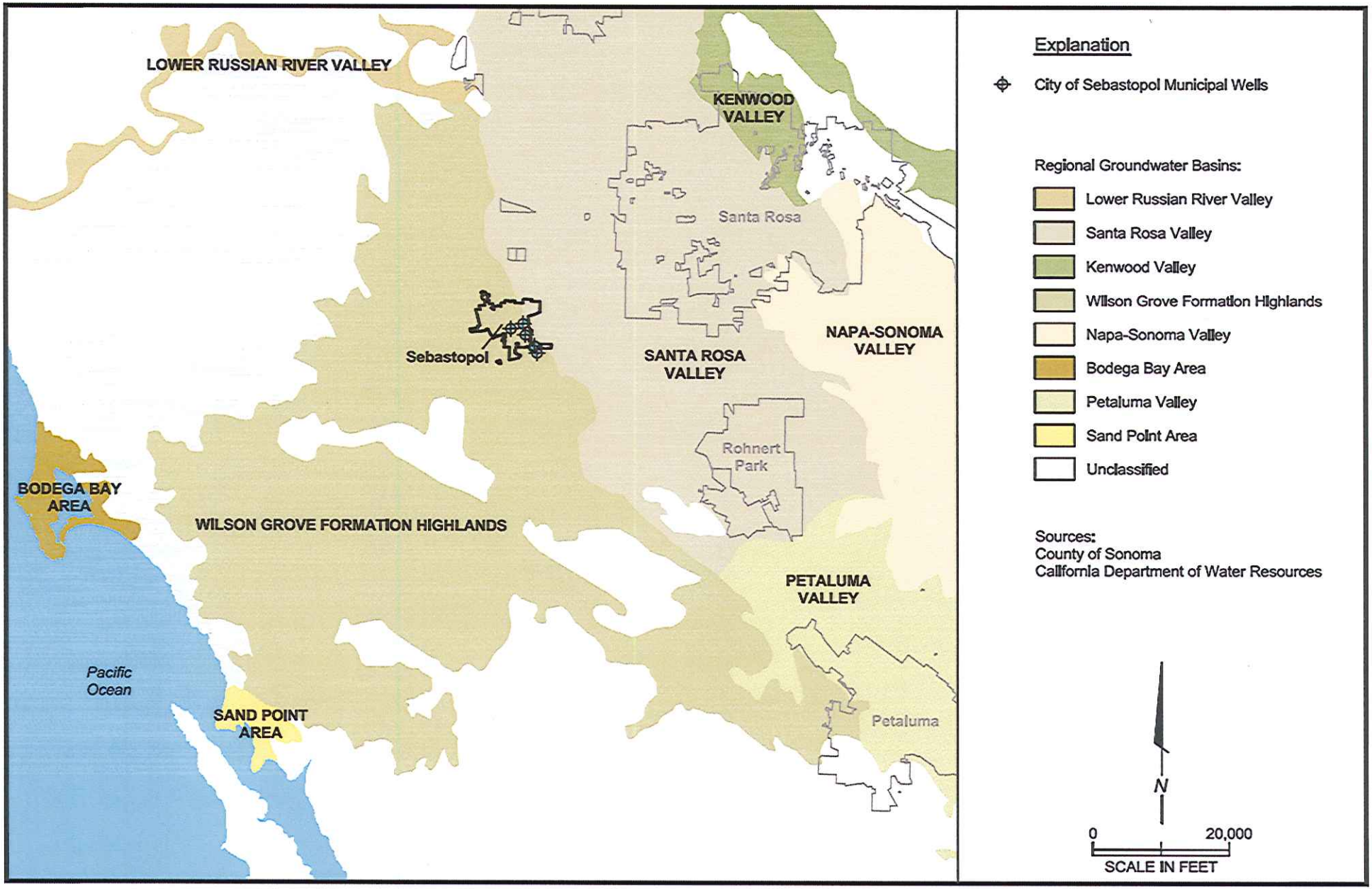
Table 3 - City of Sebastopol Water Supply Well Yield, Water Quality Issues and Treatment

Well ID	Pump Size and Type	Design or Historic Yield (gpm @ TDH)	Current Yield	Average Weekly Production (K gal)	Transducer Installation Date	Water Quality or CDPH Permit Issues	Primary Contaminants	Other Potential Contaminants	Regulatory Restrictions on use	Current Treatment	Observations/ Notes	Treatment Options
Well 4	60 HP VT	900	890 @ 338	2,612	2005	Contaminants above MCL	1,2-DCA	PCE, MTBE, As	NONE	Sand separation, GAC, Hypo-chlorination	1,2-DCA and MTBE are historical contaminants. PCE is current and rising in concentration but below the MCL. Also present is As but at only 3.6 µg/L - below the MCL.	GAC
Well 5	60 HP VT	900	~750	NO DATA	2007	Contaminants above MCL	PCE	TPH-G, BTEX, MTBE	NONE	NONE	Inactive due to past contamination. City would like to restart, but must fully understand any nearby contamination.	GAC
Well 6	250 HP Submersible VT	1200	~1,500	NO DATA	2006	Contaminants above MCL and SMCL	As	None	NONE	Sand Separation, Blending, Hypo-chlorination	Best well production-wise but also has the highest concentration of As of the two wells affected. Large enough site to support on-site well head treatment. Current blending is bringing concentration down from 17-21 to 11 µg/L, it is still above the MCL of 10.	GFH, Greensand
Well -7	100 HP Submersible VT	700	~800	2,463	2007, down, needs replacement	Contaminants above MCL	As	As in screened zones <350	NONE	Hypo-chlorination	No real estate at well site to support well head treatment. At 10 µg/L may be best to attempt blending or changing pump intake depth to deeper location. No VFD, discharge to waste.	GFH, Greensand
Well 8	125 HP Submersible VT	750 @538	604 @ 494	1,453	NONE (burnt out due to stray current)	NONE	NONE	Historic As in screened zones <350, current well is screened >350'	NONE	Hypo-chlorination	Stray current present only when well is running. Stray current in damage to the ultrasonic level sensor in the well. Well is therefore currently required to be run manually. Arsenic was detected in the old well 2 in the shallow zones, and since construction of the new well No 8 in the deeper zones, the As is below the MCL.	None at this time

Abbreviations:

gpm = gallons per minute
TDH = Total dynamic head
K gal = thousands of gallons
CDPH = County Department of Public Health
HP = Horsepower
VT = Vertical Turbine
MCL = Maximum contaminant level
SMCL = Secondary maximum contaminant level
1,2-DCA = 1,2-Dichloroethane
PCE = Tetrachloroethene
MTBE = Methyl tert-butyl ether
As = Arsenic
GAC = Granulated activated carbon
µg/L = micrograms per liter
TPH-G = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, Toluene, Ethyl benzene, and Xylenes

Appendix A
Various Figures from the PES Water Supply Assessment Northeast Area Specific Plan, June 27, 2007



PES Environmental, Inc.
Engineering & Environmental Services

Regional Groundwater Basins
Northeast Area Water Supply Assessment
Sebastopol, California

PLATE 2

954.003.01.001	954-003_gwbasin-1	CJM	6/07
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

B' (Extends approximately 4.3 miles north)

CAS 60461-60463

Santa Rosa Plain Sub-Basin

Wilson Grove Formation Highlands Groundwater Basin

SCWA-Sebastopol Road Pilot Hole

Covert Lane/Healdsburg Avenue Well

Sebastopol

City Well #5

City Wells #2 (Abandoned) & Test Hole Well #8

City Well #4

City Well #6

City Well #7

Sebastopol Fault

Apple Blossom Well

Twin Hills Well

USGS E-14

CAS 413, 55976, 60305-60312, 60314
LACM 11775
UCMP A869, B4668, B8027
USGS M4231

Salmon Creek

CAS 60468-60470
UCMP D5919

UCMP D5919

F' (Extends approximately 2.2 miles southeast)

Ebabias Creek

Hill 724

UCMP B2762

B (Extends approximately 3.3 miles south)

J (Extends approximately 3.4 miles southwest)

CAS 54135, 54136, 57867
UCMP D3224

CAS 59666

CAS 59667

Bloomfield Quarry

Tremary Ranch

CAS 59671

CAS 59668

CAS 55967, 55969

N

0 4,000

SCALE IN FEET

Explanation

City of Sebastopol Well Location

Sonoma County Water Agency (SCWA) Pilot Hole

Location of Generalized Geologic Cross Section by PES Environmental, Inc.

USGS Geologic Cross Section (ie. B-B', F-F', and J-J')

Wilson Grove Formation (Late Miocene to Late Pliocene): Thickly- to hummocky cross-stratified, marine sandstone. The late Miocene Roblar tuff of Sarna-Wojcicki (1992) (purple line; dashed where approximately located) occurs north of the Bloomfield Fault.

See the source cited below for an explanation of the geologic symbols and other information that is presented on this map, but not explained above.

Geologic Map Source:

U.S. Geological Survey (USGS) Open-File Report 2004-1017. *Invertebrate Paleontology of the Wilson Grove Formation (Late Miocene to Late Pliocene), Sonoma and Marin Counties, California, with some Observations on its Stratigraphy, Thickness, and Structure.* By Charles L. Powell, II, James R. Allen, and Peter J. Holland.

PES Environmental, Inc.
Engineering & Environmental Services

Geologic Map Showing Cross Section Line
Northeast Area Water Supply Assessment
Sebastopol, California

PLATE 3

954,003,01,001	954_CA83IIIF_xsec.doc	CJM	6/07
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

A'
Northeast

Intersection with cross sect
USGS Open-File Report 20

Apple Blossom Well (700-ft. S)
TD = 505-ft. bgs

SALMON CREEK

ATASCADERO CREEK

Twin Hills Well (5,350-ft. S)
TD = 580-ft. bgs

Covert Lane/Healdsburg Avenue Well (3,
TD = 654-ft. bgs

City Well #2 (Abandoned)/Test Hole Well #8 (500
TD = 600-ft. bgs

City Well #5 (400-ft. S)
TD = 647-ft. bgs

Sebastopol Fault

LAGUNA DE SANTA ROSA

USGS Open-File Report 2006-1196
Sonoma County Water Agency - Sebastopol Road I
TD = 1,070-ft. bgs

(Feet MSL)

600
500
400
300
200
100
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1000
-1100
-1200
-1300
-1400
-1500
-1600
-1700

Quaternary Alluvium

Late Pliocene and
Quaternary Nonmarine Deposits

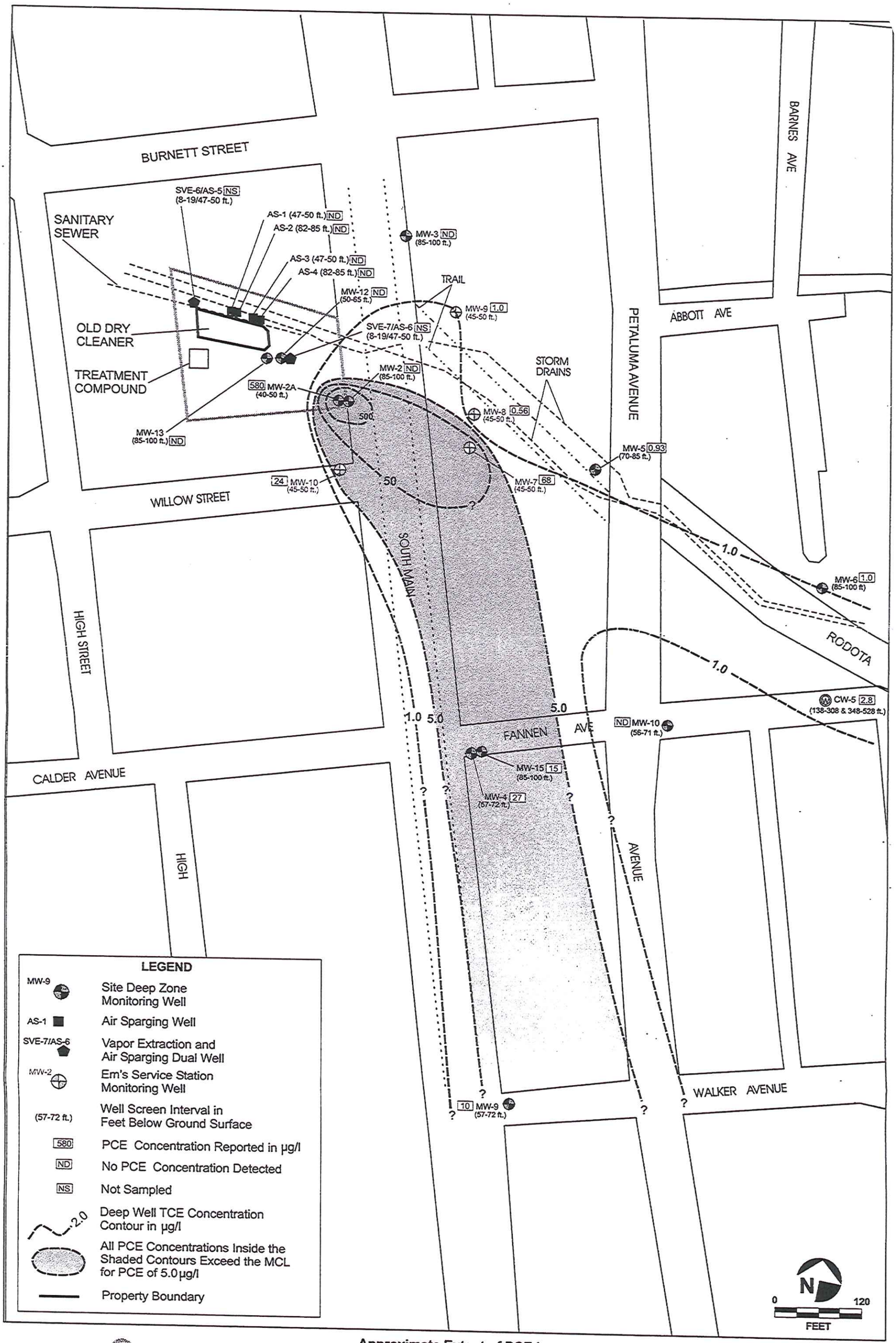
Wilson Grove Formation
(Late Miocene to Late Pliocene)

Franciscan Complex
(Jurassic to Cretaceous)

—?— Lithologic contact

First encountered shell horizon identified in boring

Roblar Tuff



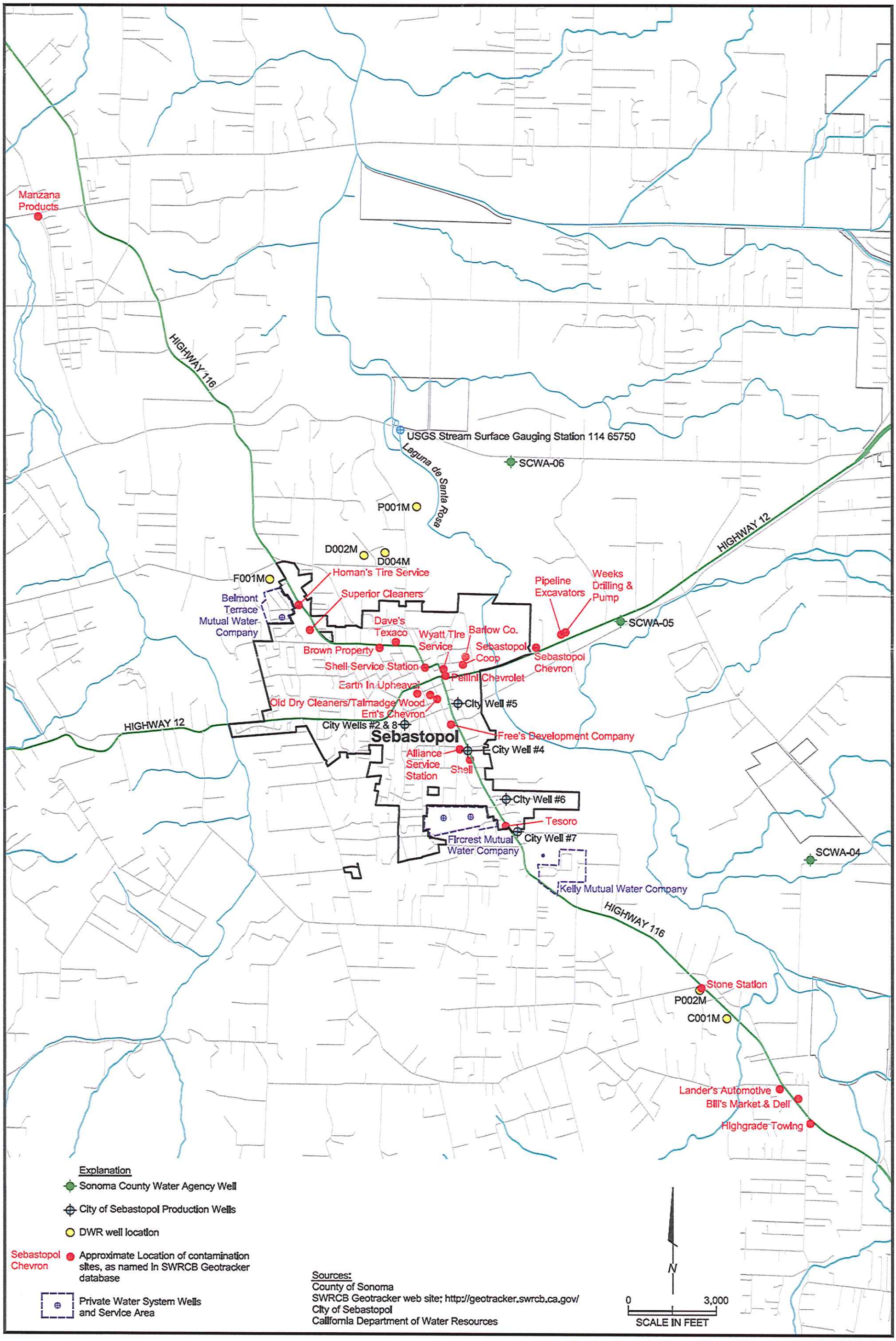
4-22

amec

Approximate Extent of PCE in Deep Ground-Water Monitoring Wells, November 2003 Old Dry Cleaner Site 250 South Main Street, Sebastopol, California

FIGURE 4-3

SF OFFICE/PR[illegible]CTS/TALMADGE QUARTERLY GRAPHICS/2003 QTRLY GRAPHICS/4TH QTR 2003/FIG 4-3.CDR

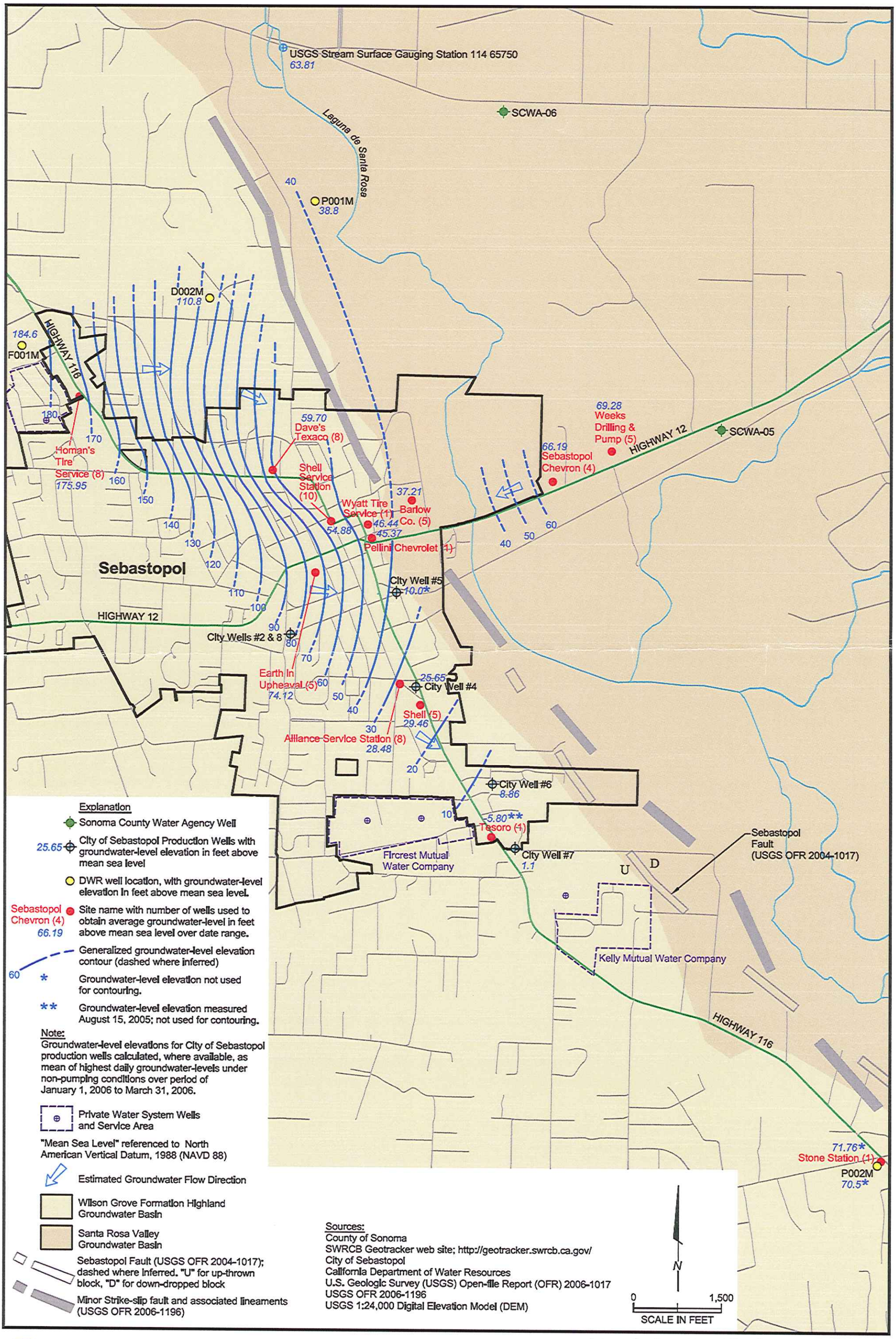


PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Northeast Area Water Supply Assessment
Sebastopol, California

PLATE 5

954.003.01	954 1_5	CJM	7
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
Engineering & Environmental Services

Interpretive Groundwater Elevation Contour Map, January 1 to March 31, 2006
Northeast Area Water Supply Assessment
Sebastopol, California

PLATE 6

954.003.01	95 _6	CJM	7
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

Appendix B
Various Figures from ECM Group's Remedial Action Plan for 501 S. Main Street, May 7, 2012

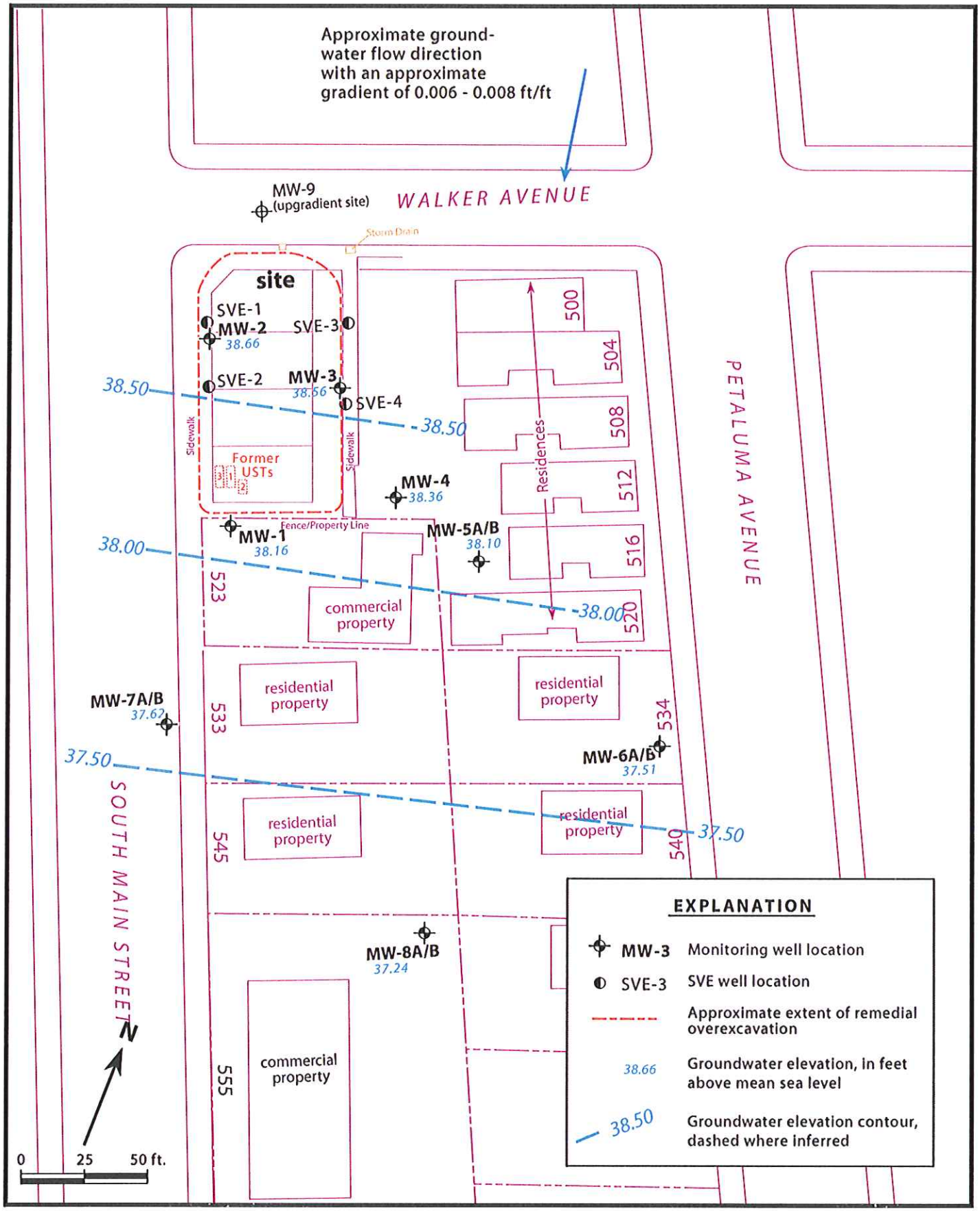


Figure 5. Monitoring Well Locations and Groundwater Elevation Contour Map - March 31, 2011 - 501 South Main Street, Sebastopol, California

