



W A T E R D E P A R T M E N T

212 Locust St., Suite C, Santa Cruz, CA 95060 • (831) 420-5200 • Fax (831) 420-5201

September 21, 2010

To: Qualified Engineering Firms

Re: *Request for Proposals*
Newell Creek Dam Inlet / Outlet Gate Repairs :
Intake Gate 5 Improvements and Modification

Dear Interested Consultant:

The City of Santa Cruz Water Department (City) requests Proposals from qualified and properly licensed firms (Consultant) to provide professional services for the technical review and preparation of plans and specifications for the Newell Creek Dam (NCD) Inlet / Outlet Gate Repairs Project.

NCD is located on the southern side of Loch Lomond Reservoir in the county of Santa Cruz, approximately 10 miles north of the City of Santa Cruz. Newell Creek Dam was built in 1960 as a zoned earthfill dam that is approximately 195 feet high with a crest length of about 750 feet. The existing intake structure at NCD is an approximately 380 foot long concrete encased and lined 24-inch steel pipe that is secured to the upstream dam slope and extends from the dam crest into the reservoir. It consists of five 12-inch intake gates located within screened valve boxes that allow water into and out of the reservoir which are assigned numbers from 1 to 5 as the pipeline extends down the dam slope into the reservoir. The five intake gates are spaced at twenty-foot vertical intervals between elevations of 550 feet (Intake Gate 1) and 470 feet above mean sea level (Intake Gate 5). Intake Gate 5 is currently covered in sediment, and is submerged in approximately 107 feet of water when the reservoir is spilling. The overall project will consist of dredging and removing sediment from all 5 intakes; replacing the five 12-inch intake/outlet sluice gates, hydraulic operating cylinders, hydraulic lines and proximity switches; replacing 5 trash racks and screens; and modifying Intake Gate 5.

The consultant's scope as part of the project includes the review of the preliminary specifications (Attachment B) and plans (Attachment C) of two anchorage designs and preparing plans and specifications for the final improvements and modifications to the intake structure of Gate 5 on NCD. The improvements to intake Gate 5 will extend the inlet further into reservoir and out of the historical sediment deposits by adding an approximately 60 foot extension and intake screen assembly.

Specifically, the City is looking for an engineering firm to provide the following:

- Review preliminary plans and specifications of two anchorage designs and make final recommendation based on one of the preliminary plans. Alternative anchorage designs will be accepted.
- Prepare final plans and specifications for bidding and construction for the final improvements and modifications to Gate 5. Consultant shall perform structural calculations and seismic analysis to verify that the final design is adequate to resist the anticipated loads with a factor of safety appropriate for a critical purpose structure. Final design shall consider cost, safety and constructability.

- Incorporate the final plans and specifications for Gate 5 to the full project plans and specifications at least 90 calendar days before the scheduled construction in March 2011.
- Prepare a table or worksheet outlining all calculations utilized during the development of the final plans and specifications.
- Prepare an engineer's estimate of construction costs.
- Assistance during the permitting process; limited to questions related to the final design of Gate 5.
- Provide bidding assistance (limited to the final design of Gate 5).
- Provide construction related services including design change orders and submittal review.

Interested firms are asked to submit written proposals for the project on or before Thursday, October 14, 2010.

The proposals shall include the following information:

Project Understanding, Technical Experience, and Qualifications

1. A general description of the Consultant's firm and the firm's qualifications.
2. A detailed description of the following:
 - a. Your understanding of the project and the City's needs. Identify any unclear requirements and possible resolutions.
 - b. Your proposed project approach.
3. A proposed scope of work and time schedule.
4. A listing of the key personnel (including subconsultants) performing the work including a description of their background, qualifications, recent similar experience, and responsibility on this project. Specify individual designated as the project manager.
5. A list and description of similar projects recently completed including dates of service and client. Please provide a cross-reference table showing which project staff from Item 4 was associated with each project(s).
6. Client references, including contact person(s) and current telephone numbers. References should focus on recent projects in which the personnel listed in Item 4 had responsibilities.