06-130-84 (QM 3-11) 4/13/11

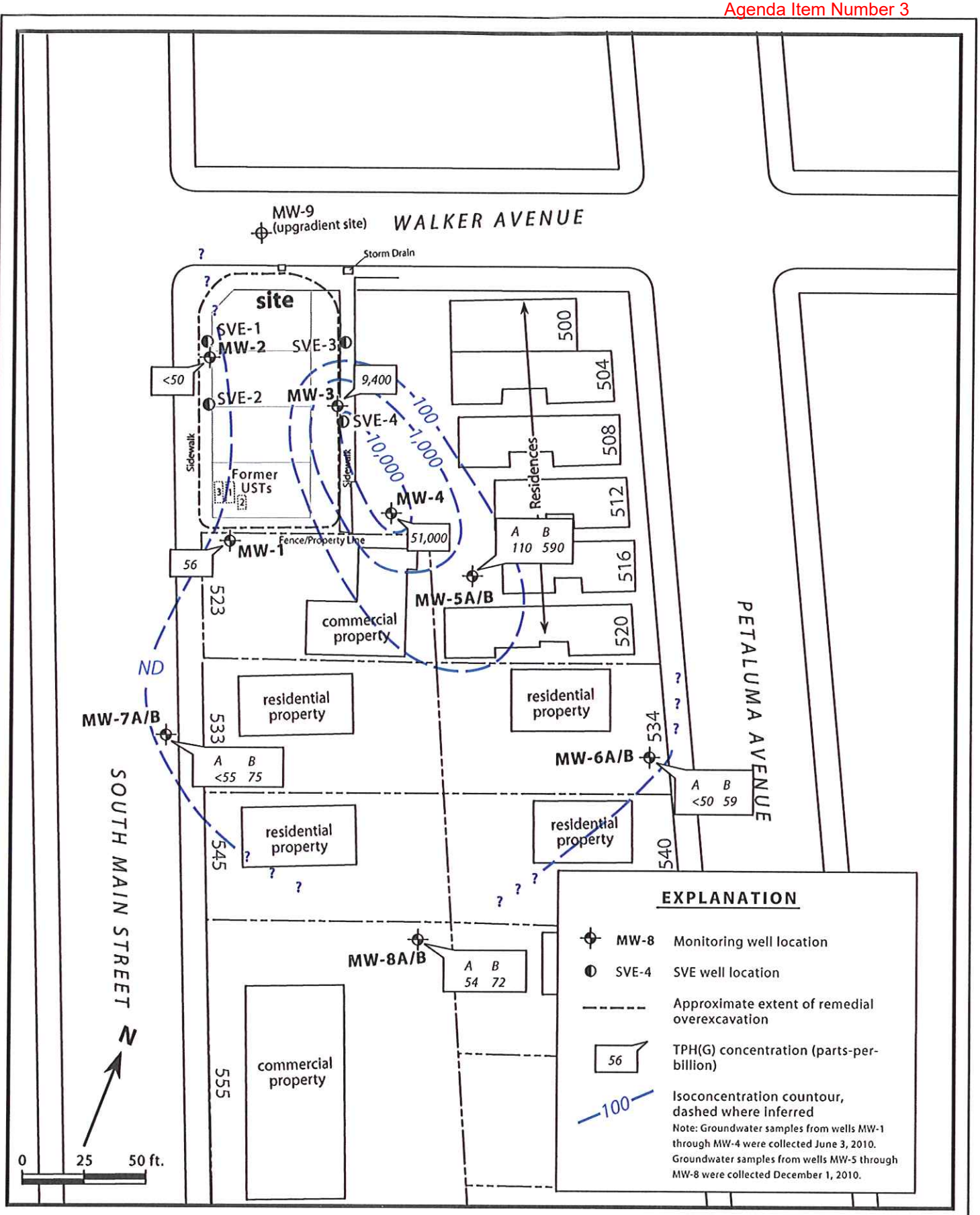


Figure 6. Gasoline Concentrations in Groundwater, June 3, 2010 and December 1, 2010 - 501 South Main Street, Sebastopol, California

05-150-00 Figure 6 4/5/11

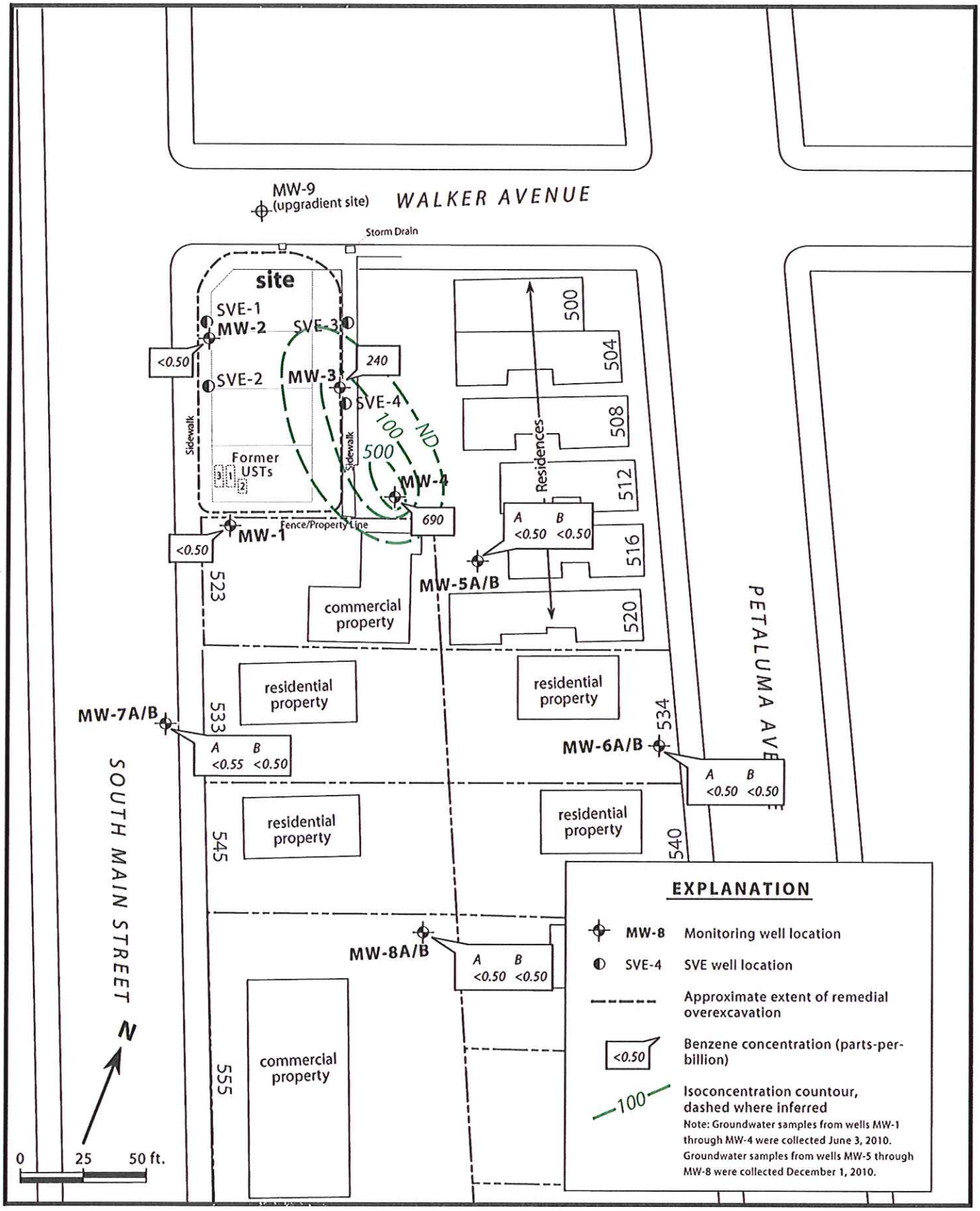
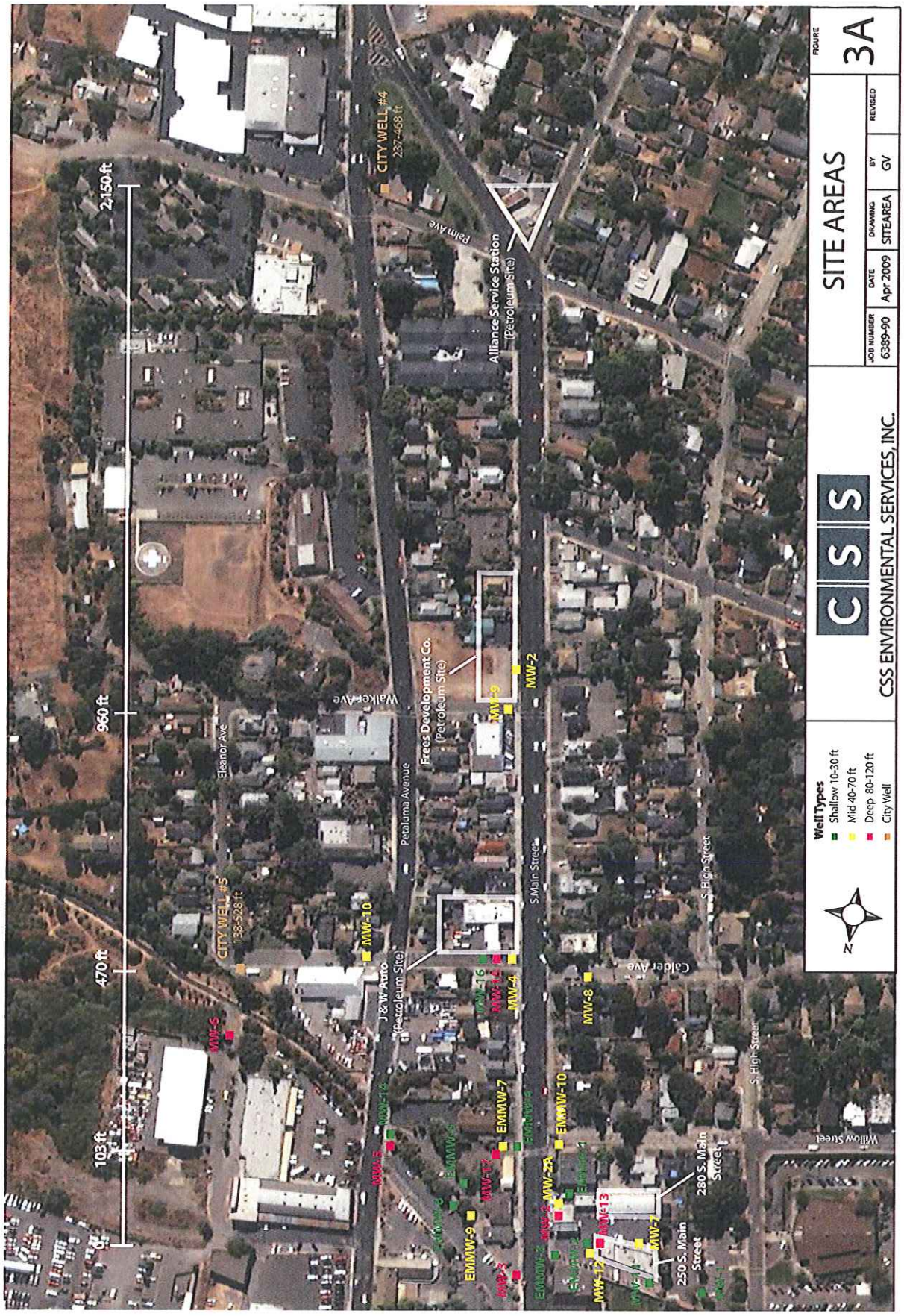
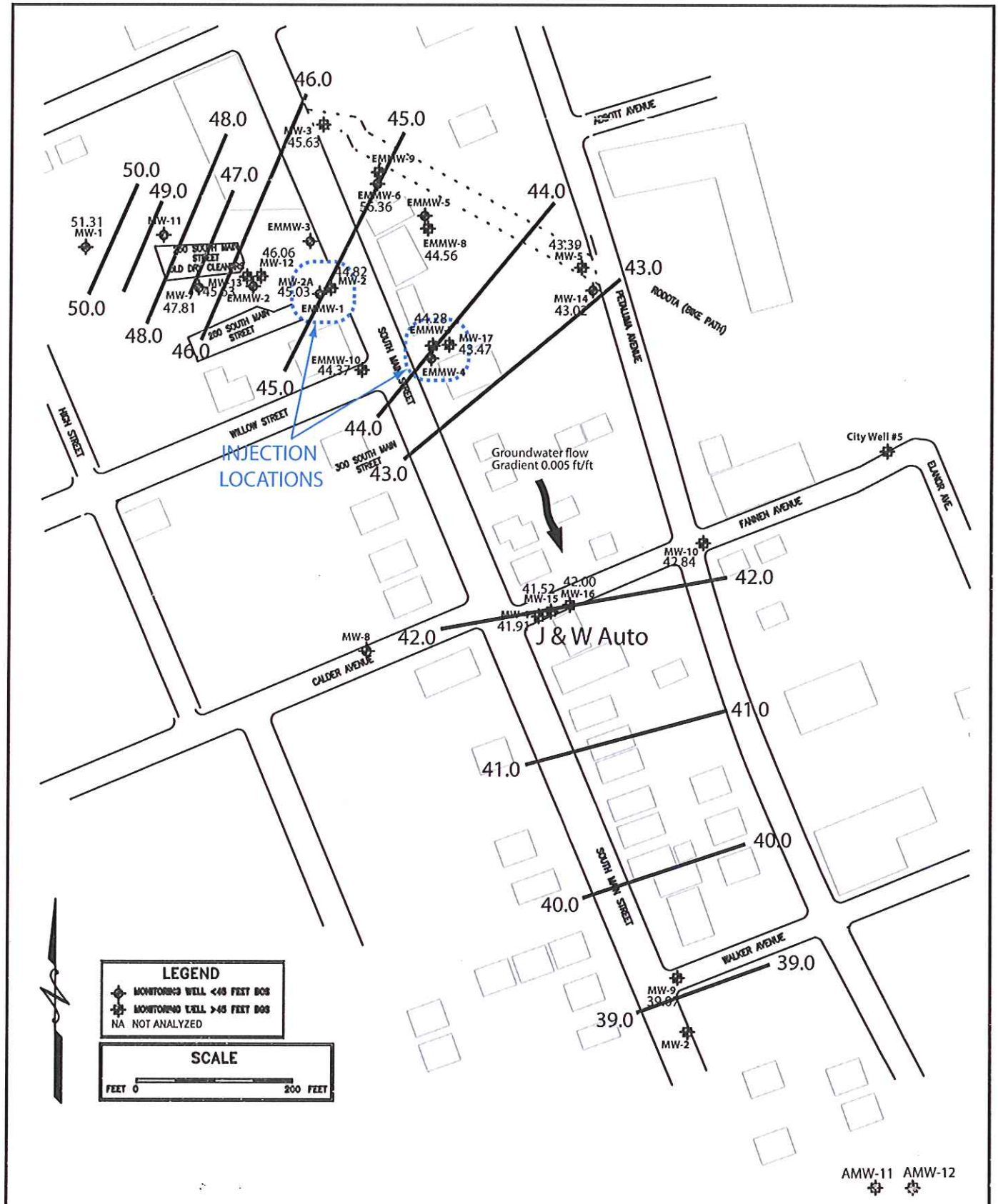


Figure 7. Benzene Concentrations in Groundwater, June 3, 2010 and December 1, 2010 - 501 South Main Street, Sebastopol, California

05-150-00 [Figure 7] 4/5/11

Appendix C
Various Figures from CSS Environmental Feasibility Study and Comprehensive Remedial Action Plan, April 24, 2009


2,150 ft
960 ft
470 ft
103 ft
CITY WELL #4
237-468 ft
CITY WELL #5
138-528 ft
Alliance Service Station
(Petroleum Site)
Frees Development Co.
(Petroleum Site)
J & W Auto
(Petroleum Site)
Petaluma Avenue
Walker Ave
Eleanor Ave
Palm Ave
S. Main Street
S. High Street
Calder Ave
Willow Street
280 S. Main Street
250 S. Main Street
MW-2
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-12
MW-13
MW-14
MW-16
EMMW-7
EMMW-9
EMMW-10
Well Types
Shallow 10-30 ft
Mid 40-70 ft
Deep 80-120 ft
City Well
N
CSS ENVIRONMENTAL SERVICES, INC.
CSS
SITE AREAS
JOB NUMBER 6389-90
DATE Apr 2009
DRAWING SITEAREA
BY GV
REVISED
FIGURE 3A

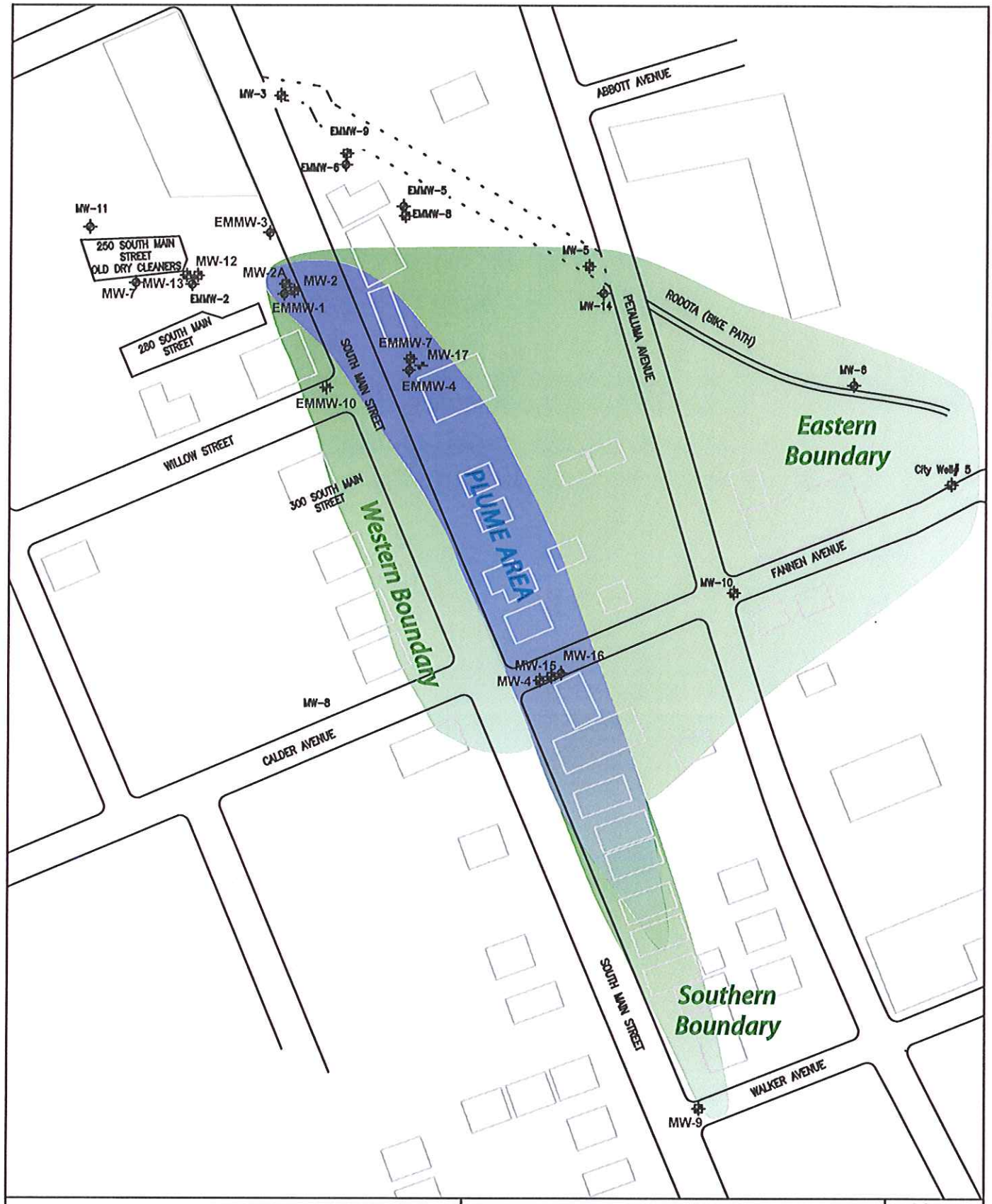


CSS ENVIRONMENTAL SERVICES, INC.

GROUNWATER FLOW THIRD QUARTER 2011
250-280 SOUTH MAIN STREET
SEBASTOPOL, CALIFORNIA

FIGURE 2

JOB NUMBER	DATE	DRAWING	BY	REVISED
6389-90	12/06	Q3 2011	GV	09/11

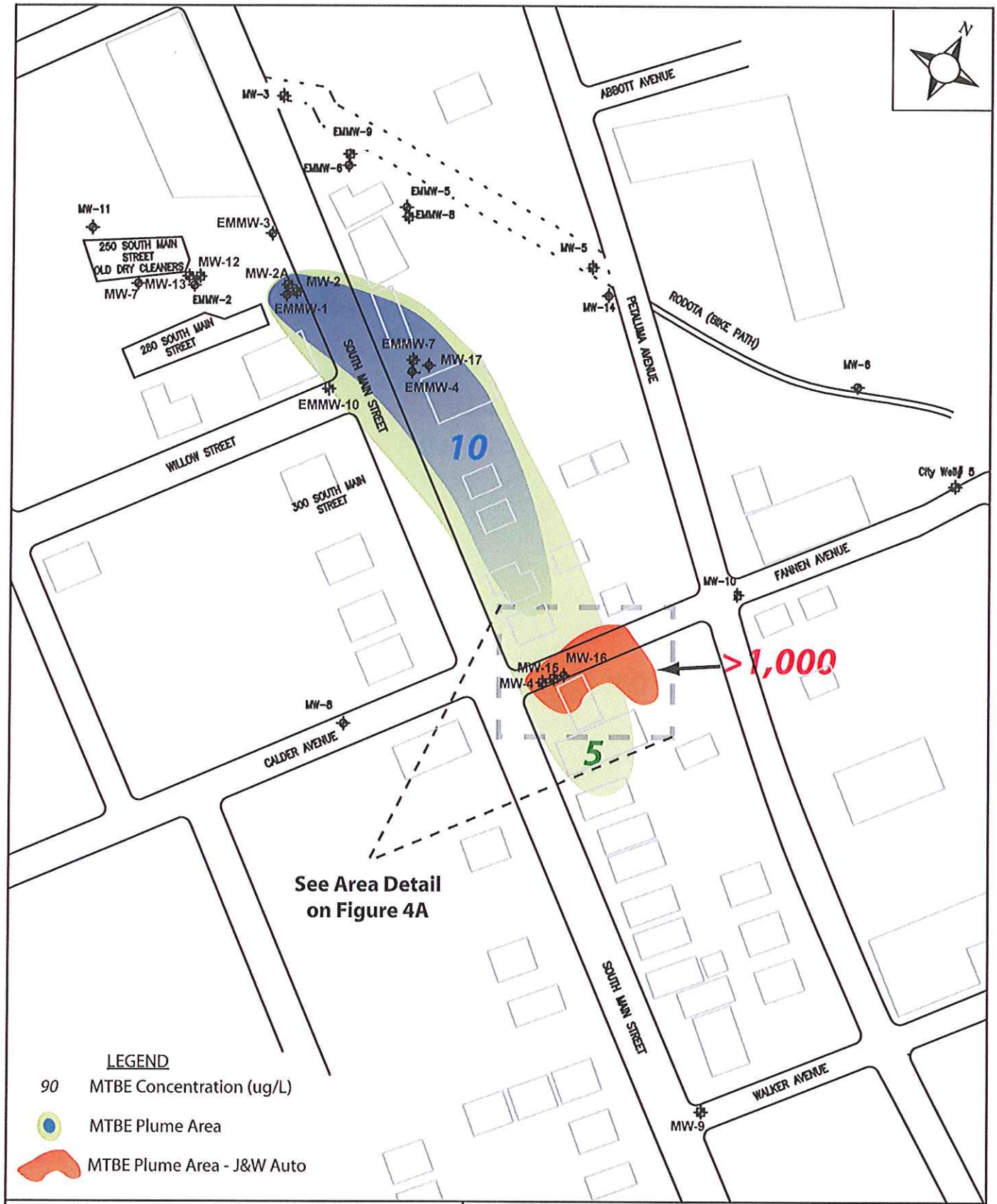


CSS ENVIRONMENTAL SERVICES, INC.

PLUME BOUNDARY AREAS
Former EMs and Old Dry Cleaners
250-280 S. Main Street, Sebastopol, CA

FIGURE 3

JOB NUMBER	DATE	DRAWING	BY	REVISED
6389-90	Dec 08	ISOCONC	GV	

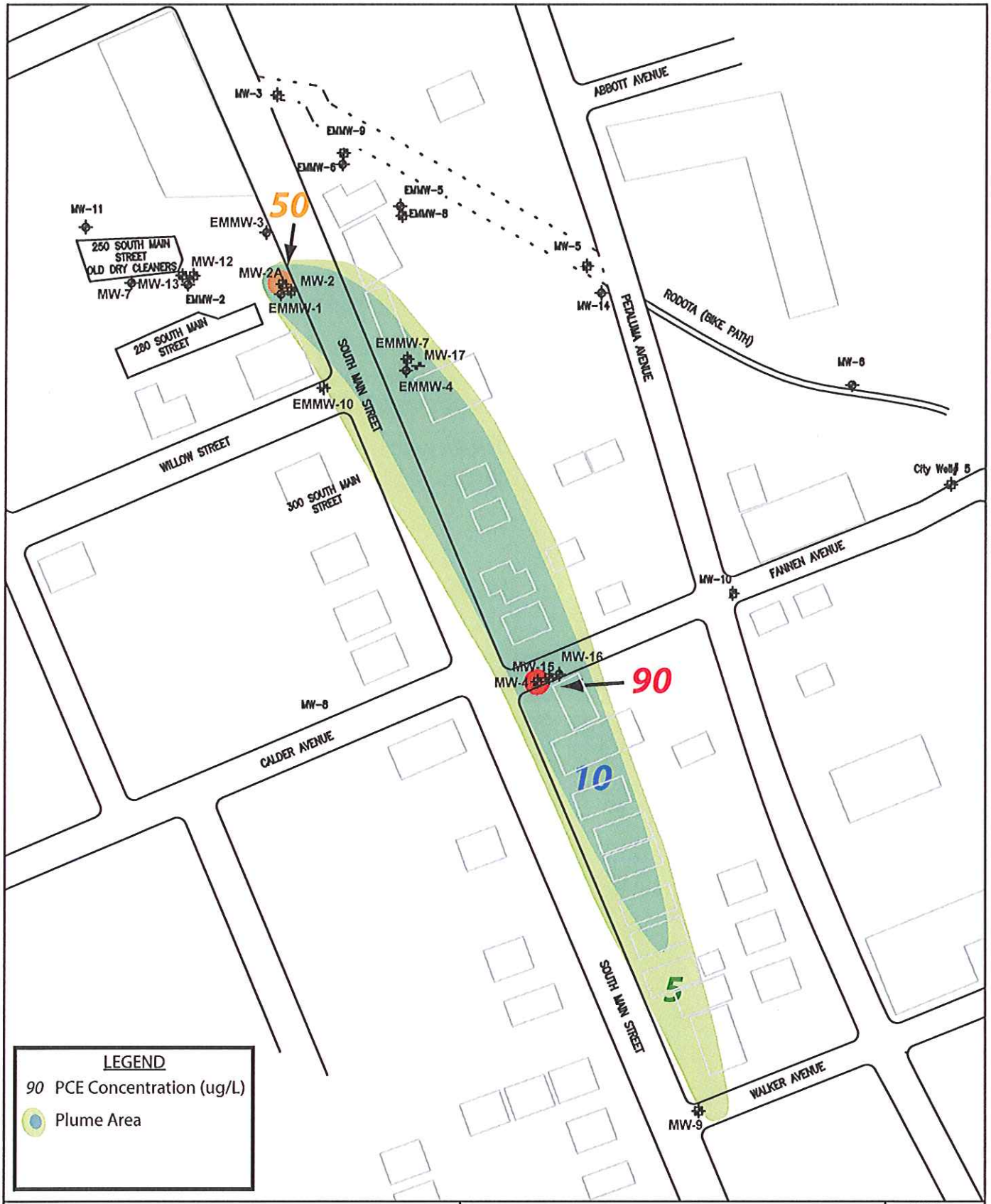


CSS ENVIRONMENTAL SERVICES, INC.

MTBE ISO-CONCENTRATIONS
Former EMs and Old Dry Cleaners
250-280 S. Main Street, Sebastopol, CA

JOB NUMBER	DATE	DRAWING	BY	REVISED
6389-90	Dec 08	ISOCONC	GV	

FIGURE 4



CSS ENVIRONMENTAL SERVICES, INC.

PCE ISO-CONCENTRATION CONTOURS
Former EMs and Old Dry Cleaners
250-280 S. Main Street, Sebastopol, CA

FIGURE 7

JOB NUMBER	DATE	DRAWING	BY	REVISED
6389-90	Dec 08	ISOCONC	GV	

Appendix D
Arsenic Speciation Laboratory Report And BESST Zone Test Report

Analytical Sciences

August 1, 2012

Dante Del Prete
City of Sebastopol
714 Johnson Street
Sebastopol, CA 95472

Dear Dante,

Enclosed you will find the partial report 2072608 for your Water Quality Feasibility Test. As required by the California Department of Health Services, the letterhead copy of the report for work performed by the subcontracted laboratory is included. An invoice for this work will be sent with the final report.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Michele Peters
Laboratory Manager
Analytical Sciences

cc: Elizabeth Cargay, GHD, Inc.

PO Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952
Fax: (707) 769-8093

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	Analytical Sciences LLC	**Service Request:**	K1207277
Project:	2072608	**Date Collected:**	7/26/2012
Sample Matrix:	Water	**Date Received:**	7/27/2012

Total Metals

Sample Name:	Well #6	Units:	ug/L (ppb)
Lab Code:	K1207277-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.04	2	NA	7/30/2012	0.54	
Arsenic (V)	None	1632 Rev. A	1.0	50	NA	7/31/2012	19.1	
Inorganic Arsenic	None	1632 Rev. A	1.0	50	NA	7/31/2012	19.6	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	Analytical Sciences LLC	**Service Request:**	K1207277
Project:	2072608	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 1	Units:	ug/L (ppb)
Lab Code:	K1207277-MB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	1	NA	7/30/2012	ND	
Arsenic (V)	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	
Inorganic Arsenic	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	Analytical Sciences LLC	**Service Request:**	K1207277
Project:	2072608	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 2	Units:	ug/L (ppb)
Lab Code:	K1207277-MB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	1	NA	7/30/2012	ND	
Arsenic (V)	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	
Inorganic Arsenic	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Report

Client:	Analytical Sciences LLC	**Service Request:**	K1207277
Project:	2072608	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Total Metals

Sample Name:	Method Blank 3	Units:	ug/L (ppb)
Lab Code:	K1207277-MB3	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Arsenic (III)	None	1632 Rev. A	0.02	1	NA	7/30/2012	ND	
Arsenic (V)	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	
Inorganic Arsenic	None	1632 Rev. A	0.02	1	NA	7/31/2012	ND	

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128
Fax (707) 769-8093

CHAIN OF CUSTODY

SUBCONTRACT LAB: Columbia
AS PROJECT NAME:
AS PROJECT NUMBER: 2072608

CLIENT INFORMATION

COMPANY NAME: ANALYTICAL SCIENCES
ADDRESS: P.O. BOX 750336
PETALUMA, CA 94975-0336
CONTACT: MARK VALENTINI
PHONE#: (707) 769-3128
FAX #: (707) 769-8093
email: ANALytical110@AOL.com

TURNAROUND TIME (check one)

SAME DAY		24 HOURS	
48 HOURS	X	72 HOURS	
5 DAYS		NORMAL	

COOLER TEMPERATURE _____ °C

COC PAGE 1 OF 1

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	AS Inorg T 1632	As 3 1632	As Calc 1632										COMMENTS	LAB SAMPLE #
1	Well #6	7/26	1330	W	1	y	X	X	X										Arsenic speciation	
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

SIGNATURES

RELINQUISHED BY: Gale Valentini — SIGNATURE
7/26/12 — DATE
4:45 pm. — TIME
RECEIVED BY LABORATORY: — SIGNATURE
7/27/12 — DATE
0900 — TIME

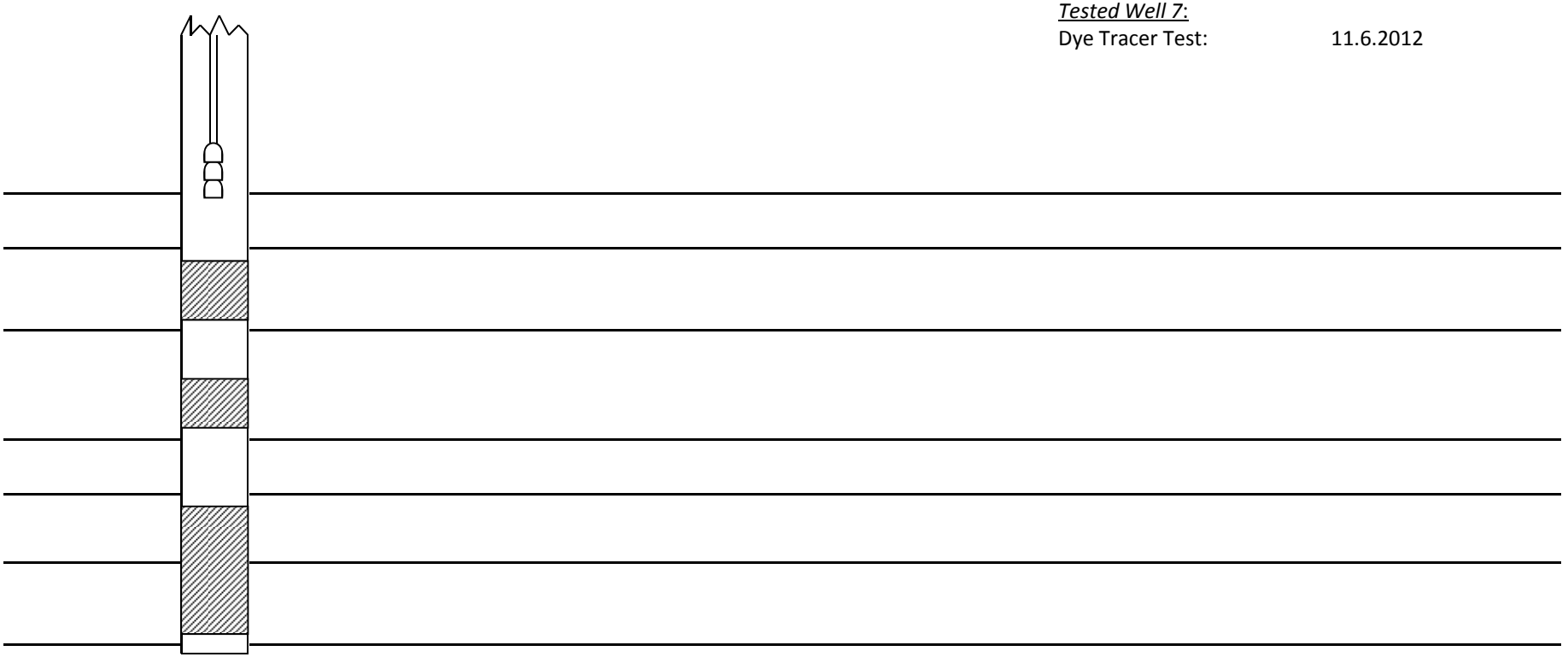
CA Lab Accreditation #: 2303

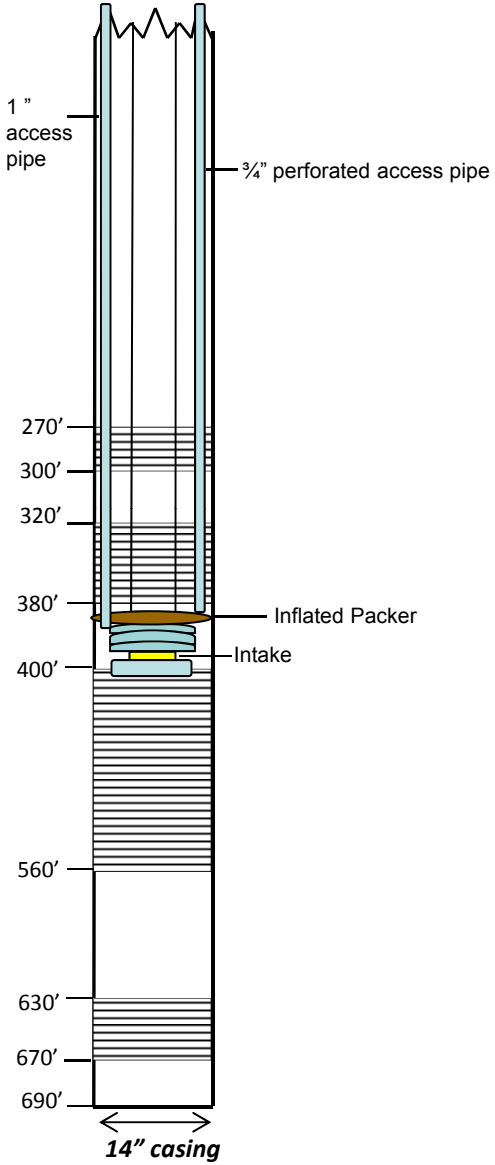
BESST INC.
GLOBAL SUBSURFACE TECHNOLOGIES

50 Tiburon Street Suite 7
San Rafael , CA 94901
Toll Free.866.298.8701
Phone.415.453.2501
Fax.415.453.2509

Report: Dye Tracer Injections To Test Packer Effectiveness
City of Sebastopol Well 7

Tested Well 7:
Dye Tracer Test: 11.6.2012





Well Information

Pump Type:	Submersible Turbine
Pump Intake (ft. bgs)	400’ (*est.)*
Packer Depth (ft. bgs)	385’-390’ (est.)
Well Diameter ID (inch)	14”
Cross Sectional Area of screen (ft^2)	1.069 ft^2
Flow Meter Discharge (GPM)	500-700 GPM (est.)
Screen/perforation Interval(s) (ft. bgs)	270’-300’, 320’-380’, 400’-560’, 630’-670’
Pumping Water Level (PWL) (ft. bgs)	Unknown
¾” PVC access pipe (ft. bgs)	385’ (est.) to top of packer
1” PVC access pipe (ft. bgs)	395’ (est.) pass through pipe

BESST INC.
GLOBAL SUBSURFACE TECHNOLOGIES

Dye Tracer Injections To Test Packer Effectiveness – City of Sebastopol Well 7

Introduction:

In 2006, BESST performed a detailed flow and chemistry profile of Well 7 to quantify arsenic mass loading on a zone by zone basis under pumping conditions. Based on those results, Well 7 was modified and re-engineered to block off the highest arsenic contributing zones, which occur in the top two screen sections between 270'-300' and 320'-380' below ground surface (bgs). This was accomplished by placing a packer between 385'-395' bgs, with relocation of the pump intake below this point. Subsequently, the goal of arsenic reduction was accomplished, and Well 7 was able operate without the need for treatment for several years. In recent months, the arsenic concentrations gradually increased above the maximum contaminant level of 10 µg/L. Recently, BESST was utilized to performed several dye tracer injections for City of Sebastopol Well 7 on November 6, 2012. The purpose of this test was to check if the packer that is currently deployed, is effectively blocking flow from above the top two screened zones.

Deployment Procedure:

Based on BESST's chain access survey, there was one viable access point available at the wellhead for Well 7. Although two PVC access pipes were installed, only one provided a viable path for dye travel within the annular space between the casing and pump column above the packer. That was the ¾" perforated access pipe, which is set between the column pipe and casing, and ends at the top of the packer at approximately 385' bgs. A 1" PVC access pipe on the opposite side of the annulus enters the top of the packer and exits just below the packer, in the part of the casing engaged by the pump. The chain survey results indicated BESST tools could not access the zone below the packer through the 1" pipe, possibly due to termination of the pipe near the top of the pump, which blocks further downward movement. Since the ¾" access pipe was perforated alongside the screened section of the casing above the packer, BESST was able inject dye in several locations inside the pipe. The effectiveness of the seal of the packer around the casing, and any other potential "leaky points" within the packer assembly would be determined based on detection of any dye concentration at the well head.

Conclusions:

Tables 1 and 2 on page 4 illustrates the results from the dye injection test above the packer. Based on injection tests at an estimated 500 and 700 GPM, at three locations above the packer (375',360', and 345'), it was determined that at no instance was their dye return at the surface, and therefore the water above the packer was not intruding below the packer. In other words, the packer is sufficiently functioning in the capacity at which it is deployed in Well 7. This conclusion is reached after allowing adequate time for the dye to reach the intake, if a leak point(s) were to exist. As a control, dye was poured down the 1" PVC access pipe followed by a constant flow of water from the discharge in order to push the dye towards the opening of the access pipe below the packer and towards the intake. The peak dye return time for this test was 9:50 at 7.60 PPB. The dye return during this control experiment verified the usage of the correct access pipe, and established the functionality of our equipment. This test only confirms the effectiveness of the packer in preventing water from above the packer, and within the well itself, from flowing to the intake. In order to understand the new dynamics in Well 7 since 2006, BESST recommends performing a detailed profile of the well to ascertain the new flow and chemical contribution characteristics along the length of screen. Based on those results, the City of Sebastopol may have the potential to relocate the pump and packer for reduction of arsenic, and therefore, avoidance or reduction of treatment costs.

BESST INC.
GLOBAL SUBSURFACE TECHNOLOGIES

Dye Tracer Injections To Test Packer Effectiveness- Dye Return Data Tables

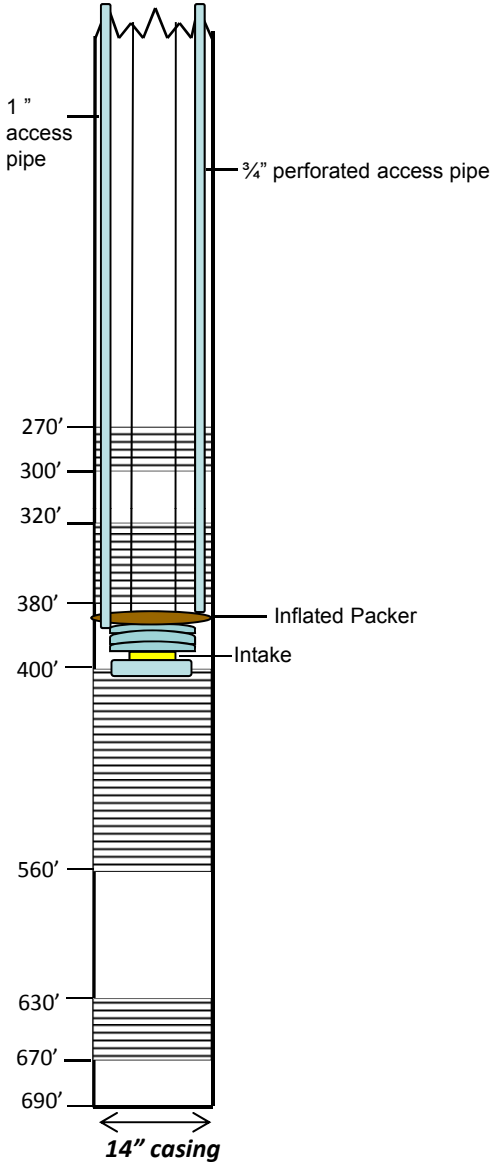


Table 1

Dye Injection Test Through ¾” access pipe			
Estimated Pumping Rate	***Injection Depth (bgs.)***	***Start Time***	***Dye Return Times***
500 GPM	375'	11:50:00	No Return
500 GPM	375'	11:56:00	No Return
700 GPM	360'	12:08:00	No Return
700 GPM	360'	12:16:00	No Return
700 GPM	345'	12:25:00	No Return

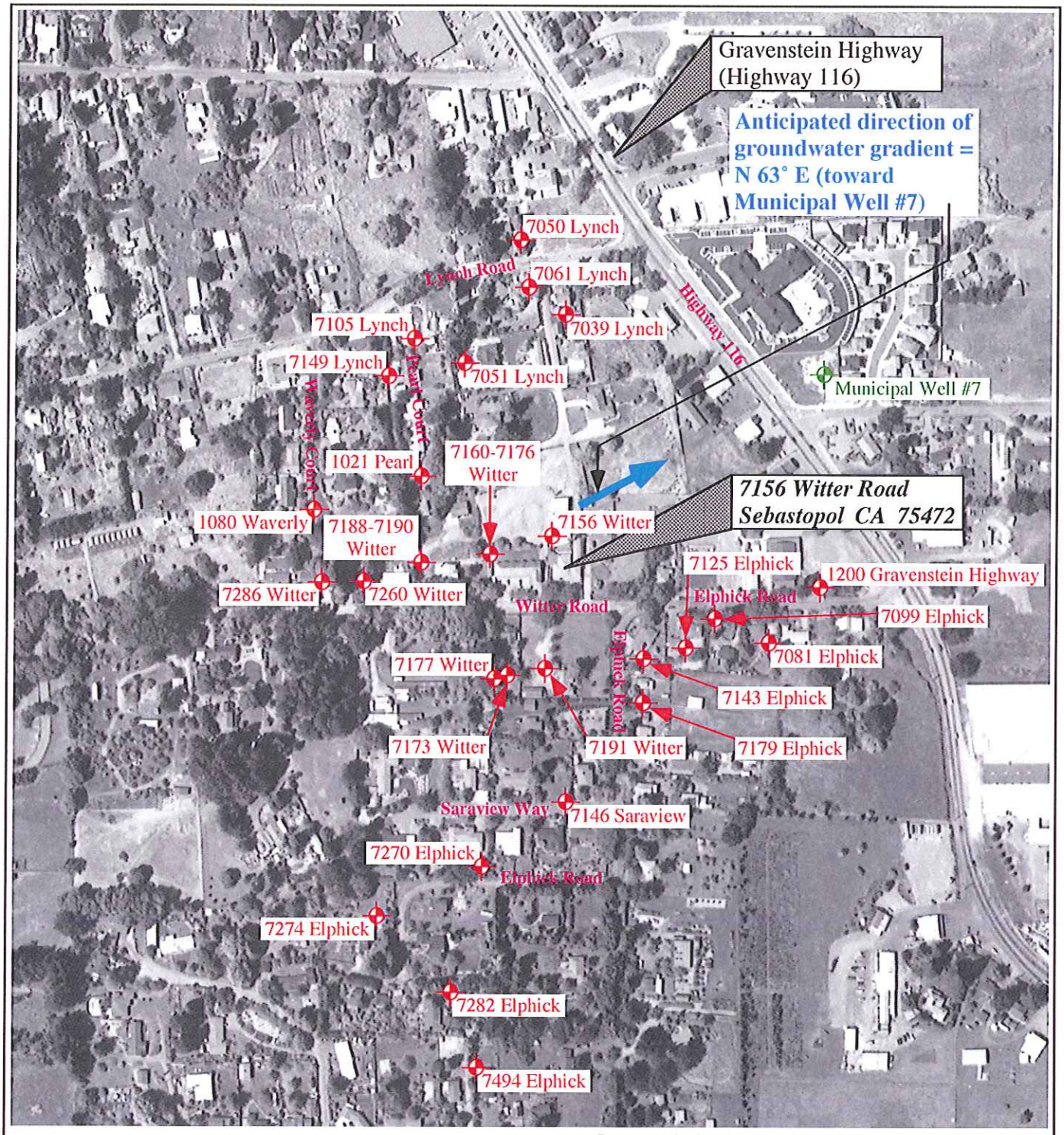
Table 2

Control Experiment Through Pass Through PVC Access Pipe (1”)			
Estimated Pumping Rate	***Injection Depth***	***Start Time***	***Dye Return Times***
700 GPM	Top of 1” access pipe	12:33:00	12:42:50

* Well 7 was turned off at approximately 12:45:00

BESST INC.
GLOBAL SUBSURFACE TECHNOLOGIES

Appendix E
Various Figures from Streamborn's Installation of Groundwater Monitoring Wells and Groundwater Monitoring, December 19, 2005



Legend

- Domestic well (active and inactive)
- Public water system well (active)

0 500 1,000

Approximate Scale in Feet

Basemap: Aerial photograph taken 21 April 2000. Photograph SON-AV-6540-11-36. Pacific Aerial Surveys, Oakland CA.