Cost Proposal Section

1. A summary table listing the key elements of cost broken down into individual tasks.
2. Task breakdown by individual or subconsultant. Indicate the hourly rate of the individual (or subconsultant) as well as the anticipated number of hours per task. Include other direct costs associated with each element.
3. Assumed costs associated with any unclear requirements mentioned above under Project Understanding, Item 2.
4. Include the total estimated costs for the work and your firm's fee schedule.

Selection Process

The selection of the firm for this project will be based on the firm's qualifications as presented in its proposal, overall price, the experience and success of the firm in completing similar projects, and the firm's ability to provide the services requested. Evaluation factors used to select the Consultant shall include, but not be limited to, the following:

1. The firm's understanding of the project requirements.

2. The project team's experience with similar projects (submerged construction, geotechnical design, seismic analysis, working for a municipal agency, and working with State and Federal Regulators).
3. The project manager's technical qualifications and commitment to this project.
4. The firm's apparent ability to provide the required services in a timely manner.
5. The firm's reputation for integrity and competence.
6. The proposal's strength, principal's involvement, and interview ranking, if applicable.
7. The cost proposal shows a responsible expenditure of public funds without an expectation of change orders.

A selection committee will rank the semi-finalists and will be responsible for negotiating a firm contract price with the highest ranked respondent. If a clear choice is not evident, interviews will be scheduled with those firms of exceptional rating.

Negotiations will begin immediately with the first choice candidate. If an agreement on cost is not reached within fourteen (14) calendar days, the Water Department Director will begin negotiations with the next highest ranked candidate. This process will continue until an agreement is reached or the City decides to re-advertise.

A copy of the Water Department's Standard Professional Services Agreement is included as a reference (Attachment A).

Licensure

Consultant shall be properly licensed and capable of working as a Licensed Engineer in the State of California, and shall be highly qualified in relation to the accepted practices of his/her profession and industry. All subcontractors, if applicable, shall be properly licensed if required. Consultant warrants that he or she has complied with any and all applicable governmental licensing requirements.

City of Santa Cruz Business Tax Certificate/Federal W-9 Form

Upon award of the contract, Consultant shall provide proof of a current City of Santa Cruz business tax certificate if the firm or subcontractor(s) is located in, or performs services within, City limits. For further information, call the Revenue and Taxation division at 831/420-5070.

Consultant shall provide City with a current Federal Tax Form W-9

Non-Response to RFP

In the event your firm decides not to submit a proposal, it would be helpful if you indicated why your firm did not wish to submit a proposal.

Collusive or Sham Proposals

No person, firm, or corporation shall make or file or be interested in more than one proposal for the same work, except so far as alternate proposals may be called for. Nor shall any person, firm, or corporation submit a collusive or sham proposal, per se, directly or indirectly, to induce any other firm to submit such a proposal, or to refrain from responding, or seek in any way to fix the price, or any portion of the proposed price, in order to secure an advantage against the owner or any person interested in a proposed contract. However, a person, firm, or corporation submitting a sub-proposal to a bidder or quoting prices on materials for a bidder, is not hereby disqualified from submitting sub-proposals or quoting prices to other bidders.

Proposal Submittal

Two (2) paper copies and one electronic copy of the project proposal and cost proposal shall be submitted and are to be no longer than 5 pages in length, excluding resumes and attachments. The paper proposal should use a double-sided format and recycled paper and binding materials as much as possible. The preferred method of electronic proposal submission is via email at the address below.

Interested firms should submit their proposal by 4:00 p.m., October 14, 2010 to:

City of Santa Cruz Water Department
212 Locust St., Suite C
Santa Cruz, CA 95060
Attention: Ryan Ernst

The anticipated Award of Contract is no later than October 21, 2011 followed by the Notice to Proceed ten working days later for a contract start date of no later than November 4, 2010.

For technical questions regarding the project and for electronic proposal submission please call Ryan Ernst, at 831/420-5429, FAX 831/420-5201, email rernt@cityofsantacruz.com.

Sincerely,



Ryan Ernst
Assistant Engineer

Attachments:

- Attachment A : Professional Services Agreement
- Attachment B : Preliminary Gate 5 Modification Specifications
- Attachment C : Gate 5 Modification Plans
- Attachment D : The Loch Lomond Sediment Sampling Report by A+ Environmental Solutions dated 11/02/09

Attachment A :
City of Santa Cruz
PROFESSIONAL SERVICES AGREEMENT FOR
NEWELL CREEK DAM INLET / OUTLET GATE REPAIRS :
INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION

THIS AGREEMENT is entered into on _____(date), by and between the City of Santa Cruz, a Municipal Corporation, hereinafter called "City" and **[Consultant's Name]**, hereinafter called "Consultant".