Figure 3

Vicinity Map

7156 Witter Road
Sebastopol CA

STREAMBORN

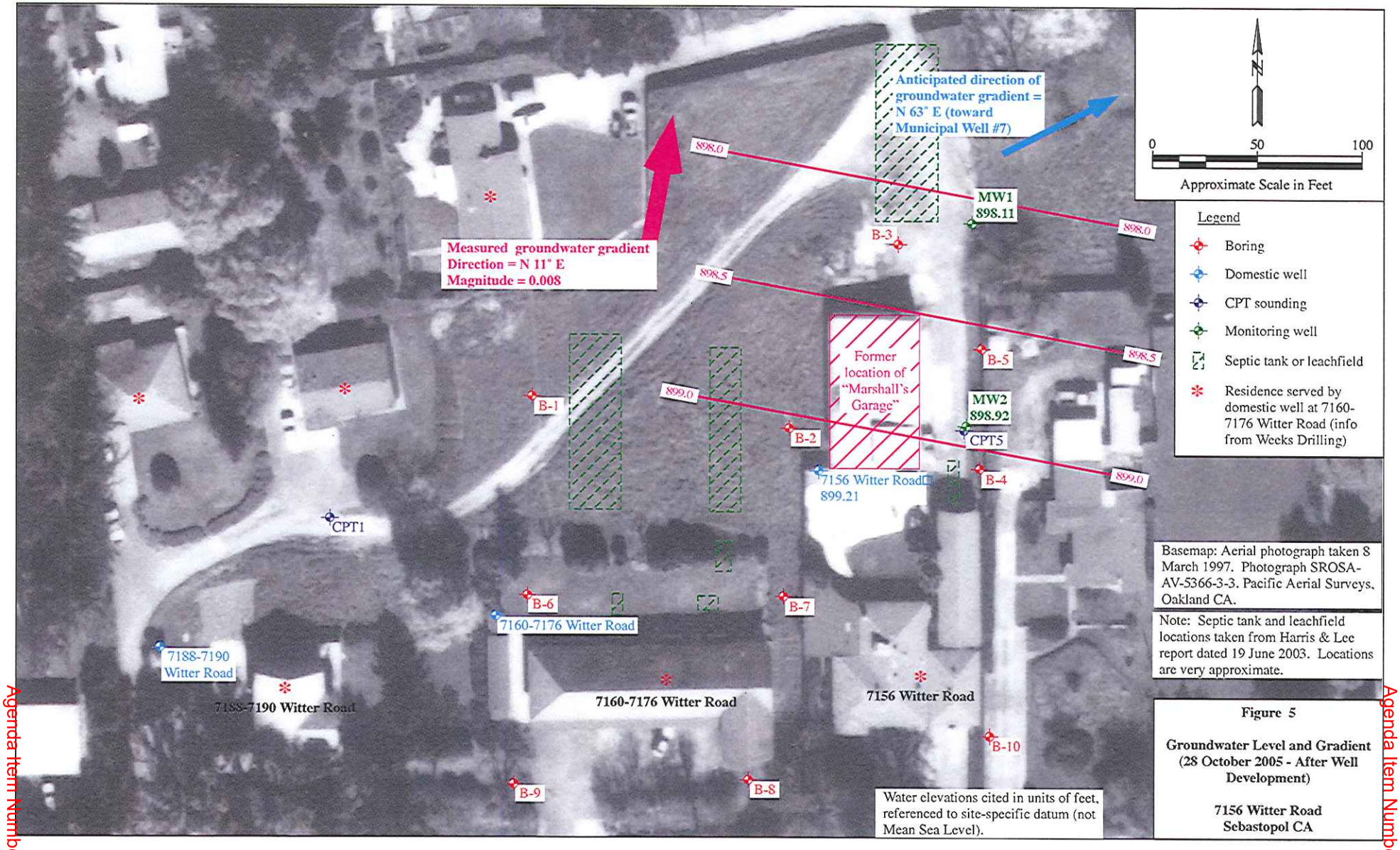


Figure 5

Groundwater Level and Gradient (28 October 2005 - After Well Development)

7156 Witter Road
Sebastopol CA

STREAMBORN

Appendix F
Copy of Letter from City of Sebastopol PWD to Sonoma County Water Agency

Engineering Department
714 Johnson Street
Sebastopol, CA 95472
Phone (707) 823-2151
Fax (707) 823-4721
Website: www.ci.sebastopol.ca.us
E-mail: suekelly@sonic.net
Susan Kelly, Engineering Director
Assistant to the City Manager

September 6, 2012

Mr. Jay Jasperse
Sonoma County Water Agency
404 Aviation Blvd.
Sonoma, CA 95403

Re: Sebastopol Water Regulatory Compliance Feasibility Study - Discussion with Sonoma County Water Agency

Dear Jay:

Thank you, and Pam and Don for taking the time to meet with us yesterday afternoon. As we mentioned at our meeting, as part of our Water Regulatory Compliance Feasibility Study, we are in the process of investigating all possible options available to the City to ensure an ongoing, ample water supply to our customers that consistently and reliably meets drinking water standards. One of the options that invariably comes up for discussion in this context is the possibility of receiving water from the water agency.

Based on our discussion at the meeting, you clarified that although the City of Sebastopol is included in the current Restructured Agreement for Water Supply (2006) in the category of "Other Users", we are the only agency in that category who is not presently receiving Agency water, and that the aggregate allocation of 2.7 mgd to "Other Users" is essentially committed to the other agencies. The realities of amending the Agreement are well understood; this would not be an easy or quick matter to resolve. In addition, there is presently no physical connection between the Sebastopol water distribution system and the Agency's nearest facilities on Highway 12; the cost of constructing a connection to the SCWA aqueduct, over a mile in length, and crossing the Laguna de Santa Rosa, presents a major constraint to this option in and of itself.

For all these reasons, a connection to the SCWA is not a viable option for Sebastopol at this time. Still, we believe that it is important to keep the option open, at least insofar as Sebastopol is included in the Restructured Agreement, among potential "Other Users" of the system, and it may be that in the future there are other developments and considerations, of interest both to Sebastopol and perhaps to some of our neighbors in the groundwater basin, in the context of groundwater management, that may revive this discussion.

Sincerely,

Susan Kelly
Engineering Director

cc: Larry McLaughlin, Interim City Manager
Rich Emig, Superintendent of Public Works
Toni Bertolero, GHD

Appendix G
Alternative Net Present Value Calculation

Net Present Value Calculations

Drinking Water Regulatory Compliance Feasibility Project
City of Sebastopol

Assumed Annual Inflation= 4%

Zone 1 Options

Option Z1A		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 5	GAC System Install	$ 1,587,000					
Well 5	GAC Media Changeout		$ 133,222		$ 197,201		
Well 7	Modifications	$ 210,000					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 1,887,000	$ 266,444		$ 394,402		
Total	**$ 2,548,000**						

Option Z1B		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 5	GAC System Install	$ 1,587,000					
Well 5	GAC Media Changeout		133222		$ 197,201		
Zone 2	Well Improvement/Treatment						
Well 4	GAC Media Changeout	$ 90,000	133222		$ 197,201		
		$ 1,677,000	$ 266,444		$ 394,402		
Total	**$ 2,338,000**						

Option Z1C		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 4	GAC Media Changeout	$ 90,000	133222		197201		
Well 5	GAC System Install	$ 1,587,000					
Well 5	GAC Media Changeout		133222		197201		
Well 7	New Replacement Well	$ 1,805,500					
		$ 3,482,500	$ 266,444		$ 394,402		
Total	**$ 4,143,000**						

Option Z1D		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 7	Modifications	$ 210,000					
Zone 2	Well Improvement/Treatment						
Well 7	Blending	$ 586,500					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		197201		
		$ 796,500	$ 133,222		$ 197,201		
Total	**$ 1,127,000**						

Net Present Value Calculations

Drinking Water Regulatory Compliance Feasibility Project
City of Sebastopol

Assumed Annual Inflation= 4%

Zone 2 Options

Option Z2A		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 6	Deactivation						
Well 5	GAC System Install	$ 1,587,000					
Well 5	GAC Media Changeout		$ 133,222		197201		
Well 7	Modifications	$ 210,000					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		197201		
		$ 1,887,000	$ 266,444		$ 394,402		
Total	**$ 2,548,000**						

Option Z2B (GFH annual changeout)		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 6	GFH System Install (Zone 2 Improve)	$ 2,321,000					
Well 6	GFH Media Changeout (annually)						$ 14,200,000
Well 5	Piping to Well 4 GAC System	$ 701,500					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		197201		
		$ 3,112,500	$ 133,222		$ 197,201		$ 14,200,000
Total	**$ 17,643,000**						

Option Z2B (GFH triennial changeout)		Cost at Time =					
Alternative Summary		0	10	15	20	25	29
Well 6	GFH System Install (Zone 2 Improve)	$ 2,321,000					
Well 6	GFH Media Changeout (triennially)						$ 4,082,000
Well 5	Piping to Well 4 GAC System	$ 701,500					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 3,112,500	$ 133,222		$ 197,201		$ 4,082,000
Total	**$ 7,525,000**						

Option Z2B - (coprecipitation)		Cost at Time =					
Alternative Summary		0	10	15	20	25	29
Well 6	Coprecip System Install (Zone 2 Improve)	$ 1,265,000					
Well 6	Coprecip Media and Chem		$ 22,203		$ 32,866		$ 3,336,876
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
Well 5	Piping to Well 4 GAC System	$ 701,500					
		$ 2,056,500	$ 155,425		$ 230,067		$ 3,336,876
Total	**$ 5,779,000**						

Option Z2C		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 6	Deactivation	$ -					
Well 5	GAC System Install	$ 1,587,000					
Well 5	GAC Media Changeout		$ 133,222		$ 197,201		
Well 7	New Replacement Well	$ 1,805,500					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 3,482,500	$ 266,444		$ 394,402		
Total	**$ 4,143,000**						

Option Z2D-1 (GFH annual changeout)		Cost at Time =					
Alternative Summary		0	10	15	20	25	30
Well 6	GFH System Install (Zone 2 Improve)	$ 2,321,000					
Well 6	GFH Media Changeout (annually)						$ 14,200,000
Well 7	Modifications	$ 210,000					
Well 7	Blending	$ 586,500					

Net Present Value Calculations

Drinking Water Regulatory Compliance Feasibility Project

City of Sebastopol

Assumed Annual Inflation= 4%

Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 3,207,500	$ 133,222		$ 197,201		$ 14,200,000
Total	**$ 17,738,000**						
Option Z2D-1 (GFH triennial changeout)		Cost at Time =					
Alternative Summary		0	10	15	20	25	29
Well 6	GFH System Install (Zone 2 Improve)	$ 2,321,000					
Well 6	GFH Media Changeout (triennially)						$ 4,082,000
Well 7	Modifications	$ 200,000					
Well 7	Blending	$ 586,500					
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 3,197,500	$ 133,222		$ 197,201		$ 4,082,000
Total	**$ 7,610,000**						
Option Z2D-2 (Coprecipitation)		Cost at Time =					
Alternative Summary		0	10	15	20	25	29
Well 6	Coprecip System Install (Zone 2 Improve)	$ 1,265,000					
Well 6	Coprecip Media and Chem		$ 22,203		$ 32,866		$ 3,336,876
Well 7	Modifications	$ 200,000					
Well 7	Partial Treat of Well Water	$ 770,500					3413472
Well 4	GAC Media Changeout	$ 90,000	$ 133,222		$ 197,201		
		$ 2,325,500	$ 155,425		$ 230,087		$ 6,750,348
Total	**$ 9,461,000**						

Appendix H
Reconnaissance Level Estimates of Probably Cost

City of Sebastopol			DATE PREPARED: 10-03-12	
New Well Installation				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Well Site survey and acquisition				
Well Site survey and acquisition	1	EA	$250,000	$250,000
Pump Station Prefabricated Metal Building	1	EA	$14,000	$14,000
Site Improvements	1	LS	$55,000	$55,000
Power to Site	1	LS	$150,000	$150,000
Drill and Install Well	1	EA	$450,000	$450,000
Water/Process Piping	1	LS	$35,000	$35,000
Subtotal				$954,000
Reconnaissance-Level Estimating Contingency (30%)				$286,200
Hard Cost Subtotal				**$1,240,200**
General Conditions (8%)				$99,216
Bond / Insurance (2%)				$26,788
O&P (15%)				$204,931
Soft Cost Subtotal				**$330,935**
Estimated Bid Price = Construction Budget				**$1,570,000**
Permitting, Engineering Design, and Construction Support (15%)				**$235,500**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$1,805,500**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 4 Ganular Activated Carbon Media Changout				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Media Changeout				
Media Changeout	2	EA	$35,000	$70,000
Subtotal				$70,000
Reconnaissance-Level Estimating Contingency (30%)				$21,000
Hard Cost Subtotal				**$91,000**
General Conditions (8%)				N/A
Bond / Insurance (2%)				N/A
O&P (15%)				N/A
Soft Cost Subtotal				**$0**
Estimated Bid Price = Construction Budget				**$90,000**
Permitting, Engineering Design, and Construction Support (0%)				**$0**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$90,000**

City of Sebastopol			DATE PREPARED: 10-03-12	
Well 5 Ganular Activated Carbon Install				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Site Preparation				
Remove Sand Settling Tank	1	EA	$6,000	$6,000
Modify Site Piping	1	LS	$17,000	$17,000
Pump and Motor Maintenance	1	EA	$35,000	$35,000
Site Development, Modification, Improvements, Foundation work	1	LS	$265,000	$265,000
GAC Unit Installation				
GAC Unit Delivered	1	EA	$350,000	$350,000
Unit Install	1	LS	$15,000	$15,000
Sand Separator Install	1	EA	$7,000	$7,000
Process Piping	1	LS	$45,000	$45,000
Filter Backwash Tank	1	LS	$72,000	$72,000
Process Controls and Integration	1	LS	$25,000	$25,000
Subtotal				$837,000
Reconnaissance-Level Estimating Contingency (30%)				$251,100
Hard Cost Subtotal				**$1,088,100**
General Conditions (8%)				$87,048
Bond / Insurance (2%)				$23,503
O&P (15%)				$179,798
Soft Cost Subtotal				**$290,349**
Estimated Bid Price = Construction Budget				**$1,380,000**
Permitting, Engineering Design, and Construction Support (15%)				**$207,000**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$1,587,000**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 5 Pipeline to Ganular Activated Carbon Unit at Well 4				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Site Preparation				
Remove Sand Settling Tank	1	EA	$5,000	$5,000
Modify Site Piping	1	LS	$10,000	$10,000
Pump and Motor Maintenance	1	EA	$15,000	$15,000
Sand Separator Install	1	EA	$7,000	$7,000
Pipelione to Well 4 GAC Unit				
8-inch C900 PVC pipeline	2,000	LF	$130	$260,000
Process Piping Modifications at Well 4	1	LS	$25,000	$25,000
Process Controls and Integration	1	LS	$47,000	$47,000
Subtotal				$369,000
Reconnaissance-Level Estimating Contingency (30%)				$110,700
Hard Cost Subtotal				**$479,700**
General Conditions (8%)				$38,376
Bond / Insurance (2%)				$10,362
O&P (15%)				$79,266
Soft Cost Subtotal				**$128,003**
Estimated Bid Price = Construction Budget				**$610,000**
Permitting, Engineering Design, and Construction Support (15%)				**$91,500**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$701,500**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 6 Arsenic Iron Coprecipitation Unit Install				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Site Preparation				
Remove Sand Cyclone	1	EA	$2,000	$2,000
Modify Site Piping	1	LS	$10,000	$10,000
Site Development, Modification, Improvements, Foundation work	1	LS	$24,000	$24,000
Coprecipitation Unit Installation				
Coprecipitation Unit Delivered	1	EA	$455,000	$455,000
Unit Install	1	LS	$12,000	$12,000
Chemical Storage and Delivery System Delivered	1	EA	$16,000	$16,000
Chemical System Install	1	LS	$11,000	$11,000
Sand Separator Install	1	EA	$7,000	$7,000
Process Piping	1	LS	$55,000	$55,000
Filter Backwash Tank	1	LS	$37,000	$37,000
Site Electrical Design Modifications	1	LS	$24,000	$24,000
Process Controls and Integration	1	LS	$12,000	$12,000
Subtotal				$665,000
Reconnaissance-Level Estimating Contingency (30%)				$199,500
Hard Cost Subtotal				**$864,500**
General Conditions (8%)				$69,160
Bond / Insurance (2%)				$18,673
O&P (15%)				$142,850
Soft Cost Subtotal				**$230,683**
Estimated Bid Price = Construction Budget				**$1,100,000**
Permitting, Engineering Design, and Construction Support (15%)				**$165,000**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$1,265,000**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 6 Granular Ferric Hydroxide Install				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Site Preparation				
Remove Sand Cyclone	1	EA	$2,000	$2,000
Modify Site Piping	1	LS	$10,000	$10,000
Site Development, Modification, Improvements, Foundation work	1	LS	$24,000	$24,000
GFH Unit Installation				
GFH Unit Delivered	1	EA	$1,120,000	$1,120,000
Unit Install	1	LS	$12,000	$12,000
Sand Separator Install	1	EA	$7,000	$7,000
Process Piping	1	LS	$35,000	$35,000
Filter Backwash Tank	1	LS	$37,000	$37,000
Site Electrical Modifications	1	LS	$24,000	$24,000
Process Controls and Integration	1	LS	$12,000	$12,000
Subtotal				$1,283,000
Reconnaissance-Level Estimating Contingency (30%)				$384,900
Hard Cost Subtotal				**$1,667,900**
General Conditions (8%)				$133,432
Bond / Insurance (2%)				$36,027
O&P (15%)				$275,604
Soft Cost Subtotal				**$445,062**
Estimated Bid Price = Construction Budget				**$2,110,000**
Permitting, Engineering Design, and Construction Support (10%)				**$211,000**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$2,321,000**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 7 Blending using Partial Treatment of Well 7 Water				
Reconnaissance-Level Estimate	**ESTIMATE BY: AS**		**CHECK BY: EC**	
DESCRIPTION	**QUANTITY**		**ENGINEERING ESTIMATE**	
	NUMBER	**UNIT**	**UNIT COST**	**TOTAL**
Site Preparation				
Modify Site Piping	1	LS	$10,000	$10,000
Site Development, Modification, Improvements, Foundation work	1	LS	$24,000	$24,000
GFH Units Installation				
GFH Unit Delivered	1	EA	$320,000	$320,000
Unit Install	1	LS	$12,000	$12,000
Process Piping	1	LS	$15,000	$15,000
Site Electrical Modifications	1	LS	$14,000	$14,000
Process Controls and Integration	1	LS	$10,000	$10,000
Subtotal				$405,000
Reconnaissance-Level Estimating Contingency (30%)				$121,500
Hard Cost Subtotal				**$526,500**
General Conditions (8%)				$42,120
Bond / Insurance (2%)				$11,372
O&P (15%)				$86,999
Soft Cost Subtotal				**$140,491**
Estimated Bid Price = Construction Budget				**$670,000**
Permitting, Engineering Design, and Construction Support (15%)				**$100,500**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$770,500**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 7 Blending with Zone 2 Water				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Well 7 Blending				
Install 12-inch Zone 2 piping to Well 7 Site	1,300	LF	$175	$227,500
Install Concrete Vault in City ROW	1	EA	$48,000	$48,000
Blending Valve, Controls, Appurtenances	1	LS	$37,000	$37,000
Subtotal				$312,500
Reconnaissance-Level Estimating Contingency (30%)				$93,750
Hard Cost Subtotal				**$406,250**
General Conditions (8%)				$32,500
Bond / Insurance (2%)				$8,775
O&P (15%)				$67,129
Soft Cost Subtotal				**$108,404**
Estimated Bid Price = Construction Budget				**$510,000**
Permitting, Engineering Design, and Construction Support (15%)				**$76,500**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$586,500**

City of Sebastopol	DATE PREPARED: 10-03-12			
Well 7 Modifications				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Well 7 Modifications				
Swaging	50	FT	$1,000	$50,000
Inverter Install to reduce pump output	1	EA	$80,000	$80,000
Lowering of Pump	1	LS	$22,000	$22,000
Subtotal				$152,000
Reconnaissance-Level Estimating Contingency (30%)				$45,600
Hard Cost Subtotal				**$197,600**
General Conditions (8%)				N/A
Bond / Insurance (2%)				N/A
O&P (15%)				N/A
Soft Cost Subtotal				**$0**
Estimated Bid Price = Construction Budget				**$200,000**
Permitting, Engineering Design, and Construction Support (5%)				**$10,000**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$210,000**

City of Sebastopol	DATE PREPARED: 10-03-12			
SCWA Pipeline				
Reconnaissance-Level Estimate	ESTIMATE BY: AS		CHECK BY: EC	
DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
SCWA Pipeline				
12-inch C900 PVC Pipeline	6,000	LF	$205	$1,230,000
Laguna de Santa Rosa Crossing (trenchless)	1	LS	$75,000	$75,000
Pump Station Site survey and acquisition	1	EA	$350,000	$350,000
Pump Station Prefabricated Metal Building	1	EA	$17,000	$17,000
Pumps with Controllers	2	EA	$35,000	$70,000
Site Water/Process Piping	1	LS	$45,000	$45,000
Power to Site	1	LS	$250,000	$250,000
Site Improvements	1	LS	$55,000	$55,000
Subtotal				$2,092,000
Reconnaissance-Level Estimating Contingency (30%)				$627,600
Hard Cost Subtotal				**$2,719,600**
General Conditions (8%)				$217,568
Bond / Insurance (2%)				$58,743
O&P (15%)				$449,387
Soft Cost Subtotal				**$725,698**
Estimated Bid Price = Construction Budget				**$3,450,000**
Permitting, Engineering Design, and Construction Support (20%)				**$690,000**
Reconnaissance-Level Project Budget Estimate (2012 Dollars)				**$4,140,000**

Hazen

June 30, 2025

To: **City of Sebastopol**
Toni Bertolero, Project Manager

Prepared by: **Hazen and Sawyer**
Trapa Barua, AICP
Tim Devine, PE
Chris Portner, PE

cc: Luke Wang, PE (Hazen and Sawyer)
Stephanie Bustos, PG (Hazen and Sawyer)

Subject: City of Sebastopol Well #4 Funding Evaluation Technical Memorandum

1. Introduction

The City of Sebastopol (the City) operates a total of five permitted groundwater wells, four of which are actively used to provide potable, non-potable, irrigation, and industrial water supplies. However, the City does not currently have a backup water supply system in place and is not connected to any neighboring water systems, which limits its ability to ensure supply redundancy and overall system resiliency. In recent years, the City has experienced multiple periods of drought, placing additional strain on its water supply system.

To address these challenges and enhance long-term water supply reliability, the City has developed a project to replace existing Well #4. The primary goal of this project is to improve the resiliency of the City's water system and reduce the risk of service disruptions during drought conditions, thereby helping to ensure the continued delivery of safe and reliable potable water to the community.

Hazen and Sawyer (Hazen) was engaged to assist with this effort by identifying and evaluating potential funding sources, developing funding alternatives, preparing a cost estimate for the Well #4 Replacement Project, and providing recommendations to advance the project. This technical memorandum documents the findings of the completed scope of work.

2. Evaluation of Potential Funding Sources

Hazen evaluated four potential funding sources summarized in **Table 1,** and discussed thereafter. Potential funding sources were selected for evaluation based on funding program alignment with the scope and goals of the Well #4 replacement as well as past discussions with the City.

Hazen

Table 1: Funding Sources Evaluated

Funding Source	Agency	Program Information	Deadline, if applicable
Drinking Water State Revolving Fund (DWSRF)	State Water Resources Control Board (SWRCB)	• Low interest loans. • The current interest rate is 1.9%.	• Year-Round.
Drought Resiliency Program	United States Bureau of Reclamation (USBR)	• Supports projects that increase the reliability of water supplies.	• Previous Notice of Funding Opportunity was posted July 24, 2024. • Applications were due October 7, 2024.
Water Technical Assistance (WaterTA)	United States Environmental Protection Agency (U.S. EPA)	• Supports communities by providing free, hands-on support to communities to help improve their drinking water, wastewater, and stormwater infrastructure.	• Assistance is provided on a rolling basis.
Hazard Mitigation Planning (HMA)	Federal Emergency Management Agency (FEMA)	• Supports local hazard mitigation plan development or updates, planning related activities, and shovel ready projects.	• Notice of Interest (NOI) Submission Deadline: May 29, 2025. • Full Application Submission Deadline: September 15, 2025.

2.1 Drinking Water State Revolving Fund (DWSRF) - State Water Resources Control Board

2.1.1 Description

The Drinking Water State Revolving Fund (DWSRF) program offers low-interest loans, grants, and technical assistance to public water systems undertaking infrastructure projects that promote compliance with the Safe Drinking Water Act and enhance overall water quality. As of the current funding cycle, the DWSRF interest rate is 1.9%, calculated as 50% of the average interest rate on California's general obligation bonds from the prior calendar year. This favorable financing structure makes the DWSRF an attractive option for municipalities seeking to implement critical water infrastructure improvements.

2.1.2 Considerations and Conclusions

Projects funded through the DWSRF program must comply with a range of federal cross-cutting requirements, including the National Environmental Policy Act (NEPA), the Davis-Bacon Act (which mandates prevailing wage rates for laborers), the American Iron and Steel (AIS) provision, and the

Hazen

Build America, Buy America (BABA) Act. These requirements may add administrative and compliance complexity, which should be considered during project planning.

In addition, the federal government's proposed Fiscal Year (FY) 2026 budget includes a significant $2.46 billion reduction to both the Clean Water and Drinking Water State Revolving Funds, a proposed 89% decrease from FY 2025 funding levels. Although these cuts are not yet finalized, if enacted, they would substantially impact California's DWSRF program[1]. Given this uncertainty, the City should consider pursuing DWSRF funding during the current application cycle. Securing funding this year will reduce the risk of delays or missed opportunities due to potential future budget reductions.

2.2 Drought Resiliency Program - United States Bureau of Reclamation (USBR)

2.2.1 Description

The Drought Resiliency Program provides funding for projects that will help communities prepare for and respond to drought. This includes projects that increase the reliability of water supplies, improve water management, and or provide benefits for fish and wildlife and the environment.

2.2.2 Considerations and Conclusions

This program is subject to several federal cross-cutting requirements, including compliance with the National Environmental Policy Act, the Davis-Bacon Act, the American Iron and Steel provisions, and the Build America, Buy America Act. These requirements can add administrative complexity and should be accounted for during project planning and implementation.

An important consideration is that USBR prioritizes funding for projects that are part of an adopted drought contingency plan. The City meets this criterion through its 2023 Water Supply Contingency Plan, which strengthens the competitiveness of its application.

The FY 2025 funding opportunity was released on July 24, 2024, with an award ceiling of $10 million. However, with potential shifts in federal priorities, the proposed FY 2026 budget includes a $609 million reduction to USBR's overall funding compared to FY 2025. If enacted, this reduction could delay future Notices of Funding Opportunity (NOFO) and reduce the availability of funding in subsequent years.

[1] Office of Management and Budget. (2025, May). Fiscal Year 2026 Discretionary Budget Request. The White House. https://www.whitehouse.gov/wp-content/uploads/2025/05/Fiscal-Year-2026-Discretionary-Budget-Request.pdf

Hazen

2.3 Water Technical Assistance (WaterTA) - United States Environmental Protection Agency (U.S. EPA)

2.3.1 Description

The WaterTA program offers free, hands-on technical support to help communities improve their drinking water, wastewater, and stormwater systems. Administered by the U.S. EPA, the program connects local governments, utilities, and Tribal entities with technical experts who assist in assessing system needs, planning infrastructure upgrades, and navigating the process of securing federal funding.

Services provided under WaterTA include identifying lead service lines, developing climate resilience strategies, and supporting compliance with the Safe Drinking Water Act and Clean Water Act. This program is particularly beneficial for small or resource-constrained communities seeking to enhance their water infrastructure without the burden of upfront consulting costs.

2.3.2 Considerations and Conclusions

This program prioritizes support for disadvantaged and underserved communities, offering no-cost technical services such as the development of Preliminary Engineering Reports, up to 30% design plans, and assistance with completing State Revolving Fund (SRF) applications. These services are intended to help communities move critical water infrastructure projects closer to implementation by reducing early-stage planning and funding barriers.

A Justice40 screening analysis for the City was conducted in 2023, which found that the City does not contain significant areas that meet the federal criteria for disadvantaged status. As such, while the City may still be eligible for some technical assistance, it may not be prioritized for WaterTA resources compared to other communities with higher environmental justice needs.

In addition, the proposed FY 2026 federal budget includes significant funding reductions for the U.S. EPA, including a $100 million cut to the Environmental Justice Program. If enacted, these cuts could impact the availability, scope, and responsiveness of WaterTA services in the near term.

2.4 Hazard Mitigation Planning (HMA) - Federal Emergency Management Agency (FEMA)

2.4.1 Description

The Hazard Mitigation Assistance program provides funding for projects that reduce the risks and impacts associated with natural hazards. It supports the implementation of long-term mitigation

strategies both before and after disaster events, with the goal of enhancing community resilience and reducing future recovery costs. Eligible activities include infrastructure retrofits, flood control

Hazen

measures, wildfire prevention, and drought mitigation projects such as groundwater well replacements and upgrades to water supply systems.

2.4.2 Considerations and Conclusions

A Notice of Intent (NOI) was submitted by Hazen on behalf of the City to the California Governor's Office of Emergency Services (CalOES) in 2023; however, a full application was not pursued, due to the complexity of FEMA grant requirements, which typically include several detailed technical components such as a benefit-cost analysis, evaluation of project alternatives, and environmental and engineering documentation. The level of required technical analysis, planning, and design required to be competitive for the FEMA grant was not available at the time.

As of April 2025, CalOES is actively accepting NOIs for the Hazard Mitigation Grant Program (HMGP), which is administered under FEMA's broader Hazard Mitigation Assistance (HMA) umbrella. To be considered for funding, projects must either be shovel-ready or structured as phased projects with clearly defined implementation stages. Funding priorities for the current HMGP cycle include:

- Innovative wildfire mitigation activities and infrastructure
- Stormwater capture and reuse
- Groundwater recharge and drought resilience enhancements
- Reservoir capacity improvements to address both drought and flood risks
- Undergrounding of power lines in wildfire-prone areas
- Landslide barriers and erosion control measures to protect communities from post-wildfire conditions

2.5 Evaluation of Potential Funding Sources

Based on the evaluation of the four funding sources, past experience supporting similar groundwater infrastructure projects, and input from City staff, the DWSRF program emerged as the most advantageous option for advancing the Well #4 Replacement Project. The program offers a combination of low-interest financing, potential principal forgiveness, and technical support, making it well-suited to the City's needs. Additionally, the DWSRF's focus on enhancing water system reliability, regulatory compliance, and drought resilience aligns closely with the project's core objectives.

Hazen

3. Evaluation of Funding Alternatives

Based on the identified potential funding sources, Hazen developed three funding alternatives for the Well #4 Replacement Project that could be assessed both qualitatively and quantitatively. These alternatives represent feasible approaches to financing the project and were selected for comparison based on the City's current financial planning, funding eligibility, and strategic goals. The three alternatives are:

Alternative 1: Full project financing through City-issued revenue bonds. This approach was previously identified in the City's 2024 Water and Wastewater Rate Report as the preferred financing mechanism for the Well #4 Replacement Project.

Alternative 2: Full project financing through the DWSRF program. This option offers low-interest loans and potential principal forgiveness, making it a financially attractive alternative if the City qualifies.

Alternative 3: A hybrid funding approach that combines partial grant funding with the remainder financed through City-issued revenue bonds. This strategy assumes successful grant acquisition and is intended to reduce the City's overall debt burden.

Details of each funding alternative, including assumptions and financial parameters used in the analysis, are provided in **Table 2**.

Table 2: Funding Alternative Scenarios Evaluated

Alternative	Definition	Assumptions
1	City-issued Revenue Bonds	• 5.0% interest rate and 30-year term[2].
2	DWSRF Loan	• 1.9% interest rate and 30-year term. • A 10% markup was applied to the construction cost estimate to account for federal cross-cutting requirements. The most significant of these requirements is the Build America, Buy America Act (BABA Act) procurement rules which apply for DWSRF funded projects identified as equivalency projects.
3	Partial Grant Funding and City-issued Revenue Bonds	• $1.0 million dollars in grant funding from USBR or other source. • 5.0% interest rate and 30-year term for Revenue Bond funded portion. • A 10% markup was applied to the construction cost estimate to account for federal cross-cutting requirements. The most significant of these requirements is the Build America, Buy America Act (BABA Act) procurement rules.

[2] Based on financing assumptions for Revenue Bonds presented in the City of Sebastopol Water and Wastewater Rate Study Report (Raftelis 2024): https://www.cityofsebastopol.gov/wp-content/uploads/2024/06/SebastopolCA_WaterWW_RateStudyReport_06122024_FINAL.pdf

Hazen

3.1 Evaluation of Financial Impact for Funding Alternatives

The financial impact of the three Well #4 Replacement Project funding alternatives were evaluated to quantify the potential benefits associated with pursuing state or federally administered funding programs. This analysis focused on comparing total project costs[3] (refer to **Figure 1**) and the estimated financial burden per residential account per month (refer to **Figure 2**) under each alternative.

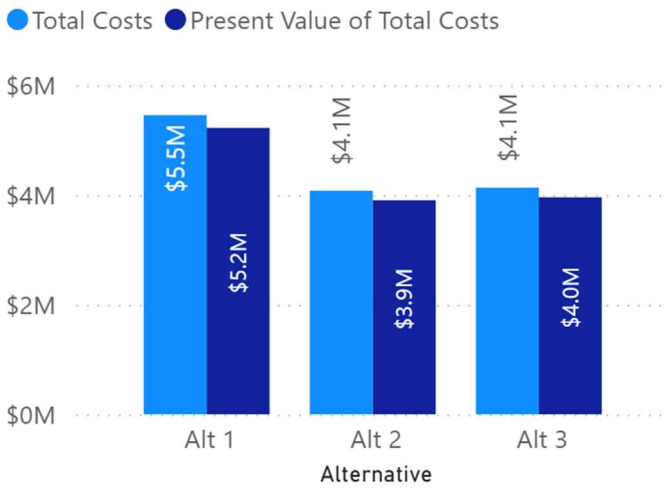


Figure 1: Total Cost of Funding Alternatives

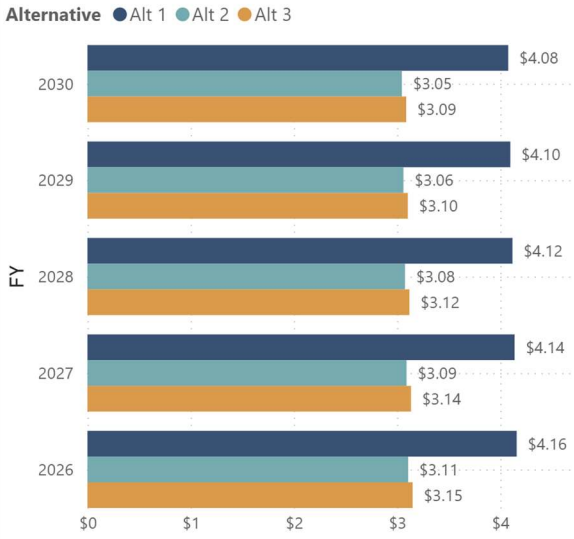


Figure 2: Estimated Debt Service Cost Per Month Per Equivalent Residential Account, FY26-FY30

[3] The total costs include the sum of all cash outflows over the lift of the loan. For example, a $3 million construction project financed through a loan of 5% interest over a 30-year term would result in annual payments of approximately $193,000. Over 30 years, this amounts to roughly $5.8 million in total payments.

Hazen

The analysis indicates that the DWSRF loan program offers the most significant financial benefit to the City. Due to its low-interest financing terms, the DWSRF alternative results in a present value savings of approximately $1.3 million over the life of the project compared to full revenue bond financing.

This cost advantage also translates into a lower monthly impact on ratepayers. The debt service burden, calculated as the annual debt service attributable to the Well #4 project divided by the number of equivalent residential water accounts and then divided by 12 months, shows an estimated reduction of approximately 25%, or roughly $1.05 per month per account when using DWSRF financing instead of revenue bonds.

Importantly, the analysis accounts for a potential 10% increase in construction costs associated with meeting federal cross-cutting requirements. Even with this additional cost, the favorable interest rate of the DWSRF loan still makes it the most financially advantageous alternative for the City.

3.2 Assessment of Funding Alternative Risks

Project financing methods can introduce new risks that may affect both the timeline and overall cost of implementation. These include schedule-related risks and the uncertainty of securing funding through competitive selection processes. In some cases, administrative requirements tied to specific funding programs, such as detailed application procedures, environmental reviews, or compliance documentation, may not align with the project's current schedule. Similarly, delays in the release or timing of funding opportunities can disrupt planned activities.

If the project schedule must be adjusted to meet funding program timelines or requirements, this can result in extended implementation periods, increased costs due to inflation or contractor pricing, and potential delays in delivering critical infrastructure improvements. These risks should be carefully weighed when selecting a financing strategy to ensure that project delivery remains efficient and cost-effective. A summary of the risks associated with each of the three funding alternatives are provided in **Table 3** below.

Table 3: Risks Associated with Funding Alternatives

Alternative	Definition	Assumptions
1	City-issued Revenue Bonds	• The City's 2024 Water and Wastewater Rate Report indicates that securing new debt financing may be challenging given the current financial condition of the water enterprise fund. This presents a moderate level of risk to the feasibility of obtaining revenue bond financing. By approving the 5-year water rate plan outlined in the Rate Report, the City has worked to mitigate this risk. • This funding approach would not trigger federal cross-cutting requirements and is expected to pose minimal risk to the project schedule.

Hazen

Alternative	Definition	Assumptions
2	DWSRF Loan	• Given the project scope and estimated cost, the Well #4 Replacement Project is well-suited for DWSRF funding opportunities. However, the requirement to apply through a competitive process introduces a moderate level of funding risk. • This funding method would trigger federal cross-cutting requirements; however, it presents only modest project schedule risk, as the DWSRF program is well-established with clearly defined application and implementation milestones.
3	Partial Grant Funding and City-issued Revenue Bonds	• The City's 2024 Water and Wastewater Rate Report indicates that securing new debt financing may be challenging given the current financial condition of the water enterprise fund. This presents a moderate level of risk to the feasibility of obtaining revenue bond financing. By approving the 5-year water rate plan outlined in the Rate Report, the City has worked to mitigate this risk. • Grant opportunities are not currently open for application and would be awarded through a competitive process, resulting in a high level of uncertainty and risk in securing this funding source. • This funding method would trigger federal cross-cutting requirements and is associated with a moderate level of project schedule risk.

3.3 Funding Alternatives Evaluation Summary

Based on the funding options identified and evaluated, pursuing a low-interest loan through the DWSRF emerges as the most advantageous option for financing the Well #4 Replacement Project. The DWSRF program offers the greatest financial benefit to the City while presenting relatively low risk compared to other alternatives.

Hazen recommends that the City move forward with a DWSRF funding application for the Well #4 Replacement Project. In parallel, the City should continue to monitor potential opportunities to supplement this funding with grants, such as those offered by the USBR, should NOFOs be released. This dual-track strategy would enhance financial flexibility and potentially reduce the City's long-term funding burden.

Hazen

4. Cost Estimate Evaluation

An updated estimate of probable construction cost was developed for the drilling, development, testing, and equipping of a new groundwater well. This estimate follows the Association for the Advancement of Cost Engineering (AACE) guidelines for a Class 5 estimate. A Class 5 estimate is expected to have an accuracy range of -50% to +100% relative to the estimated cost.

Due to the preliminary nature of the design and the classification of the estimate, a 40% design contingency was included. All costs are presented in 2025 dollars. The estimated probable construction cost is summarized in Table 4 below.

Table 4: Cost Estimate

No.	Cost Item	Total ($)
1	Well Drilling and Development	$790,000
2	Well Pump and VFD and Piping	$290,000
3	Well Building	$120,000
4	Site Work	$90,000
5	Yard Piping	$60,000
6	Electrical and Controls	$210,000
7	Design Contingency	$620,000
8	**Total including Design Contingency:**	**$2,180,000**
9	Furnish new pump instead of reusing existing	$740,000
10	**Total including with new pump:**	**$2,920,000**

The cost estimate is based on the following key assumptions:

- The well will have a nominal diameter of 14 inches and a depth of 500 feet below grade.
- The base cost includes relocating the existing 100hp pump from the existing well to the new well. A new VFD will be provided. Rental of a temporary pump is included for approximately 1 week during switchover. An additional cost for a new 250-horsepower vertical turbine pump is included below the line if a larger pump is required.
- A 10-foot by 10-foot concrete masonry unit (CMU) building will house the pump.
- Site work, yard piping, electrical, and controls are estimated as a percentage of the total cost based on similar past projects plus some items as noted by the City such as new sidewalk along Palm Ave, extending the existing chainlink fence around the new wellhead structure,

Hazen

installation of a manual transfer switch for future portable generator hook-up, and a security camera and panel.

- A new motor control center (MCC) is not included. It is assumed that power and controls will be provided by existing onsite equipment. Electrical costs are limited to new conduit and conductors between existing and new equipment, along with instrumentation at the wellhead.

Hazen

5. Recommendations

Based on the range of funding sources evaluated, it is recommended that the City move forward with applying for a low-interest loan through the DWSRF to finance the Well #4 Replacement Project. The DWSRF program offers the most favorable financial terms and aligns well with the project's scope and objectives.

In addition, the City should actively monitor federal grant opportunity announcements, including those from the USBR, which may offer supplemental funding opportunities in the future. While such grants could help reduce the City's long-term financial burden, the availability and timing of these opportunities remain uncertain. Given this uncertainty, it is not recommended that the City rely on potential federal grant funding as part of its primary financial planning for the project. However, if relevant grant opportunities are released, the City should promptly evaluate the associated costs, benefits, and administrative requirements to determine whether pursuing supplemental funding would be advantageous. This flexible, proactive approach allows the City to move forward with a secure funding path while remaining positioned to capitalize on additional opportunities as they arise.

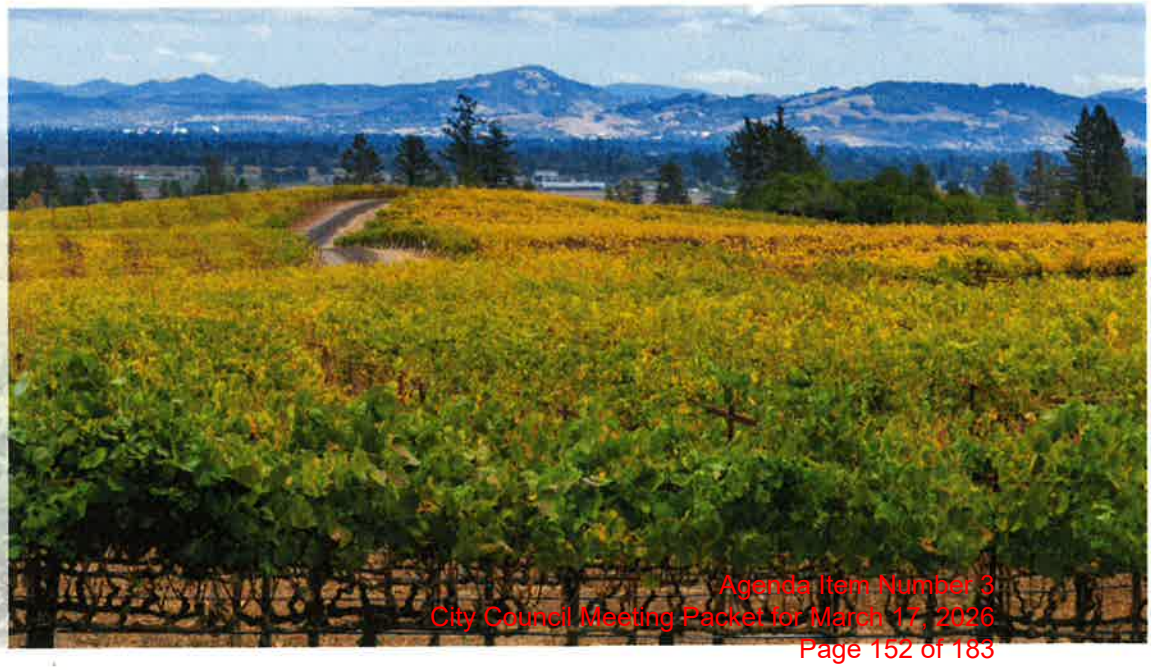
Luhdorff & Scalmanini
Consulting Engineers

Proposal to Provide

Engineering Services for Well 4 Replacement (CIP #0822-24.06)

City of Sebastopol

DECEMBER 8, 2025



LSCE

December 8, 2025

LSCE No. 25-2-196

Elissa Overton
Engineering Technician II
City of Sebastopol
714 Johnson Street
Sebastopol, CA 95472

SUBJECT: Response to RFP – Engineering Services for Well 4 Replacement (CIP #0822-24.06)

Dear Ms. Overton,

Luhdorff & Scalmanini Consulting Engineers (LSCE) is pleased to submit our qualifications and proposal to assist the City of Sebastopol with professional services related to the design of a replacement well for the City's existing Well 4, as well as the design of the associated replacement well pump station.

Based on our understanding of the project after reviewing the City's Request for Proposal (RFP), the work to be completed generally includes permitting assistance, preparation of well and pump station project specifications, preparation of a well and pump station design and engineers estimate, and assisting the City with financing and /or grant funding to be used for the Well 4 replacement well and pump station, with the understanding that the City will issue a separate RFP for construction-phase services at a future date.

LSCE has a long history of successfully designing and installing hundreds of community water-supply wells throughout California, providing us with a uniquely comprehensive understanding of new well projects and the challenges they present. We are confident that our extensive experience and demonstrated record of delivering successful groundwater projects statewide will support a smooth and efficient effort, culminating in a well-designed replacement well and pump station that fully meets the City's objectives.

Additionally, while LSCE is headquartered in Woodland, our project manager, Charlie Jenkins works remotely in Santa Rosa. He can be at the City's offices or the project site within approximately twenty minutes, providing timely in-person support should project issues, concerns, or questions arise. Charlie grew up in Sebastopol and maintains long-standing family and community ties in the area. This personal connection further reinforces his commitment to the project's success and to providing dedicated support to the City throughout its completion.

LSCE prides itself on the close working relationships that we develop with our clients. As such, we will work closely with City staff during all phases of the project to meet their needs and expectations. The team assembled by LSCE for the City's project is second to none in terms of experience and track record of successfully completing projects similar to those outlined in the RFP.

We have reviewed our current and projected obligations and determined that we have the necessary resources to complete this project in a timely and cost-efficient manner. We will be happy to respond to any questions you may have regarding our proposal. We look forward to the opportunity to assist the City on this project. We have also reviewed the City's standard contract and insurance requirements and have no exceptions.

As company president, Scott Lewis is authorized to negotiate contract terms and make binding agreements on behalf of LSCE. If you have any questions regarding our proposal, please contact Charlie Jenkins, our proposed project manager for this project. He can be reached at cjenkins@lsce.com or 530.661.0109.

Sincerely,

Luhdorff & Scalmanini, Consulting Engineers

Charlie Jenkins, PG
Senior Geologist

Scott Lewis, PG
Senior Principal Geologist | President

Firm Information

Luhdorff and Scalmanini, Consulting Engineers
500 1st Street, Woodland, CA 95695
Tel. 530.661.0109

FEDERAL TAX ID – 20-1984423

LSCE Authorized Contact

Charlie Jenkins, PG
Senior Geologist
530.661.0109
cjenkins@lsce. com

Table of Contents

1. Team Background 1
   LSCE 1
   Subconsultants 1
2. Project Team 2
3. Experience 4
4. Project Understanding and Approach 7
   Understanding 7
   Approach 7
5. Detailed Scope of Work 8
6. Fee Estimate ***(COST OMITTED)*** 12
7. Proposed Schedule 15

Section 1.