WHEREAS, City desires certain services described in Appendix One, Scope of Work and Consultant is capable of providing and desires to provide these services;

NOW, THEREFORE, City and Consultant for the consideration and upon the terms and conditions specified agree as follows:

SECTION 1
Scope of Services

The services to be performed under this Agreement are set forth in Appendix One, Scope of Work.

SECTION 2
Duties of Consultant

All work performed by Consultant, or under its direction, shall be sufficient to satisfy the City's objectives for entering into this Agreement and shall be rendered in accordance with the generally accepted practices, and to the standards of, Consultant's profession.

Consultant shall not undertake any work beyond the scope of work set forth in Appendix One, Scope of Work unless such additional work is approved in advance and in writing by City. The cost of such additional work shall be reimbursed to Consultant by City on the same basis as provided for in Section 4.

If, in the prosecution of the work, it is necessary to conduct field operations, security and safety of the job site will be the Consultant's responsibility excluding, nevertheless, the security and safety of any facility of City within the job site which is not under the Consultant's control.

Consultant shall meet with Bill Kocher, Department Director, called "Director", or other City personnel, or third parties as necessary, on all matters connected with carrying out of Consultant's services described in Appendix One, Scope of Work. Such meetings shall be held at the request of any party. Review and City approval of completed work shall be obtained monthly, or at such intervals as may be mutually agreed upon, during the course of this work.

SECTION 3
Duties of the City

City shall make available to Consultant all data and information in the City's possession which City deems necessary to the preparation and execution of the work, and City shall actively aid and assist Consultant in obtaining such information from other agencies and individuals as necessary.

The director may authorize a staff person to serve as his or her representative for conferring with Consultant relative to Consultant's services. The work in progress shall be reviewed from time to time by City at the discretion of City or upon the request of Consultant. If the work is satisfactory, it will be approved. If the work is not satisfactory, City will inform Consultant of the changes or revisions necessary to secure approval.

SECTION 4 **Fees and Payments**

For the services performed, the City will pay the Consultant on a time-charge plus expense basis, as charges accrue. Consultant's salary expenses and non-salary expenses will be compensated at the rates set forth in the fee schedule detailed in Appendix Two, Fee Schedule and in accordance with any terms set forth therein. Payment for the Consultant's services in carrying out the entire Scope of Work shall be made within the budget limit, or limits shown in Appendix Two, Fee Schedule . Such payment shall be considered the full compensation for all personnel, materials, supplies, and equipment used by Consultant in carrying out the work. Where conflicts may occur, the provisions of this section apply.

Salary expenses include the actual pay of personnel assigned to the project plus payroll taxes, insurance, sick leave, holidays, vacation, other fringe benefits, overhead costs, and fees. Chargeable time does not include time for meals or other personal time. Consultant shall not charge the City for personnel overtime salary at rates higher than those set forth in the attached fee schedule without the City's prior written authorization.

Non-salary expenses include travel, meals and lodging while traveling, materials (other than normal office supplies), shipping and reproduction costs, equipment rental, services of subconsultants and subcontractors, and other direct, identifiable project related expenses. Markups shall not be charged for non-salary expenses, subconsultants, or subcontractors.

The use of vehicles for travel, including rental vehicles, shall be paid at the current standard business mileage rate as established by the U.S. Internal Revenue Service. Commercial airline travel shall be reimbursed at coach class rates. Lodging, meals, and incidental expenses shall be reimbursed at the current per diem rates established by the U.S. General Services Administration for Santa Cruz County. Receipts must be provided for any single authorized expense incurred costing over \$75. Consultants shall be entitled to 75% of the prescribed meals and incidental expenses for the first and last day of travel and for one day travel if it is longer than 12 hours. It is expected that all expenses associated with travel incurred by the Consultant, while conducting activities on behalf of the City, will be at reasonable rates and that the Consultant will exercise prudence in incurring such expenses.