Team Background

LSCE

Luhdorff and Scalmanini, Consulting Engineers (LSCE) is a consulting and services organization that, for over 45 years, has provided public and private entities with hydrogeologic and civil engineering services related to the investigation, development, use, protection, and management of groundwater. LSCE was founded to fill a recognized need for technical and management expertise in a broad range of issues associated with groundwater resource development, its efficient utilization, and protection.

LSCE's primary clients are municipalities, water districts, and other public agencies, as well as agricultural, corporate, and private interests throughout California. Many of our clients are repeat clients and use our services regularly, which is a testament to the quality and economic value of our professional services. Our staff includes experts in hydrogeologic investigations, site characterization, monitoring and production well design, well construction and testing, well rehabilitation, water resources management, permitting, groundwater modeling, pump selection and pump station design, geographic information systems (GIS), database design, and AutoCAD (ACAD) drafting. Our integrated approach leverages our experience and expertise in groundwater and engineering to develop straightforward and economical solutions to our clients' water resource needs. LSCE is uniquely positioned to address the City's water infrastructure needs. With 45 years of experience and a proven track record, LSCE's expert staff and teaming partners will seamlessly integrate to ensure the success of the Well 4 Replacement.

Subconsultants

Frisch Electrical Engineering (Frisch) specializes in electrical engineering for the water, wastewater, and power industry. The firm has 23 years of experience, with staff averaging over 20 years of experience each. Their expertise encompasses power distribution, protective relaying, hardware controls, PLCs, SCADA systems, programming, and instrumentation.

Peoples Associates Structural Engineers (PASE) has provided structural engineering for industrial, infrastructure, institutional, commercial, and residential projects for the last 34 years. From their San Jose headquarters and Northern California satellite offices, they provide design and construction phase services, seismic evaluations and retrofits, structural condition assessments, and peer reviews.

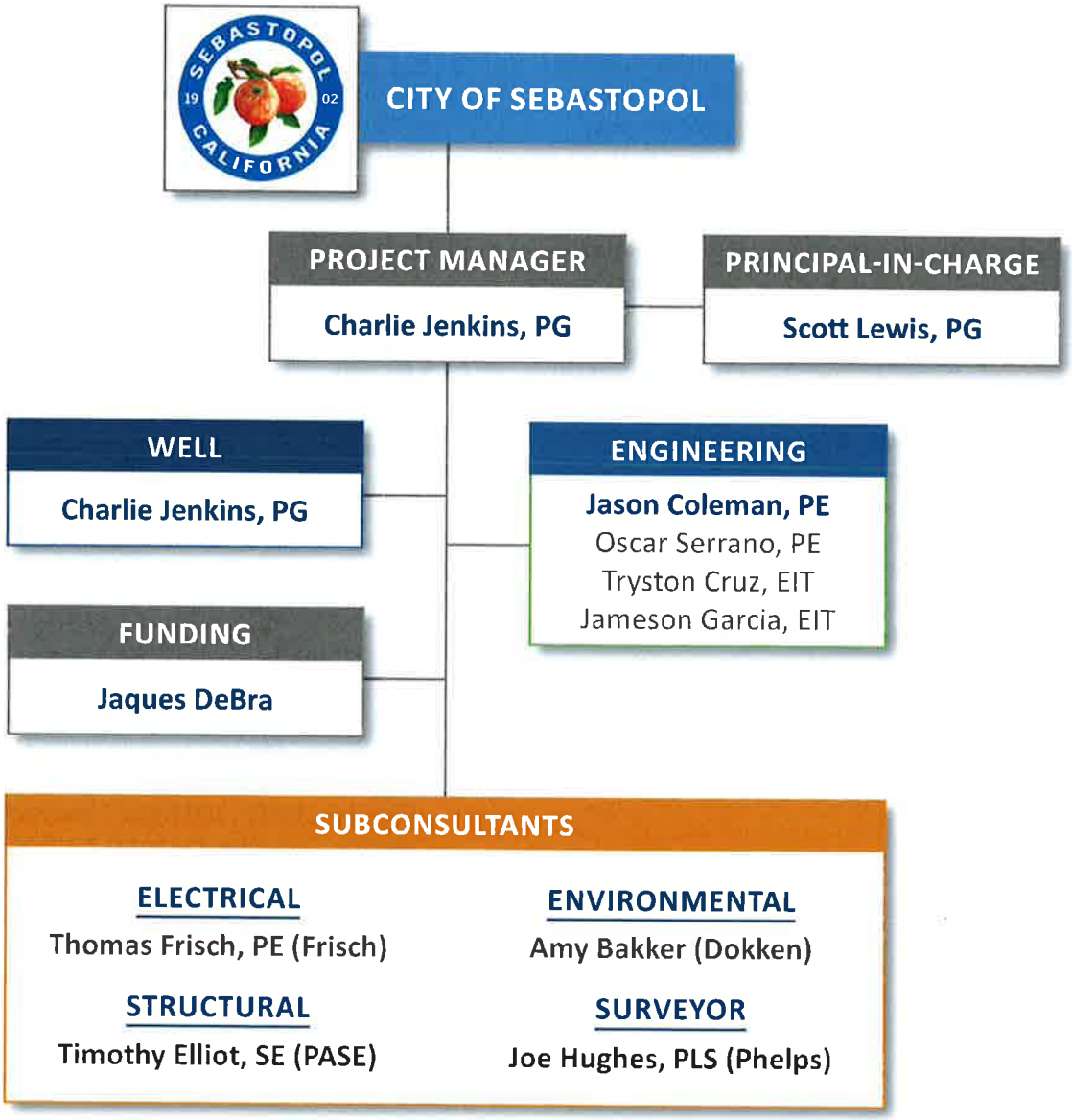
Dokken Engineering, Environmental Services Division (Dokken) has completed CEQA/NEPA documentation for over 600 projects throughout California, including more than 40 water distribution projects in Northern California. Their staff have experience preparing all levels of CEQA/NEPA documentation, from CEQA Categorical Exemptions and NEPA Categorical Exclusions to Environmental Impact Reports (EIR) and Environmental Impact Statements (EIS).

Phelps & Associates Land Surveyors (Phelps) specializes in boundary retracement, topographic mapping, subdivisions, and construction staking. Formed in 1976, Phelps is based in Sebastopol and serves the counties of Sonoma, Marin, and Napa. Their staff are licensed in California and utilize the latest in robotic total stations, along with the most current generation of real-time kinematic Global Positioning System receivers.

Section 2.

Project Team

LSCE has assembled a team of experienced professionals to meet the project's goals and objectives outlined in the RFQ. LSCE proposes a project team that includes key hydrogeologists, geologists, and civil, structural, and electrical engineers who have worked together as a team for over 20 years on similar well, pump station, and water treatment projects. The team members were selected based on their experience, qualifications, and proven track record of successfully completing projects of similar scope to that outlined in the RFQ. The primary team members proposed for the project are shown in the project organization chart below. In addition to the key team members below, the project manager will have the ability to select from a pool of experienced project and staff professionals to assist with the project as needed. Following the organizational chart is a brief biography for each key team member, with one-page resumes for all team members available in **Appendix A**.



Bold = Leadership role

LSCE Staff

Charlie Jenkins, PG – Project Manager/Well Lead: A seasoned geologist with 17 years of experience in geology and hydrogeology, providing reliable and accurate geological insights to support project goals and regulatory requirements. A proven track record of successfully managing and executing various projects, ensuring compliance with industry standards, and delivering high-quality technical reports. Expertise spanning subsurface investigations, well design, construction management, geophysical survey interpretation, and water quality assessments.

Scott Lewis, PG – Principal-in-Charge: Over 25 years of experience throughout California with groundwater investigations, water supply assessments, site assessments, well evaluations, well abandonments, well modifications, and well rehabilitations. He specializes in the investigation, design, construction oversight, testing, and evaluation of monitoring and municipal water wells. Scott was a technical advisor for the recent update of the California Water Well Standards, Bulletin 74-81.

Jason Coleman, PE – Engineering Lead: Over 17 years of experience in well pump stations, water distribution and water treatment design, and related construction management. Experience includes engineering design of well pumps, booster pumps, pipeline distribution systems, storage tanks, surface water and groundwater treatment facilities, as well as preparation of engineering drawings and specifications, construction management, and CEQA studies.

Oscar Serrano, PE – Engineering Support: Over 20 years of experience in engineering design, feasibility studies, water master planning, urban water management plans, and the design of water, wastewater, and stormwater facilities.

Tryston Cruz, EIT – Engineering Support: Four years of professional water resources and environmental engineering experience. Pump station inspection experience and knowledgeable in submersible and vertical turbine lineshaft well pump installation practices. Design and record plans for water infrastructure projects relating to consolidation, irrigation, pipeline replacement, and pump stations.

Jameson Garcia, EIT – Engineering Support: A recent Civil Engineering graduate with a concentration in water resources. Supported submittal and RFI review, ensuring compliance with project specifications, and prepared and updated engineering plans.

Jacques DeBra – Funding Lead: Over 30 years of experience in public water utilities management, consulting, and as an AWWA water instructor. Developed funding strategies to maximize grant funding for local and regional activities. Secured and administered over $400 million in funding. Secured grant funds through every State Proposition funding program since 1988, as well as California I-Bank, EPA, WIFIA, and other federal funding programs.

Subconsultants

Thomas Frisch, PE (Frisch) – Electrical Engineering Lead: Water supply project experience since 1991 with expertise in power, controls, instrumentation, and communications. As a Consultant, he has designed the electrical systems for over 250 water projects ranging from small pump stations to large-scale treatment plants.

Timothy Elliott, SE (PASE) – Structural Engineering Lead: Over 25 years of analysis, design, and construction experience, including water, wastewater, and stormwater facilities (pump stations, wells, storage tanks, and underground structures); vehicular and pedestrian bridges; civil infrastructure facilities (culverts, channels, and retaining walls); anchorage of equipment and evaluation of existing facilities.

Amy Bakker (Dokken) – Environmental Lead: 14 years of environmental compliance experience, including NEPA/CEQA environmental documents, regulatory permits, and technical studies. Exceptionally skilled at delivering defensible documents and conducting biological surveys. Experience assisting with Federal and State regulatory permitting and compliance with environmental laws and regulations.

Joseph Hughes, PLS (Phelps) – Survey Lead: A licensed Professional Engineer with over 25 years of survey experience. Involved in every aspect of surveying, including running and coordinating surveys in the field and managing projects from proposal through completion.

Section 3.

Experience

LSCE has worked on hundreds of projects similar to the requirements described in the RFQ. The table at right summarizes clients for whom we have completed related projects. More detailed project descriptions and references for three projects are provided below.

RELATED LSCE EXPERIENCE SUMMARY

	Well Inspection and Rehabilitation	Well Design	Pump Station Design	Construction and Testing Oversight	Grant/Loan Funding
AKT Santa Nella Investors		●	●	●	
Blue Lakes Mutual Water Company	●		●	●	●
Butte County		●	●	●	●
California Water Services Company		●		●	
Citrus Heights Water District	●	●	●	●	
Del Oro Water Company		●	●	●	●
Diablo Water District		●	●	●	
Merced, City of		●	●	●	
Millview County WD		●	●	●	
Morgan Hill, City of	●	●	●	●	
Mountain View, City of			●	●	
Natomas Mutual Water Company		●		●	
Pittsburg, City of	●	●	●	●	●
Rural North Vacaville Water District	●	●	●	●	
Sacramento Area Flood Control Agency		●	●	●	
Sacramento County Water Agency		●	●	●	
Sacramento Suburban WD	●	●	●	●	
San Bruno, City of		●	●	●	
San Francisco PUC	●	●	●	●	
San Jose Water	●	●	●	●	
San Jose, City of		●	●	●	
Santa Clara, City of		●		●	
Sierra Nevada Brewing		●		●	
Simplot/Glenn Springs Holdings		●	●	●	
Spreckels Water Company	●	●	●	●	
Stanford University		●	●	●	
Town of Discovery Bay CSD	●	●	●	●	
Vacaville, City of	●	●	●	●	
Watsonville, City of		●	●	●	
Winters, City of		●	●	●	
Yolo County CSD		●	●	●	●

Well 8 Site Investigation and Pump Station Design

TOWN OF DISCOVERY BAY

DATES: 2022 - 2024; ***REFERENCE:*** Ms. Dina Breitstein, General Manager, 925.634.1131, dbreitstein@todb.ca.gov

TEAM: Scott Lewis, PG (Wells Project Manager), Charlie Jenkins (Wells Project Support), Jason Coleman, PE (Engineering Project Manager), Oscar Serrano, PE (Engineering Support), Jameson Garcia, EIT (Engineering Support)

LSCE has provided engineering and hydrogeologic services to the Town of Discovery Bay (TODB) for over 25 years, offering comprehensive engineering and hydrogeologic solutions that encompass groundwater supply, treatment, and distribution. The Town relies exclusively on groundwater from several aquifers whose water quality ranges from fresh to brackish. LSCE's work has focused on understanding these aquifers in detail, then developing solutions that protect water quality, improve system reliability, and support long-term planning. LSCE's work with the Town has included groundwater investigations, well siting studies, well design, construction oversight, pump station design, treatment plant design, well rehabilitation programs, and distribution system analysis, design, and construction.

A major component of LSCE's work for the Town involves site-specific hydrogeologic investigations to identify brackish water intervals and design municipal wells that draw from the most productive freshwater zones. These investigations have combined historic well data, geologic records, and downhole geophysics to develop conceptual production well designs for each new site. LSCE has overseen the drilling of test holes, installation of multi-completion monitoring wells, and collection of depth-specific water quality samples. These efforts have led directly to the construction of multiple new municipal wells that meet both yield and water quality objectives, including the most recent investigation and design for Well No. 8, which features an iron and manganese treatment system capable of producing up to 1,980 gallons per minute.

In addition to well development, LSCE serves as the Town's District Engineer, providing strategic planning, regulatory compliance, asset management development, and hydraulic modeling. LSCE prepared the most recent Water Master Plan, Urban Water Management Plan, and annual SB 555-compliant water audits. LSCE also completed the Town's Risk and Resilience Assessment and Emergency Response Plan in accordance with AWIA requirements. These efforts help the Town navigate evolving regulatory requirements while maintaining a clear roadmap for capital improvements and system resiliency.

Acappella Well 21

CITY OF SAN BRUNO

DATES: 2021 - Ongoing; ***REFERENCE:*** Dalia Manaois, Principal Engineer, 650-616-7047, DManaois@sanbruno.ca.gov

TEAM: Scott Lewis, PG (Project Manager), Charlie Jenkins (Wells Lead), Jason Coleman, PE (Engineering Lead)

LSCE conducted a detailed site investigation that included test hole drilling, monitoring well installation, and water quality sampling to inform the final well design. The results supported LSCE's preparation of well design documents, construction specifications, and DWSAP materials. LSCE coordinated with DDW for approvals, assisted with bidding, and provided construction oversight through drilling, development, and testing. The completed well exceeded the original design flow rate and performance requirements.

LSCE also prepared and oversaw the destruction of Well 15, which had reached the end of its service life. Additionally, LSCE is contributing to the design and construction oversight of the associated pump station, with completion expected by the end of 2027.

Wild Wings Wells and Treatment

YOLO COUNTY

DATES: 2020 - Ongoing; ***REFERENCE:*** Yana Pavlova, Business Services Manager, 530.666.8157, Yana.Pavlova@yolocounty.gov

TEAM: Jason Coleman, PE (Project Manager), Scott Lewis, PG (Technical Advisor), Charlie Jenkins, PG (Project Geologist), Jameson Garcia, EIT (Engineering Support)

LSCE has supported the Wild Wings County Service Area (CSA) public water system for more than twenty years. The firm designed the original water supply, storage, pumping, and distribution facilities when the system was constructed in 2002 and has continued to provide technical guidance as the community's water quality and supply conditions evolved. This long-term involvement has created a detailed understanding of system constraints, regulatory obligations, and operational needs, which has been critical as the CSA's groundwater conditions changed over time.

Arsenic treatment planning began in 2018 when concentrations at the Canvasback well exceeded the State Maximum Contaminant Level. LSCE prepared preliminary treatment concepts for this source, which remained in emergency standby status. Rising arsenic levels at the Pintail well in 2020 prompted a broader feasibility analysis. Work included potable and non-potable demand evaluations, treatment sizing, and a comparison of adsorption and coagulation filtration technologies. The review also addressed chemical feed design, backwash and waste handling needs, long-term maintenance considerations, and capital and operating costs. LSCE coordinated vendor outreach, developed a pilot testing protocol, and supported pilot testing efforts with system operators, treatment vendors, and the University of California, Davis. These evaluations culminated in conceptual layouts and refined design recommendations for siting treatment at the Pintail well.

From 2021 through 2023, LSCE advanced the arsenic treatment project through full design. Plans, specifications, and a comprehensive cost estimate were prepared for a 500 gpm adsorption treatment system capable of treating water from Pintail as well as from the Canvasback well through the existing raw water pipeline. The design includes dual treatment vessels on a skid, pH adjustment systems, a 16,500-gallon backwash tank, and complete process, electrical, and control improvements. Construction management support commenced in late 2023 and has included submittal review, RFI coordination, field visits, progress payment reviews, and regular communication with County staff to ensure scope, budget, and schedule alignment.

Declining groundwater levels in the region prompted the CSA to also pursue an additional supply well and associated pump station in parallel with the treatment effort. LSCE completed the well siting evaluation and regulatory concurrence, prepared CEQA documentation, and provided design and construction-phase support for the new Wood Duck production well and pump station. The well was drilled to a depth of approximately 1,150 feet and constructed as an 18-inch diameter municipal supply well. Planned above-ground improvements include station piping and valving, a vertical turbine well pump, electrical and control systems, and provisions for future backup generator, chemical treatment, and tie-in to the distribution system. Construction of the Wood Duck Pump Station is now underway.

Section 4.

Project Understanding and Approach

Understanding

LSCE understands that the City of Sebastopol (City) relies exclusively on groundwater to meet its potable water system demands, with no interties to neighboring agencies. This creates a strong dependence on individual production wells for system capacity and redundancy. Well 4, constructed in 1953, has reached the end of its useful service life, and its replacement is critical for maintaining reliability during peak demands and drought periods. The City's objective is to construct a new well and pump station at the existing site that maximizes yield, performance, and operational efficiency for the subject Well 4 Replacement Project (CIP #0822-24.06). Significant elements of the project include funding assistance, permitting, well and pump station design, and preparation of project specifications and bid documents.

All project elements defined in the RFP are fully incorporated into LSCE's work plan. The plan identifies each task, the work to be completed within that task, and the associated cost. It distinguishes investigation activities from well design and pump station design, while maintaining a clear sequence that supports efficient project delivery. LSCE is familiar with the funding alternatives presented in Appendix D and will integrate those considerations into the design and permitting approach. The level of detail in the work plan reflects what is required to investigate and design a fully permitted replacement well and pump station that meets the City's needs. This proposal includes services through completion of the well and pump station design only, with the understanding that the City will issue a separate RFP for construction-phase services at a later date.

Approach

For more than forty-five years, LSCE has continually refined its approach to projects similar to that described in the City's RFP. We continually refine our project approach based on the experience gained from completing hundreds of similar well pump station projects, advances in investigative and design methods, and changing regulatory requirements. LSCE's general approach is to achieve a practical and straightforward design that meets the City's budget and schedule objectives, while also ensuring that all design aspects have been thoroughly considered.

LSCE has reviewed the funding TM completed by Hazen Sawyer, which provides the City with the recommendation of pursuing DWSRF funding for this project. The DWSRF program offers low interest rates; however, it would delay project delivery by 3 to 5 years due to the long lead times associated with SRF funding, including the review and approval of funding applications, as well as the execution of funding agreements. The LSCE proposal assumes providing support for DWSRF funding based on our success in securing DWSRF funding for our clients. If the project delivery time line is important to the City for this critically important water infrastructure, LSCE can assist the City with a project funding strategy that would identify the best available funding sources that would expedite the project delivery schedule, resulting in lower funding administrative costs and reducing water system risk to a more acceptable level.

LSCE's approach for this project will include the early concurrent execution of key site investigations, preliminary design elements, and CEQA review, as well as the identification of required mitigation measures to identify any issues that may affect project efficiency and timeline.

Other aspects of our project approach are outlined below. They are aligned with the efforts outlined in the Detailed Work Plan section of this proposal, enabling us to proceed with multiple headings to ensure timely project completion. Creative insight, innovative response to perplexing challenges, and sound technical knowledge to support practical engineered solutions are integral to our practice.

WELL DESIGN

To begin the project, LSCE will evaluate the site in terms of constructability, specifically the ability to locate a well on the site that meets all SWRCB-DDW minimum setbacks from sanitary features, as well as the establishment of a control zone around the well. LSCE's extensive experience with well siting, well construction, pump station design, and operation enables us to critically evaluate and identify any challenges or impediments to the design or construction and use of a well and pump station, and develop strategies to address any identified issues early in the planning and design stage of the project.

LSCE will utilize lithologic, well construction, well performance, and water quality data from existing City wells, along with other relevant data sources and information, to refine its current understanding of the hydrogeologic system in the Sebastopol area. This refinement of our understanding of the hydrogeologic landscape will serve as the basis for our site-specific hydrogeologic assessment and will inform the preparation of a well design. Additionally, LSCE will prepare a detailed engineer's estimate presenting the projected costs for the replacement well.

LSCE will prepare well construction and testing specifications that include detailed requirements to be followed by the well drilling contractor during every phase of the project. These specifications will adhere to the most up-to-date well drilling industry standards and ensure compliance with all pertinent regulations and permit requirements.

PUMP STATION DESIGN

LSCE has identified the following significant project elements associated with the well pump station design phase, which will be key to the project's successful completion on budget and within schedule.

Utilities – LSCE will request that the City provide any additional information pertaining to the site, including existing City facilities, and other utilities via as-builts. LSCE will tie in to existing utilities (water, storm, sewer, electrical, etc.) onsite as needed to support the new well pump facility. Due to the long lead time required to secure electrical power to the site, one of the first items to be addressed is the filing of the application for electrical service with PG&E.

Existing Property – LSCE will work with all parties to minimize any schedule impacts associated with identifying the space required for a new well pump station site within the existing lot.

Building – LSCE understands that the new well pump, electrical equipment, chemical feed equipment, and station piping will need to be housed in a new building. LSCE envisions the building to be wood-framed to match the structure type of the existing building onsite. LSCE has developed a unique, removable roof design for wellhead access, which is used on many of our well pump stations for the City's consideration.

Well Pump – LSCE will evaluate the new well design and construction information to confirm the suitability and proper placement of the pump already purchased by the City. This includes reviewing specific capacity data to establish appropriate head conditions, assessing projected pumping water levels and screen intervals to ensure correct setting depths, and verifying alignment and plumbness survey results so that column diameter and shaft tolerances do not create vibration or wear issues. LSCE will also review whether any extended suction or tailpipe modifications are needed to position the pump intake in an optimal zone. If any compatibility concerns arise between the well's final characteristics and the City-furnished equipment, LSCE will identify necessary adjustments and coordinate with the City during the design process.

LSCE assumes that after the well is constructed and well pump testing is completed, the City (with LSCE's assistance under a separate contract) will finalize the well pump design to incorporate actual specific capacity and production capacity for the well.

Section 5.

Detailed Scope of Work

LSCE has reviewed and understands the project as outlined in the City's RFP. The Scope of Work outlined in the tasks below encompasses all the core objectives outlined in the RFP.

Task 1 – Project Coordination, Meetings, and Administration

TASK 1.1 – KICKOFF AND INFORMATION REQUEST

LSCE's work on the project will begin with a kickoff meeting with City staff and key LSCE team members to discuss the various aspects of the project. Items such as contact information, chain of command, the City's project expectations, respective roles and responsibilities, schedule, design preferences and parameters, and site constraints shall be discussed at the kick-off meeting. Following the meeting, LSCE will provide the City with a list of requested information.

TASK 1.2 - PROJECT COORDINATION, MEETINGS, AND ADMINISTRATION

Key LSCE team members will attend regular design meetings with the City to discuss various aspects of the project. For each meeting, LSCE will prepare and distribute meeting agendas, minutes, and

summaries of action items. LSCE will also provide frequent updates via email or telephone as needed throughout the project. This task also provides project management and administrative activities such as: (a) Contractual Arrangements, (b) Ongoing Examination Regarding Adherence to The Scope, Budget, and Schedule, (c) Coordination of Staff Resources (d) Internal Review of Work Products, (e) Management of Subcontractors, (f) Billing Review, and (g) Scoping and Budgeting.