Budget estimates of the cost of each phase of the project are shown in Appendix Two, Fee Schedule . Variations from the budget for each task are allowed with City approval when such variations are justified by statements indicating personnel time expended and submittal of a revised budget; however, in no event shall the total fee charged for the Scope of Work set forth in Appendix One exceed the budget limit, or limits shown in Appendix Two, Fee Schedule without advance written City authorization in the form of a contract amendment or change order.

Unless otherwise specified in the fee schedule detailed in Appendix Two, Fee Schedule , Consultant's fees shall be payable on monthly invoices. Invoices shall detail the time worked by each class of employee on each task and the expenses incurred for which billing is made. Invoices shall indicate the percent

completion of each work task as identified in Appendix One, Scope of Work and the overall percent completion of the total required services. The monthly invoices shall contain the following affidavit signed by a principal of the Consultant's firm:

"I hereby certify as principal of the firm of (Insert Firm Name), that the charge of (Insert invoice amount) as summarized above and shown in detail on the attachments, is fair and reasonable, is in accordance with the terms of Agreement dated (Insert Agreement Date), and has not been previously paid."

SECTION 5 **Changes in Work**

City may order major changes in scope or character of the work, either decreasing or increasing the scope of Consultant's services. No changes in the Scope of Work as described in Appendix One shall be made without the City's written approval. Any change requiring compensation in excess of the total sum specified in Appendix Two, Fee Schedule shall be approved in advance in writing by the City.

SECTION 6 **Time of Beginning and Schedule for Completion**

Consultant shall begin work upon its receipt of a written Notice to Proceed from Director. The Notice to Proceed shall not be issued until after this Agreement has been approved and authorized by the City Council, or an officer of the City whom the City Council has empowered to approve and authorize such agreements.

The schedule for completion of the work shall be as shown in Appendix Three, Work Schedule. In the event that major changes are ordered, the schedule for completion as stated in Appendix Three, Work Schedule will be adjusted by City so as to allow Consultant a reasonable period of time within which to complete any additional work which may be required as a result of the ordered changes.

In the event Consultant is delayed in performance of its services by circumstances beyond its control, the City will grant Consultant a reasonable adjustment in the schedule for completion as described in Appendix Three, Work Schedule provided that to do so would not frustrate the City's objective for entering into this Agreement. All claims for adjustments in the schedule of completion must be submitted to City by Consultant within thirty calendar days of the time of occurrence of circumstances necessitating the adjustment.

Consultant acknowledges that it is necessary for Consultant to complete its work on or before the completion date set forth in Appendix Three, Work Schedule in order to allow the City to achieve its objectives for entering into this Agreement. The parties therefore agree that time is of the essence in the performance of this Agreement.

SECTION 7 **Termination**

City shall have the right to terminate this Agreement at any time upon giving ten days written notice to Consultant. Consultant may terminate this Agreement upon written notice to City should the City fail to

fulfill its duties as set forth in this Agreement. In the event of termination, City shall pay the Consultant for all services performed and accepted under this Agreement up to the date of termination.

SECTION 8 Insurance

Consultant shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Consultant, his agents, representatives, employees or subcontractors. With respect to General Liability and Errors & Omissions, coverage should be maintained for a minimum of five (5) years after contract completion.

Minimum Scope of Insurance

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage (occurrence Form CG 0001 or Claims Made Form CG 0002); or equivalent.
2. Insurance Services Office Form No. CA 0001, covering Automobile Liability, Code 1 (any auto).
3. Workers' Compensation insurance as required by the State of California.
4. Errors & Omissions Liability insurance appropriate to the consultant's profession. Architects' and engineers' coverage to be endorsed to include contractual liability.

Minimum Limits of Insurance

Contractor shall maintain limits no less than:

- | | |
|--------------------------|---|
| 1. General Liability: | (including operations, products and completed operations)\$1,000,000 per occurrence for bodily injury, personal injury and property damage; \$2,000,000 policy aggregate. |
| 2. Automobile Liability: | \$1,000,000 per accident for bodily injury and property damage. |
| 3. Errors and Omissions: | \$1,000,000 each occurrence; \$2,000,000 policy aggregate. |

Deductible and Self Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the City. If possible, the Insurer shall reduce or eliminate such deductibles or self insured retentions as respects the City, its officers, officials, employees and volunteers; or the Contractor shall provide evidence satisfactory to the City guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

Other Insurance Provisions

The commercial general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City of Santa Cruz, its officers, officials, employees and volunteers are to be covered as additional insureds with respects to liability arising out of work or operations performed by or on behalf of the Consultant; or automobiles owned, leased, hired or borrowed by the Consultant.
2. For any claims related to this project, the Consultant's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees or volunteers shall be excess of the Consultant's insurance and shall not contribute with it.

3. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled by either party, except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the City.
4. Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Subdivision (b) of Section 2782 of the Civil Code.

Acceptability of Insurers

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

Verification of Coverage

Contractor shall furnish the City with a certificate of insurance as evidence of the above coverages and conditions prior to the commencement of work. The certificate is to be signed by a person authorized by that Insurer to bind coverage on its behalf. The certificate holder shall be the City of Santa Cruz, Risk & Safety Management, 809 Center St Room 7, Santa Cruz, CA 95060. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

Subconsultants

Consultant shall include all subconsultants as insureds under its policies or shall furnish separate certificates and endorsements for each subconsultant. All coverages for subconsultants shall be subject to all of the requirements stated herein.

SECTION 9 Indemnification

Consultant agrees to indemnify, defend, and hold harmless the City, its officers, agents and employees, from and against any and all claims, demands, actions, damages, or judgments, including associated costs of investigation and defense arising in any manner from consultant's negligence, recklessness, or willful misconduct in the performance of this agreement.

SECTION 10 Civil Rights Compliance/Equal Opportunity Assurance

Every supplier of materials and services and all consultants doing business with the City of Santa Cruz shall be in compliance with the applicable provisions of the Americans with Disabilities Act of 1990, and shall be an equal opportunity employer as defined by Title VII of the Civil Rights Act of 1964 and including the California Fair Employment and Housing Act of 1980. As such, consultant shall not discriminate against any person on the basis of race, religious creed, color, national origin, ancestry, disability, medical condition, marital status, age or sex with respect to hiring, application for employment, tenure or terms and conditions of employment. In addition, the City of Santa Cruz, as defined in Resolution NS-20,137 and Ordinance 92-11, further prohibits discrimination on the basis of sexual orientation, height, weight and physical characteristics. Consultants agree to abide by all of the foregoing statutes, regulations, ordinances and resolutions.

SECTION 11 Legal Action/Attorneys' Fees

If any action at law or in equity is brought to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees in addition to any other relief to which he or she may be entitled. Either the Santa Cruz County Superior or Municipal Court shall have jurisdiction over any such action, and that Court shall be authorized to determine which party is the prevailing party and what amount constitutes reasonable attorneys' fees to be awarded to the prevailing party.

SECTION 12

Assignment

This Agreement shall not be assigned without first obtaining the express written consent of the Director after approval of the City Council.

SECTION 13

Amendments

This Agreement may not be amended in any respect except by way of a written instrument which expressly references and identifies this particular Agreement, which expressly states that its purpose is to amend this particular Agreement, and which is duly executed by the City and Consultant. Consultant acknowledges that no such amendment shall be effective until approved and authorized by the City Council, or an officer of the City when the City Council may from time to time empower an officer of the City to approve and authorize such amendments. No representative of the City is authorized to obligate the City to pay the cost or value of services beyond the scope of work set forth in Appendix One. Unless expressly authorized by the City Council, Consultant's compensation shall be limited to that set forth in Appendix Two, Fees and Services.

SECTION 14

Miscellaneous Provisions

1. Project Manager. Director reserves the right to approve the project manager assigned by Consultant to said work. No change in assignment may occur without prior written approval of the City.
2. Consultant Services Only. Consultant is employed to render professional services only and any payments made to Consultant are compensation solely for such professional services.
3. Licensure. Consultant warrants that he or she has complied with any and all applicable governmental licensing requirements.
4. Other Agreements. This Agreement supersedes any and all other agreements, either oral or in writing, between the parties with respect to the subject matter, and no other agreement, statement or promise related to the subject matter of this Agreement which is not contained in this Agreement shall be valid or binding.
5. City Property. Upon payment for the work performed, or any portion, all drawings, specifications, records, or other documents generated by Consultant pursuant to this Agreement, or any other work product of Consultant, are, and shall remain, the property of the City whether the project for which they are made is executed or not. The Consultant shall be permitted to retain copies, including reproducible copies, of drawings and specifications for information and reference in connection with the City's use and/or occupancy of the project. The drawings, specifications, records, documents, and Consultant's

other work product shall not be used by the Consultant on other projects, except by agreement in writing and with appropriate compensation to the City.