Task 2 – Permitting Assistance

TASK 2.1 – PERMITTING ASSISTANCE

Through our work on numerous projects in the past, LSCE has developed a good working relationship with the SWRCB and other regional permitting and regulatory entities and can assist in expediting all necessary applications and supporting permit documents in a cost-efficient manner. LSCE envisions that the following permitting activities will be required to complete the project.

SWRCB-DDW Water Supply Permit Amendment – LSCE will coordinate with the SWRCB-DDW and the City to provide all necessary supporting technical information to complete the water supply permit amendment package, which will be submitted to the SWRCB-DDW. LSCE has completed numerous new and amended water supply permits and has a thorough understanding of the SWRCB-DDW process and the required submittals. A draft water supply amendment will be submitted to the SWRCB-DDW following construction of the production well. Following the completion and acceptance of the project, LSCE will assist the City with the preparation of the final DDW amended water supply permit, which will include updates to the information from the preliminary submittal and the submission of the final As-Built drawings prepared by LSCE.

CEQA – LSCE envisions that the project meets the requirements for a CEQA categorical exemption. LSCE will prepare CEQA documentation consistent with a Class 1 or Class 3 Categorical Exemption, including drafting the exemption form, providing supporting technical rationale, coordinating with City Planning staff, and assisting the City in filing the Notice of Exemption.

Other Permitting Activities – LSCE will contact applicable agencies as needed to establish permitting requirements for well drilling (County of Sonoma), well siting concurrence (Department of Drinking Water), encroachment permits (City), and discharge requirements for development and pump testing fluids (City).

Task 3 – Site Specific Investigation

TASK 3.1 – INITIAL SITE ASSESSMENT

Well Siting Review – LSCE will complete a thorough onsite inspection/assessment of the site. Specifically, LSCE will evaluate the well site in relation to the siting and constructability of the new well, as well as the DDW setback distances from sanitary features and control zone requirements.

Hydrogeologic Review – The goal of the hydrogeologic review is to determine the probable yield, water quality, anticipated well depth, screen intervals, static and pumping water levels, specific capacity, and potential impacts on nearby wells due to the pumping of the new well.

Evaluation of Potential Impacts to Groundwater Quality – LSCE will investigate possible sources of groundwater contamination in the vicinity of the project site.

TASK 3.2 – WELL DESIGN RECOMMENDATION REPORT

LSCE will prepare and deliver to the City a well design recommendation report that provides justification for the recommended well design. The report will include a preliminary well design profile and a preliminary construction cost estimate.

TASK 3.3 – SITING CONCURRENCE

After the City approves the well design, LSCE will prepare an initial DDW submittal document requesting siting and design concurrence for the new well, based on compliance with DDW and DWR regulations. The initial submittal will include a preliminary well design, site layout, location map indicating location and distances of sanitary features from the proposed well location, delineation of the wellhead control zone, and the preliminary DWSAP.

Task 4 – Production Well Design

TASK 4.1 – PRODUCTION WELL CONSTRUCTION SPECIFICATIONS

LSCE will prepare specifications that include detailed construction requirements to be followed by the well drilling contractor during every phase of the project, including minimum acceptable methods for drilling fluid control, well development, pump testing, and well performance standards. Other site-specific items will include requirements for the

containment and disposal of drill cuttings, as well as the handling of discharge water during development and test pumping, in accordance with applicable local, state, and federal regulations. The production well specifications will include comprehensive design plans, accompanied by an engineer's cost estimate for the City's use.

LSCE will attend up to two regulatory coordination meetings with SWRCB-DDW and the Water Board, supporting the City with technical presentations and responding to regulator questions related to siting, well design, and water supply permit amendments under this task.

LSCE will also support one public outreach meeting under this task by preparing presentation materials, summarizing technical content in accessible formats, and attending meetings with City staff to respond to community questions related to well siting, design, construction sequencing, and water-quality considerations.

Task 5 – Pump Station Design

TASK 5.1 – PRELIMINARY PUMP STATION DESIGN ACTIVITIES

LSCE will meet with and conduct a site visit with City personnel to discuss the overall pump station project design requirements, construction concepts, and site constraints at the existing site. The primary goal of the site visit is to discuss the design elements required to serve the new facility, including water supply connection, storm drain pump-to-waste (overboard) operations, building sewer systems, electrical services, radio communications, access controls, and other relevant aspects. To aid in this preliminary design effort, LSCE will distribute a design basis checklist document to the City, enabling it to quickly obtain a comprehensive understanding of the City's preferences for the functionality, operation, and equipment to be designed.

The LSCE Team will complete a topographic survey basemap in AutoCAD format for the project site. The basemap will be used for the preliminary layout of the pump station, which will, in turn, be used for preparing the final bid set plans. LSCE will incorporate City-provided standard plans, as-builts, and base mapping (as available) into the design process to ensure consistency with existing infrastructure. It is assumed that an existing geotechnical site investigation/study is available from the City for purposes of facilitating the overall project design, including structural foundation and building design elements.

Under this task, LSCE will also develop a Preliminary Design Report (PDR). The report will summarize design criteria, site constraints, and key assumptions established during early coordination with the City. It will present preliminary layouts for the building, site civil improvements, process piping, electrical systems, and instrumentation. The report will also include an evaluation of the City-furnished pump equipment for compatibility with well performance data, along with any recommended adjustments to accommodate the equipment within the pump station design. Additionally, the PDR will outline anticipated permitting needs, identify any remaining data gaps, and provide a preliminary engineer's estimate of probable construction cost. The document will serve as the basis for the development of the initial 50% design submittal (as part of **Task 5.2**) and will confirm alignment between LSCE and the City on scope, configuration, and design direction before advancing into detailed design.

TASK 5.2 – PUMP STATION DESIGN AND CONSTRUCTION SPECIFICATIONS

This task covers the scope of work required to prepare the engineering plans and technical specifications for the project, consisting of a well pump and motor, motor control center, discharge piping, chemical treatment system, instrumentation, electrical control panels, SCADA communication, a wood-framed building to house the above-ground components onsite, and all other required site improvements. The design will also address all other site modifications and improvements, including grading, drainage, paving, fencing, painting, etc. Following submittal of the PDR, the detailed design will be completed at the 50% and 100% stages, and an Engineer's Estimate of project construction costs will be prepared with each design phase. After the City's review of each design phase, LSCE will prepare the complete set of plans and specifications for the subsequent design stage, incorporating any comments received from the City in the previous design reviews.

LSCE will attend up to two regulatory coordination meetings with SWRCB-DDW and the Water Board to obtain approval for the well pump station plans, the water supply permit amendment, and to coordinate field visits during project startup.

LSCE will also support one public outreach meeting under this task by preparing presentation materials, summarizing technical content in accessible formats,

and attending follow-up meetings with City staff to respond to community questions related to the well pump station design and construction scope.

Task 6 – Funding Assistance

LSCE will assist the City with preparing and submitting a DWSRF funding application, including assembling technical documentation, schedules, preliminary cost estimates, and environmental compliance materials.

TASK 6.1 – DWSRF CONSTRUCTION FUNDING APPLICATION

LSCE will coordinate with the City to incorporate the needed information and data for the proposed Project to complete the DWSRF Construction Funding Application. The Project scope of work, budget, and schedule will be developed in coordination with the City, consistent with the 2025 DWSRF Construction Funding Program guidelines. LSCE will prepare and submit the required DWSRF Construction Funding Application documents, including the application elements, as follows:

- General Package - DWSRF Construction Funding Application Package
- Technical Package - DWSRF Construction Funding Application Package (100% design)
- Environmental Package - DWSRF Construction Funding Application Package (CEQA-Plus)
- Financial Package - DWSRF Construction Funding Application Package

The application elements above will be developed based on information provided by the City. LSCE will develop a comprehensive DWSRF construction funding application, which will contain the four packages outlined above.

LSCE will develop the Project Report required as part of the Technical Package submittal and will incorporate the 100% plans and specifications prepared under **Tasks 4** and **5** into the Project Report, as required for a complete DWSRF funding application.

LSCE will submit a draft of the completed DWSRF Construction Funding Application packages to the City for review and comment before submitting the final application. Comments from the City will be incorporated into the final application submitted to the SWRCB.

LSCE will submit the completed DWSRF Construction Funding Application through the SWRCB's online FAAST process. The process of receiving funding approval is anticipated to occur in the fourth quarter of 2026. The funding agency will review applications in 2027, subject to their schedule for processing other funding applications. LSCE will work with the funding agency to submit a complete application and to help coordinate a timely decision for funding approval.

TASK 6.2 – DWSRF ENVIRONMENTAL DOCUMENTATION

This task involves preparing the minimum CEQA-Plus requirements outlined in the DWSRF funding policy. This would involve preparing Cultural and Biological Resource Assessments that meet both federal and state environmental requirements. It is LSCE's experience that, at a minimum, these assessments are the required for all DWSRF construction applications and must be completed as part of the application approval process. These are in addition to the proposed CEQA compliance documentation for a well replacement, which typically involves preparing and filing a Notice of Exemption. Any additional CEQA-Plus or other compliance documentation required, beyond that described above, would be prepared through an additional task order as agreed upon between the parties. It has been LSCE's experience that the DWSRF funding program often requires the most stringent environmental documentation and processes compared to other funding options.

TASK 6.3 – ALTERNATE FUNDING SOURCES (OPTIONAL)

LSCE is also available to identify eligibility for complementary programs and coordinate with City staff on required submittals. If the City chooses to pursue an alternative funding source, LSCE would assist with the funding application procurement process and coordination with the funding agency.

Section 6.

Fee Estimate

LSCE's estimated cost to complete the scope of work outlined in this proposal is based on our current understanding of the project and what would be typically expected to complete the tasks described based on our prior experience. The cost estimate assumes the following:

- A project design duration of 11-16 months.
- General Conditions, Supplemental General Conditions, and other "front-end" specifications will be prepared by the City.
- Design documents will conform to the City's standards.
- The City has a Geotech report available for the existing facility.
- Construction-related costs are not included.
- Any additional enviromental requirements beyond a Notice of Exemption (**Task 2**) and Cultural and Biological Resource Assessments (**Task 6.2**), are not included in the cost estimate

Fees shall remain in effect for the full contract period. In the event that the City directs LSCE to deviate from the proposed scope, or as dictated by unforeseen field conditions or events beyond LSCE's control, LSCE will provide notification of any potential changes in the estimated cost to complete the work. LSCE will not proceed with any work that deviates from the approved scope and budget until approval to proceed is granted by the City.

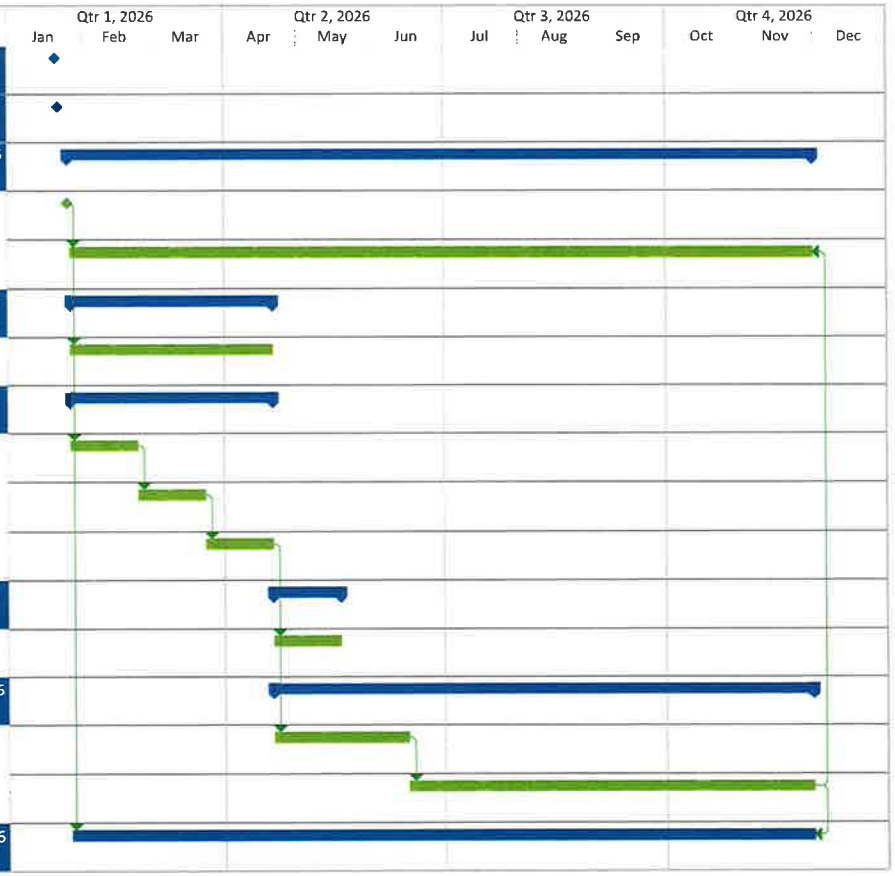
As required in the RFP, our cost estimate has been omitted from this PDF version of the proposal, but is included in the printed copies scheduled for delivery on Monday, December 8th.

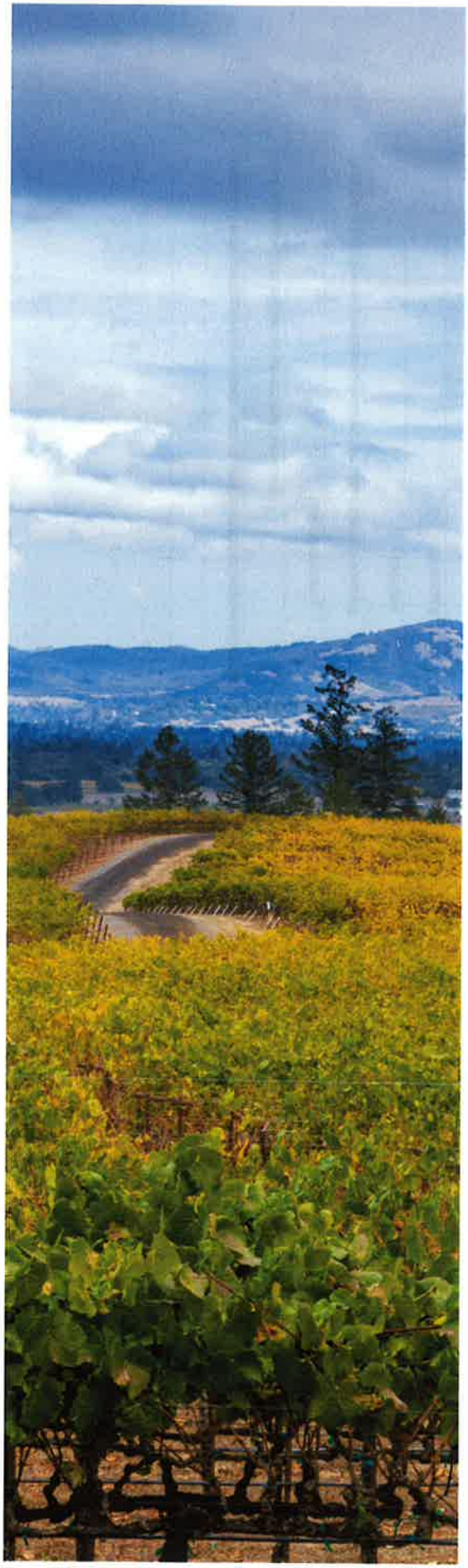
Section 7.

Proposed Schedule

LSCE understands that the City anticipates awarding the project to a consultant in January 2026. LSCE assumes that work on the project will begin soon thereafter. LSCE's proposed project schedule is based on the tasks outlined in this proposal, with an anticipated project completion date of December 2026. The estimated completion time of the project may change (shorten/lengthen) based on the responsiveness of the City and other agencies regarding information requests, design review phases, and the ability to perform some project tasks concurrently. The key members of the assembled project team have collaborated on similar projects and possess the experience to effectively gauge workloads and commitments to other projects. LSCE has reviewed the services outlined in the RFP, our current commitments, and staffing levels, and determined that we can dedicate the resources required to provide engineering and oversight services to the City in a timely and efficient manner, as illustrated in our proposed schedule.

Task Name	Duration	Start	Finish
Council Approval	1 day	Tue 1/20/26	Tue 1/20/26
Notice to Proceed	1 day	Wed 1/21/26	Wed 1/21/26
TASK 1 - Project Coordination, Meetings, and Administration	11.05 mons	Mon 1/26/26	Mon 11/30/26
Task 1.1 - Kickoff and Information Request	1 day	Mon 1/26/26	Mon 1/26/26
Task 1.2 - Project Coordination, Meetings and Administration	11 mons	Tue 1/27/26	Mon 11/30/26
TASK 2 - Permitting Assistance	3 mons	Tue 1/27/26	Mon 4/20/26
Task 2.1 - Permitting Assistance	3 mons	Tue 1/27/26	Mon 4/20/26
TASK 3 - Site Specific Investigation	3 mons	Tue 1/27/26	Mon 4/20/26
Task 3.1 - Initial Site Assessment	1 mon	Tue 1/27/26	Mon 2/23/26
Task 3.2 - Well Design Recommendation Report	1 mon	Tue 2/24/26	Mon 3/23/26
Task 3.3 - Siting Concurrence	1 mon	Tue 3/24/26	Mon 4/20/26
TASK 4 - Production Well Design	1 mon	Tue 4/21/26	Mon 5/18/26
Task 4.1 - Production Well Construction Specifications	1 mon	Tue 4/21/26	Mon 5/18/26
TASK 5 - Pump Station Design	8 mons	Tue 4/21/26	Mon 11/30/26
Task 5.1 - Preliminary Pump Station Design Acitivities	2 mons	Tue 4/21/26	Mon 6/15/26
Task 5.2 - Pump Station Design and Construction Specifications	6 mons	Tue 6/16/26	Mon 11/30/26
TASK 6 - Funding Assistance	11 mons	Tue 1/27/26	Mon 11/30/26





Appendix A

Team Resumes

LSCE

- Charlie Jenkins, PG
- Scott Lewis, PG
- Jason Coleman, PE
- Oscar Serrano, PE
- Tryston Cruz, EIT
- Jameson Garcia, EIT
- Jacques DeBra

Subconsultants

- Thomas Frisch, PE (Frisch)
- Tim Elliott, SE (PASE)
- Amy Bakker (Dokken)
- Joe Hughes, PLS (Phelps)

CHARLIE JENKINS, PG
Senior Geologist

Charlie is a seasoned geologist with 17 years of experience in geology and hydrogeology providing reliable and accurate geological insights to support project goals and regulatory requirements. He has a proven track record of successfully managing and executing various projects, ensuring compliance with industry standards. His expertise spans subsurface investigations, construction management, geophysical survey interpretation, and water quality assessments.

Charlie has extensive well experience, including site assessment, well design, and construction management during the drilling, construction, and testing phases of the project. He conducts subsurface investigations for hydrogeologic characterization, interprets geophysical surveys, performs grain size distribution analyses, and oversees water quality sample collection. He prepares specifications and permit applications, monitors permit compliance, reviews technical submittals, and prepares technical reports. He efficiently navigates the challenging conditions associated with small well sites on many projects.

Years of Experience
17

Education
BS, Geology, California State University, Sacramento, CA

Professional Registrations
Professional Geologist
CA No. 9154

Professional Affiliations
- Groundwater Resources Association of California

Areas of Expertise
- Project Management
- Production/Monitoring Wells
- Well Rehabilitation and Repair
- Well Siting Studies

EXPERIENCE

Well Replacement Projects, San Jose Water, Santa Clara County, CA (as recently as 2024): *Project Geologist.* Over a dozen replacement well installations, including assisting with the well design.

Bennett and NDC Well Design, Natomas Mutual Water Company, CA (as recently as 2023): *Project Manager.*

Well Destruction Projects, San Jose Water Company, CA (as recently as 2024): *Project Manager.* Over 18 well destruction projects.

Well Siting Study and Well 4 Design, City of Watsonville, Santa Cruz County, CA (2021): *Project Geologist.* Assisted with the well siting study, summary report, and well design.

Well No. 8 Pump Station and Treatment Design, City of Winters, Yolo County, CA (2021): *Project Geologist.*

Monitoring Well Installations, Napa Valley Subbasin GSP Implementation, CA (as recently as 2024): *Project Geologist.* Over 12 well installations on small sites.

Monitoring Well Installations, Solano Subbasin GSP Implementation, CA (as recently as 2023): *Project Geologist.* Supported the design and installation of two dozen monitoring wells on small sites.

City of Roseville ASR Program, Placer County, CA (as recently as 2023): *Project Geologist.*

Dixon Station No. 4 Replacement, California Water Service Company, Dixon, Solano County, CA (2018): *Project Geologist.* Assisted with the well design on a small site.

East Main #3, Boys Ranch #2A, Jackson #3 Well Pump Station Projects, City of Morgan Hill, San Mateo County, CA (2019): *Project Geologist.* Assisted with well design.

SCOTT LEWIS, PG

Senior Principal Geologist, President

Scott has over 25 years of experience in groundwater resources projects, including evaluation of groundwater conditions, hydrogeologic assessments, site-specific hydrogeologic explorations and evaluations, lithologic and groundwater characterization, monitoring and production well design, construction and testing oversight, development of well rehabilitation and repair programs, oversight of groundwater monitoring programs, and overall project management.

Scott specializes in the investigation, design, construction oversight, testing, and evaluation of monitoring and municipal water wells. He has extensive experience throughout California with groundwater investigations, water supply assessments, site assessments, well evaluations, well abandonments, well modifications, and well rehabilitations.

Years of Experience

25+

Education

BS, Geology, California State University, Sacramento, CA

Professional Registrations

Professional Geologist
CA No. 7876

Professional Affiliations

- California Groundwater Resources Association
- CA-NV AWWA Water Well Technologies Committee

ASSIGNMENTS

- **Technical Advisor:** California Water Well Standards - Bulletin 74-81 Update (2020-2022).
- **Project Manager:** New Municipal Water Well Projects including well design, construction and testing oversight, permitting, and reporting.
- **Technical Assistance:** Provides technical assistance to other firms and drilling contractors regarding well design and construction.

EXPERIENCE

Acapella Well 21, City of San Bruno, San Mateo County, CA (Ongoing): *Project Manager.*

Well Siting Study and Well 4 Design, City of Watsonville, Santa Cruz County, CA (2021): *Project Manager.*

Well No. 8, Town of Discovery Bay, Contra Costa County, CA (2023): *Project Manager.*

Well Replacement Projects, San Jose Water, Santa Clara County, CA (as of 2025): *Project Manager.* Thirty-six new wells (twenty-one since 2012).

Groundwater Storage and Recovery Project, San Francisco Public Utilities District, CA (Ongoing): *Well Lead.*

ASR Program, City of Roseville, CA (as recently as 2023): *Principal Geologist.*

Evaluation of the Palm and Sunrise Wells, Citrus Heights Water District, Sacramento County, CA (2020): *Project Manager.*

Monitoring Well Project, Solano County Water Agency, CA (as recently as 2023): *Project Manager.*

Representative Monitoring Well Project, Madera County Department of Water and Natural Resources, CA (Ongoing): *Project Manager.*

Dover Well Pump Station, City of Pittsburg, Contra Costa County, CA (as recently as 2023): *Principal Geologist.*

Well N10 Walnut Evaluation and Repair, Sacramento Suburban Water District, Sacramento County, CA (2020): *Project Manager.*

Station 1 Well Replacements, California Water Service Company, CA (2019): *Principal Geologist.*

East Main #3, Boys Ranch #2A, Jackson #3 Well Pump Station Projects, City of Morgan Hill, CA (2019): *Principal Geologist.*

Dixon Station No. 4 Replacement Well, California Water Service Company, Solano County, CA (2017): *Project Manager.*

JASON COLEMAN, PE
Supervising Engineer

Jason Coleman is a Supervising Engineer with 17 years of experience in water resources planning, groundwater supply development, and potable water infrastructure design. His expertise spans well beyond pump station and treatment facility design, as well as associated construction management and facility regulatory compliance. Jason routinely provides QA/QC oversight on planning documents, technical memoranda, and design/construction deliverables to ensure compliance with State requirements and alignment with client objectives. He has extensive experience coordinating with the California Department of Water Resources (DWR) and the State Water Resources Control Board Division of Drinking Water (DDW) related to water supply permitting, UWMPs, RRAs, TMF reports, CEQA documentation, water supply assessments, and more.

Years of Experience
17

Education
BS, Civil and Environmental Engineering, Minor - Atmospheric Science, University of California Davis, CA.