6. Consultant's Records. Consultant shall maintain accurate accounting records and other written documentation pertaining to the costs incurred for this project. Such records and documentation shall be kept available at Consultant's office during the period of this Agreement, and after the term of this Agreement for a period of three years from the date of the final City payment for Consultant's services.
7. Independent Contractor. In the performance of its work, it is expressly understood that Consultant, including Consultant's agents, servants, employees, and subcontractors, is an independent contractor solely responsible for its acts and omissions, and Consultant shall not be considered an employee of the City for any purpose.
8. Conflicts of Interest. Consultant stipulates that corporately or individually, its firm, its employees and subcontractors have no financial interest in either the success or failure of any project which is, or may be, dependent on the results of the Consultant's work product prepared pursuant to this Agreement.
9. MacBride Principles/Peace Charter. The City Council of the City of Santa Cruz approved Resolution No. NS-19,378 on the 24th day of July 1990, endorsing the MacBride Principles and the Peace Charter and encourages all companies doing business in Northern Ireland to abide by the MacBride Principles and the Peace Charter.
10. Notices. All notices herein provided to be given, or which may be given by either party to the other, shall be deemed to have been fully given and fully received when made in writing and deposited in the United States mail, certified and postage prepaid, and addressed to the respective parties as follows:

CITY

Richard C. Wilson
City Manager
809 Center Street
Santa Cruz, CA 95060

CONSULTANT

[Name
Company Name
Address
Address]

Technical Review by:

Linette Almond, P.E., Deputy Water Director/Engineering Manager

Approved As To Form:

_____ Date: _____
John G. Barisone, City Attorney

Department Approval by:

Bill Kocher, Water Director

CONSULTANT

By _____ Date _____
Name

CITY

By _____ Date _____
Richard C. Wilson, City Manager

APPENDIX ONE
Scope of Services

[WILL BE COMPLETED BY CITY FROM CONSULTANT'S PROPOSAL]

APPENDIX TWO
Fee Schedule

[WILL BE COMPLETED BY CITY FROM CONSULTANT'S PROPOSAL]

APPENDIX THREE
Work Schedule

[WILL BE COMPLETED BY CITY FROM CONSULTANT'S PROPOSAL]

Attachment B :

CITY OF SANTA CRUZ WATER DEPARTMENT

PRELIMINARY GATE 5 MODIFICATION SPECIFICATIONS

FOR

NEWELL CREEK DAM INLET / OUTLET GATE REPAIRS :
INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION

The following specification sections were selected to support the preliminary 50% Draft Plans (See Gate 5 Modification Plans, Sheets 1 thru 4) and provide general and project background for both anchorage designs under review. The following sections were taken from the 50% Draft Specifications and Contract Documents for Newell Creek Dam Inlet / Outlet Gate Repairs dated 4/28/10.

5.7 CONCRETE STRUCTURES

All concrete shall be Portland cement Class A concrete with a compressive strength at 28 days of 3000 lbs/in², a minimum of 565 pounds of cement per cubic yard of concrete by weight, and a slump range of 2 to 4 inches. City shall be responsible for strength testing of concrete.

All concrete work including pre-cast foundation slabs shall be performed above the water surface whenever possible.

Steel rebar material and construction shall be grade 40 or better. Rebar shall be from new stock free from rust, dirt or oil and other coating which adversely affect bonding capacity.

5.7.1 Foundation

All foundation slabs shall be pre-cast above the water surface and allowed to cure prior to installation per American Concrete Institute (ACI) 302.1R, latest revision, Guide for Concrete Floor and Slab Construction. All foundation reinforcing bars shall be accurately set and securely held in place to maintain positions during placement of concrete. All reinforcing steel shall be grade 40 rebar or better from new stock free from rust, dirt or oil and other coating which adversely affect bonding capacity conforming to ASTM A615. Reinforcing bar bends and standard hooks shall conform to ACI 318, latest revision. All bends shall be standard hooks unless otherwise noted. All bars shall be in single length runs as shown without splices.