Professional Registrations
Professional Engineer
CA No. 78366

Professional Affiliations
- American Society of Civil Engineers #497173
- American Water Works Association #01179332
- Groundwater Resources Agency #4497
- American Council of Engineering Companies (ACEC)

AREAS OF EXPERTISE
- Water Infrastructure
- Treatment Facilities
- Planning

EXPERIENCE

District Water Engineer, Town of Discovery Bay, Contra Costa County, CA (2021-2025): *District Engineer.* Provided engineering design, construction phase services, and technical oversight for TODB's drinking water infrastructure projects since 2021.

Groundwater Storage and Recovery Project, San Francisco Public Utilities Commission (SFPUC), San Mateo County, CA (2010-2025): *Project Manager.* Well pump designs and construction, and testing oversight for 13 new wells requiring additional coordination with new and upgraded system components, pipelines, storage tanks, and other facilities.

Well Replacement Projects, San Jose Water, Santa Clara County, CA (2008-2025): *Well Pump Design Lead.* Well pump design and related engineering services for over 20 new and numerous existing wells.

East Main #3, Boys Ranch #2A, Jackson #3 Well Pump Station Projects, City of Morgan Hill, Santa Clara County, CA (2015-2019): *Project Manager.* Investigation, design, and construction oversight.

Well 4 Pump Station, City of Watsonville, Santa Cruz County, CA (2017-Ongoing): *Project Manager.* Plans and technical specifications for the well pump station, including a chlorine gas chemical treatment system, a standby diesel generator, a bulk storage materials bunker, and the replacement of approximately 800 feet of ductile iron water main.

River Island Surface Water Treatment Plant, Del Oro Water Company, Springville, CA (2024): *Project Manager.* Led the design of a surface water treatment plant and oversaw construction management.

Chemical Feed Control Project, Diablo Water District, Contra Costa County, CA (2015-2018): *Project Manager.* Managed the design of a liquid sodium hypochlorite and aqueous ammonia chemical treatment system to increase the concentration of chloramine disinfectant to address residuals dropping below desired levels.

Dover Well Pump Station and On-Call Engineering Support, City of Pittsburg, Contra Costa County, CA (2018): *Project Manager.*

OSCAR SERRANO, PE
Supervising Engineer

Oscar is a Professional Civil Engineer registered in California with over 20 years of experience, bringing extensive expertise in project management, feasibility studies, water master planning, urban water management plans, and the design of water, wastewater, and stormwater facilities. Specifically, Oscar has designed and provided construction services for pump stations, treatment facilities, water storage tanks, booster stations, and pipeline replacement, among other projects. Additional experience includes developing technical memoranda and reports, grant writing, water rights, water supply permit amendments, and hydraulic modeling.

Years of Experience
20+

Education
MS, Civil & Environmental Engineering, UC Berkeley, CA

BS, Civil Engineering, California State University, Sacramento

Professional Registrations
Professional Engineer
ID No. P-21080
CA No. 66841

Professional Affiliations
- Groundwater Resources Association
- American Society of Civil Engineers

AREAS OF EXPERTISE
- Water Infrastructure
- Water Resources Planning
- Water Supply Assessments
- Water System Consolidations
- Program Development
- Grant/Funding Assistance

EXPERIENCE

Oscar is an experienced project manager who has managed the development of engineering plans and technical specifications, as well as engineering services during construction for infrastructure projects.

Well 8 Pump Station, Town of Discovery Bay, Contra Costa County, CA (Ongoing): *Engineer Support.*

Well 4 Pump Station, City of Watsonville, Santa Cruz County, CA (ongoing): *Engineer Support.*

Edgeview Drive and Discovery Bay Boulevard Pipeline Replacement, Town of Discovery Bay, Contra Costa County, CA (2022): *Project Manager.*

Willow Lake Water Treatment Plant Filter 1 Replacement, Town of Discovery Bay, Contra Costa County, CA (2024): *Project Manager.*

Well 2 Arsenic Treatment System, Rural North Vacaville Water District (RNVWD), Solano County, CA (2024): *Project Manager.*

Simplot Well Pump Station, Glenn Springs Holdings/Simplot Lathrop, San Joaquin County, CA (2023): *Project Manager.*

Water Meter Replacement Project, City of Patterson, Stanislaus County, CA (2022): *Project Manager.*

ASR Wells No. 5 and 6 Facilities, California American Water, Monterey County, CA (2019): *Project Engineer.*

Water System Improvements, Colusa Indian Community Council, Colusa County, CA (2020): *Project Manager.* (Prior firm)

Feather Ridge Estates Water System Improvement, Butte County, Berry Creek, CA (ongoing): *Project Manager.*

Bethel Island Pipeline project, Diablo Water District, Contra Costa, CA (2025): *Project Manager.*

Marina/Marlin Crossing Project, Town of Discovery Bay, Contra Costa County, CA (2025): *Project Manager.*

Ackerman Bridge Pipeline Replacement, Millview County Water District, Ukiah, CA (ongoing): *Project Manager.*

TRYSTON CRUZ, EIT, CESSWI

Staff Engineer

Tryston's experience includes 3 years of professional and 5 years of sub-professional experience in water resources and environmental engineering. His experience includes international field engineering/ construction, design, mapping, drafting, water quality monitoring, data and project management, leadership, and teaching.

Years of Experience

8

Education

BS, Civil Engineering, California State University, Sacramento, CA

Professional Registrations

Engineer-in-Training CA No. 173207

Certified Erosion, Sediment, & Storm Water Inspector (CESSWI) No. 00006060

Certified Water Auditor

Professional Affiliations

- California Groundwater Resources Association

Applications & Programing

- AutoCAD/Civil 3D
- ArcGIS Pro/Map
- Bently Water/Sewer CAD
- HEC-RAS
- Excel VBA

AREAS OF EXPERTISE

- Water Infrastructure
- Water System Evaluation
- Water System Consolidations

EXPERIENCE

Field Engineering Services

Tryston provided construction oversight during pump removal, assessed the pump conditions, and helped provide recommendations to bring the well stations back into optimal performance.

Groundwater Storage and Recovery Project, San Francisco Public Utilities Commission, CA (Since 2022): *Staff Engineer.*

General Services, City of Pittsburg, Contra Costa County, CA (Since 2022): *Staff Engineer.*

General Services, City of Morgan Hill, Santa Clara County, CA (2023): *Staff Engineer.*

Water System Consolidation Project, Del Oro Water Company, City of Porterville, Stanislaus County, CA (2023): *Staff Engineer.* Consolidation of two public water systems.

Engineering Plans

Sand Hill Road Irrigation Supply, Stanford University, San Mateo County, CA (Since 2022): *Staff Engineer.* Grading, pump station layout, pipeline, roadway alignment, stormwater collection and treatment, and erosion and sediment control plan assistance.

Foothills Solar Community Well & Pump Station Design, Wilshire Ranch, Butte County, CA (2024): *Staff Engineer.* Assisted with well and pump station plans, including chemical treatment, a backup generator, and a pressure tank.

General Engineering Services, Town of Discovery Bay, Contra Costa County, CA (Since 2022): *Staff Engineer.* Underwater pipeline crossing plan assistance.

Engineering Support

Water System Evaluation, Madera County Public Works, Madera County, CA (Since 2022): *Staff Engineer.* Developed field assessment forms, helped develop a Excel framework to score and rank the water systems, and analyzed each system in ArcGIS.

GIS Utility Mapping Update, City of Patterson, Stanislaus County, CA (2022-2023): *Staff Engineer.* Assisted with as-built review, updating improvements, and converting the map books from AutoCAD to GIS.

JAMESON GARCIA, EIT
Staff Engineer

Jameson is a recent Civil Engineering graduate with a concentration in water resources, including the design of water and sewer systems. As a student, he acquired skills in planning and designing public works infrastructure, including drinking water distribution and sanitary sewer collection systems. He applied knowledge of flow generation, pipe flow hydraulics, regulations, and public health protection to design these systems and explored pump technology and rehabilitation techniques for existing piping systems. He has a comprehensive understanding of soil properties, classification, compaction, groundwater, stresses, compressibility, and shear strength. He has developed proficiency in analytical and experimental procedures for solving geotechnical engineering problems. He possesses strong collaboration skills and the ability to clearly communicate complex technical concepts, adapting effectively to diverse situations.

Education

BS, Civil Engineering, California State University, Sacramento

Professional Registrations

Engineer-In-Training
CA No. 180691

Professional Affiliations

- Groundwater Resources Association

Applications & Programing

- AutoCAD/Civil 3D
- SewerCAD

AREAS OF EXPERTISE

- Water Infrastructure

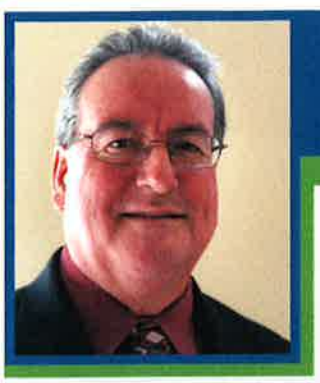
EXPERIENCE

Well No. 8 Pump Station, Town of Discovery Bay, Contra Costa County, CA: *Staff Engineer.* Jameson supported submittal and RFI review, ensuring compliance with project specifications. He delivered timely reviews of submittals and revisions to maintain workflow efficiency. Utilized Civil 3D software to update engineering drawings, addressing all relevant comments and feedback to produce accurate and high-quality plan sets.

Replacement Water Storage Tank Project, Del Oro Water Company, Tulare County, CA: *Staff Engineer.* Collaborated closely with team members to incorporate feedback and make necessary adjustments. Updated engineering drawings in Civil 3D, addressing all comments accurately to develop high-quality plans.

Additional Experience

As a **Civil Engineer Laboratory Assistant** at CSUS, Jameson contributed to the development of work plans and proposals, outlining project details, existing conditions, key issues, and constraints. He facilitated effective communication and collaboration among students. He demonstrated adaptability by responding to experimental needs and ensuring the successful completion of lab exercises. With a strong command of engineering terminology, he effectively communicated technical concepts clearly and concisely.



JACQUES DEBRA

Supervising Water Resources Planner

Years of Experience

30+

Education

BA, Environmental Studies, University of California, Santa Barbara

Professional Affiliations

- Association of California Water Agencies (ACWA)
- American Public Works Association
- American Water Works Association (AWWA)
- DWR County Drought Advisory Group
- WateReuse Association
- Sacramento Area Water Works Association (SAWWA)
- Water Resources Association (WRA)
- Yolo County Water Committee (YCWC)

AREAS OF EXPERTISE

- Ordinances and Policies
- Project Management
- Funding Strategy
- Grant Implementation
- Agency Coordination/ Collaboration
- Outreach
- Instructor/Speaker

Jacques brings over 30 years of experience in public water utilities management, consulting, and as an AWWA water instructor. He planned and implemented watershed, groundwater, and surface water monitoring programs; conjunctive use projects; prepared groundwater management and integrated water resource planning reports; and developed funding strategies to maximize grant funding for local and regional activities. As a utility manager and on behalf of consulting clients, Jacques has secured over $400 million in funding over the last three decades and administered funds for Prop 88, AB 303, Prop 13, Prop 50, Prop 84, Prop 68, Prop 1, WIFIA, and California I-Bank funding programs. He has secured grant funds through every State Proposition funding program since 1988, as well as EPA, WIFIA, and other federal funding programs.

EXPERIENCE

Prop 13 Grants: Davis Deep Aquifer Studies I/II $500,000/$225,000, Meter Retrofit Project $377,000; City of Rohnert Park Meter Retrofit Project $1.2M

Prop 50 Grants: Yolo County IRWMP planning $984,000

Prop 13 & Prop 50 Grants: Bay Area Regional Conservation Program $5M

Prop 84 Grants: Sacramento Westside Integrated Regional Water Management Plan (IRWMP) implementation $11M (2014-16) and $3M for planning

AB 303 Grants: Yolo County Groundwater Monitoring Program $450,000; Davis-UC Davis Groundwater Management Plan $110,000; State-wide Residential End Use Study $784,00; Playfields Artificial Turf Replacement Project $250,000

Prop 204 Grant: Davis Water Supply Feasibility Study $500,000

DWR/USACOE Grants: Yolo County Subsidence Monitoring Program $148,000

DWSRF Grants: City of Newman Cr6 compliance planning $497,000; Palermo Clean Water Consolidation Project construction $11.7M pending approval in 2023

EPA Grant: Pollution Load Reduction Program $100,000

SWRCB Grant: Pollution Load Reduction Program $1M

Loans: East Davis Water Storage Tank/Well 32 $10M, Davis Meter Retrofit Project $3.8M Prop 82 Loan, West Davis Water Storage Tank Project $5M low-interest loan.

Proposition 1 IRWM Grant: Palermo Clean Water Consolidation Project ($525,000)

DWR Small Community Grant Awards: Berry Creek School Water Project $1.35M; Feather Ridge Estates Water Improvement Project $900,000

SGMA: Involved with procurement of over $50M in planning and implementation grants for various GSAs in California.

FRISCH ENGINEERING, INC.

Consulting Electrical Engineers
13405 Folsom Blvd., Unit 600
Folsom, CA 95630

Phone 916.353.1025

Thomas P. Frisch, P.E.

Experience Summary

Mr. Thomas Frisch has worked in the water/wastewater/power/landfill industries since 1991, developing skills in power, controls, instrumentation, and communications. He has become very familiar with most practices and processes used in this industry. His experience is diverse since he has worked as a Contractor and Consultant in various capacities. As a Contractor, he brought contract drawings to completion by designing the final details, making submittals, and managing production. As a Consultant, he has designed over 250 water and wastewater projects ranging from small pump stations to large-scale treatment plants. Consequently, he has a high degree of product knowledge that enables him to minimize design exposure to unproven materials or practices. He understands the challenges that Contractors face in translating plans into construction and knows when to assist on behalf of the Owner. His designs for electrical, instrumentation, and telemetry systems have been very successful with near-zero change orders due to design flaws. His designs include complex PLC motor controls for booster pump stations, lift stations, and motor-operated valves, as well as SCADA telemetry between pump stations and tanks. He has conducted electrical studies, including damage assessments, to determine system capacity and performed cost comparisons to evaluate the electrical operational costs of VFDs versus throttled fixed-speed motors.

Education

B.S. Electrical Engineering, University of California, Los Angeles, 1991

Registration

Professional Electrical Engineer Reg. CA E15761, other states as needed

Work Experience

Electrical Engineer (30 years)

Mr. Frisch obtained his Professional Engineering License in 1998 and, shortly thereafter, began working as a consultant in Electrical Design. Thomas has designed over 800 projects ranging from small sewage lift stations to large (2000 HP total medium voltage) pump stations and treatment plants. During this time, Mr. Frisch has become proficient as a designer, obtained the respect of his peers, and now operates a successful Electrical Engineering design and construction services business.

Prior to consulting, Mr. Frisch worked for Tesco Controls as a Field Service Engineer (4 years), Sales Engineer (1 year), and Project Engineer (3 years). While working for Tesco, he became very familiar with the design philosophies of HDR, Montgomery Watson, Brown and Caldwell, Black & Veatch, Carollo, and others. He engineered and coordinated numerous projects, including full treatment plants in El Dorado Hills, City of Davis, City of Corona, and City of Sanger. He became very familiar with many manufacturers of instrumentation, PLCs, and SCADA systems. He developed and defined many of the standards still in use today at Tesco Controls concerning drafting, testing, and manufacturing.

PASE

Timothy E. Elliott, S.E.

Senior Project Manager

Mr. Elliott is a Professional Structural Engineer with twenty-six years of experience in Structural Engineering analysis, design, and construction, and he has experience in a wide range of projects utilizing various building materials and systems. He has extensive experience with a variety of finite element and other structural analysis computer programs. Mr. Elliott also has experience in 3-D dynamic response spectrum analysis and design of buildings, bridges, and other structures.

Mr. Elliott has completed hundreds of projects in his twenty-six year career, across many different project types including new buildings and building additions for industrial, commercial, residential and institutional use; water, waste water and storm water facilities (pump station and well facilities, water storage tanks, etc.); vehicular and pedestrian bridges; civil infrastructure facilities (culverts, channels, retaining walls, custom junction structures and manholes, etc.); anchorage of equipment and evaluation/retrofit of existing structures.

Registration

California No. C63260 & S4946

Education

M.S. Civil Engineering, University of Delaware, Newark, DE, 1999
B.S. Civil Engineering, University of Delaware, Newark, DE, 1997

Selected Experience

Dry Creek & Del Mesa Pump Stations, Monterey County, CA (In Progress)
McCandless Well Facility, Milpitas, CA (In Progress)
Well 8 Pump Station, Discovery Bay, CA (In Progress)
Mariposa SDPS, Stockton, CA (In Progress)
McCarthy Well Pump Station, Gilroy, CA (In Progress)
South Lakeside Well Pump Station, Counsman, CA (In Progress)
San Pablo Creek Culvert Repair Project, Orinda, CA
San Clemente Pump Station Repairs, Corte Madera, CA
Seismic Evaluation of Steel Water Tanks, Petaluma, CA
Municipal Groundwater Well No. 2, Yuba City, CA
Airpark and Sanchez SDPS, Stockton, CA
North, South, and Recycled Water Pump Stations, Montebello, CA
Del Rio Well 70 and Replacement Well 229, Modesto, CA
Farmers Lane Wells 4-1 and 4-2 and Emergency Well 7, Santa Rosa, CA
Miguelito Pump Station Replacement, San Jose, CA
Grogan Park (Tivoli) Production Well, Modesto, CA
Tracy Hills Pump Station, Tracy, CA
Anderson Property Steel Water Tank, Rohnert Park, CA
North Tank 11 & Pump Station, Modesto, CA
West Tank 12 & Pump Station, Modesto, CA
Roseville Well Buildings, Roseville, CA

DOKKEN ENGINEERING

Amy Bakker

ENVIRONMENTAL LEAD

Education
2013, BA Environmental Science, California State University, Sacramento

Licenses / Certifications
2017, T/E Branchiopod Recovery Permit

Experience
14 years (10 w/ Dokken)

Ms. Amy Bakker, a Senior Environmental Planner with 14 years of experience, is responsible for assisting with the various stages of environmental compliance including environmental construction support, NEPA/CEQA environmental documents, regulatory permits, and technical studies. Amy is exceptionally skilled at delivering defensible CEQA documents, conducting biological surveys, and has strong relationships with the regulatory agencies. She has experience in assisting with Federal and State of California regulatory permitting and compliance with environmental laws and regulations. Amy is skilled in scoping, inventory, and analysis of environmental and biological resources that may be impacted by transportation projects.

As **Environmental Lead**, Amy will be responsible for managing the environmental services team, developing strategies to avoid/minimize environmental impacts, securing CEQA approvals, and delivering environmental tasks on time and within the budget.

Solano Irrigation District Pipelines Project Environmental Services On-Call | Solano County

Project Manager | Dokken is currently providing as-needed biological and cultural resources evaluation services to the District for multiple pipeline construction projects at various locations throughout Solano County. As Project Manager, Amy is responsible for coordination and oversight of all environmental approval documents including CEQA document approvals, biological and cultural resources records searches, field surveys, and preparation of technical memorandums. To date, Dokken has completed more than 40 water distribution projects for the District.

Sweeney/McCune Creek Outflow Recovery and Automation | Solano County

Project Manager | This project constructed an eight-foot-tall weir wall and integrated flume meters and automated discharge gates within the Sweeney and McCune creek confluence for recapturing agriculture irrigation water. Solano Irrigation District acted as CEQA lead and Bureau of Reclamation acted as NEPA lead. Primary constraints for this project included extensive Native American coordination and monitoring for special status species, such as the western pond turtle. As Project Manager, Amy's primary responsibilities included the preparation of the environmental technical studies, the CEQA/ NEPA environmental documents, and all regulatory permits, as well as agency coordination, construction monitoring, and complete project oversight. Construction was completed in November of 2017.

Quail Canyon Improvement District Replacement Well and Pipeline | Solano County

Project Manager | This project will construct a new well and conveyance pipeline in unincorporated Solano County. The new well is necessary to reduce drought impacts of a failing well and increase fire resiliency within the service area. The Project consists of installing and equipping a new 300-foot-deep groundwater well and an approximately 2,600 LF of 10 or 12-inch diameter conveyance pipeline to deliver water from the new well to the existing system. Amy's primary responsibilities included oversight of preparation of the environmental technical studies, CEQA/ NEPA environmental document, agency liaison, and complete project oversight. The project is anticipated to start construction in the fall of 2025.

Pleasant Hills Ranch Estates Drinking Water Treatment Plant | Solano County

Environmental Lead | This project constructed a water purification plant to bring the Pleasant Hills Ranch Estates (PHRE) subdivision into compliance with the Federal and State Safe Drinking Water Act requirements. A transmission line runs 2000 feet along existing roadways to an existing pumping plant that operates a 175 gallon per minute membrane filtration with post chlorination and has 40,000 gallons of storage available. Amy's primary responsibilities included the preparation of the Supplemental Initial Study leading to a Mitigation Negative Declaration, agency coordination, public outreach, and general project management. The treatment plant was constructed in 2018.

On-Call Environmental Services | Santa Cruz County

Task Order Manager | Heavy rains and saturated soils during the winter of 2017 caused multiple storm damage related issues throughout Santa Cruz County requiring emergency repairs for roadways, embankments, and culverts. Dokken provided design and environmental services for 15 of these locations, all of which included both FHWA and FEMA funding. Amy's responsibilities included project management, QA/QC, FEMA liaison, Caltrans liaison, and preparing the regulatory permits.

Additional Relevant Experience

- On-Call Environmental Services | Solano County | Environmental Lead
- Well 12 Water Treatment Plan | Solano County | Environmental Lead
- La Sierra Aquifer Storage and Recovery Well | Carmichael Water District | Environmental Lead

PHELPS & ASSOCIATES
LAND SURVEYORS

632 PETALUMA AVENUE, SEBASTOPOL, CALIFORNIA 95472 / (707)829-0400 / FAX (707)829-0401

Joseph L Hughes

California Professional Land Surveyor – License No. PLS 8992

Education

1997-1999 SRJC Civil Surveying Technology Program Santa Rosa, CA

1993-1997 El Molino High School Forestville, CA

Work experience

1998 - 1998 CARLILE-MACY Santa Rosa, CA

Chain-Man

- I worked as a Chain-man on a two-man crew for the summer months.

1999 - Current Phelps & Associates, Inc. Sebastopol, CA

Project Manager, Party Chief, Instrument Man, GPS Manager, AutoCAD Manager

- I have worked as the Project Manager and Party Chief for many years. I am highly versed with the methodology and background of GPS. I have construction staked, performed boundary / topographic mapping / ALTA / aerial mapping / and elevation certificate surveys. I have also put numerous hours on a CAD station drafting Record of Survey Maps, Topo Maps, Parcel Maps, ALTA's, etc.

2013 - Licensed as a Professional Land Surveyor

Summary of qualifications

At Phelps & Associates I'm involved in every aspect of Surveying. When out in the field I run the crew and coordinate the survey. When in the office, I manage jobs from proposal to completion making sure they are done correctly and completed on time. I've seen and participated in several other events related to surveying. In 2013 I became licensed as a Professional Land Surveyor in the State of California and am a member of the California Land Surveyors Association.

I have had three semesters of the SRJC's Civil Surveying Technology program. The SRJC's program contains surveying skills, AutoCAD experience, roadway design, map drafting, curves vertical and horizontal, solars, staking, level loops, state plane coordinates, traversing, legal description writing, subdivision planning, and boundary surveying.

Interim City Manager
Mary Gourley
mgourley@Cityofsebastopol.gov

City of Sebastopol

AGENDA REVIEW COMMITTEE MEETING OF
WEDNESDAY -March 18, 2026
1:00 pm

AGENDA

In Person Location:
Please Note Location Change: Sebastopol City Hall, 7120 Bodega Avenue, Sebastopol, CA 95472

Call to Order
Roll Call
LAND ACKNOWLEDGEMENT: The City of Sebastopol acknowledges that we live and work within the unceded ancestral homelands of the Southern Pomo and the Coast Miwok people. We pay our respect to the past, present, and future generations of these peoples, including the Federated Indians of Graton Rancheria.

1. Discussion of Upcoming City Council Agendas/Forward Calendars

Adjournment

American Disability Act Accommodations/Accessibility: A request can be made orally or in writing, and submitted to the ADA Coordinator by email: building@cityofsebastopol.org or to the City Clerk's Office so as to avoid delay in reviewing and processing the request. Requests can be made by contacting the ADA Coordinator's Office at (707) 823-8597, via email at building@cityofsebastopol.org or by mailing such a request to the ADA Coordinator's Office located at 7425 Bodega Avenue, Sebastopol, CA. Note that if you contact the ADA Coordinators Office, via mail, you need to make the request early enough that a response can be timely provided.