5.7.1a Foundation Sub-grade Preparation

After dredging the Gate 5 Modification Pipe Anchor Assemblies and Screen Assembly foundation sites shall be free of deleterious material and scarified to a field determined and approved depth to minimize post construction settling. This field determined depth shall be agreed upon between the Contractor and Project Engineer prior to any foundation installations based on site conditions, visual inspection, experience, and requirements of regulatory agencies. Preliminary investigations estimate this depth which is included in the dredged volume estimate to be less than one foot. Refer to the Marine Geophysical Survey Loch Lomond Reservoir, California by Sea Engineering, Inc. dated 12/15/08 and The Loch Lomond Sediment Sampling Report by A+ Environmental Solutions dated 11/02/09 for additional information and site conditions. An area shall be cut as horizontally as possible into the perpendicular approximately

thirty percent NCD face slope as required to install the foundations flush with the existing ground but not to exceed a depth of three feet or as required by the State of California Department of Water Resources Division of Safety of Dams to provide level areas for the foundations. The foundation sub-grade shall include 9 inch wide by 24 inch deep edge beam excavations for the Gate 5 Modification Screen Assembly Foundation. All excavated materials not used as fill and dredged materials shall be relocated to the dredge disposal sites per Section 4.2.13 Environmental Protection. Temporary excavation spoil piles shall be located at elevations below adjacent work sites.

5.7.1.b Visual Inspection

Video or photographic documentation throughout submerged construction shall be provided whenever possible by the Contractor. The minimum requirement for video or photographic documentation shall include the foundation sub-grade preparation and final equipment installation visual inspections or as requested by the Project Engineer. Final project completion and acceptance shall be dependent on acceptable visual inspection of video or photographic documentation as determined by the Project Engineer.

5.7.1.c Gate 5 Modification Screen Assembly Foundation

The Gate 5 Modification foundation slab shall be 4.5' X 9.5' X 0.75' concrete with one grid #5 rebar @ 12 inches on center both ways centered in the slab width. The slab edges perpendicular to the slope of NCD shall have 9 inch wide by 24 inch deep edge beams with one additional #5 rebar longitudinally located 4.5 inches from the bottom of the edge beam width and spliced into all perpendicular #5 rebar @ 12 inches on center from the slab. During installation the foundation edge beams and slab shall be aligned within the sub-grade excavations to uniformly distribute the assembly load and prevent post construction lateral movement.

5.7.1.d Gate 5 Modification Pipe Anchor Assembly Foundation

The Pipe Anchor Assemblies shall be constructed above the water surface and installed at 9 foot spacing intervals flush with the existing ground after completion of the foundation sub-grade preparation. The pipe anchor foundation shall be a 3.5' X 2' X 1' concrete slab with #5 rebar at 18" OC both ways embedded 4" from the slab surface.

5.8 PIPING

5.8.1 Ductile Iron Pipe

All Ductile Iron water pipe and appurtenances shall be Class 150 conforming to AWWA C151 for pipe and AWWA C110 for appurtenances. Fittings and appurtenances shall also conform to AWWA Standards and Part II Materials Specifications of the City of Santa Cruz Standard Specifications for the Installation of Water Mains, current version. Pipe interior shall be cement mortar lined in accordance with AWWA Standard C104, latest revision. Pipe exterior shall be coated as required in Part II Materials Specifications of the City of Santa Cruz Standard Specifications for the Installation of Water Mains, current version, unless otherwise specified. Fittings shall be coated with fusion bonded epoxy inside and out in accordance with AWWA C116 and constructed of the same material as the pipe unless otherwise specified. Joints between valves and other fittings shall be flanged, assembled in accordance with the manufacturer's instructions, and be fitted with nitrile gaskets.

5.8.2 High Density Polyethylene Pipe

The High Density Polyethylene (HDPE) pipe and appurtenances shall be AWWA C-906 DR-11 or approved equal with butt-fused joints, AWWA C228 stainless steel bolt rings, ductile iron pipe size (DIPS) flange adaptors, and stainless steel bolts and nuts. Assemble the HDPE pipes and flanges above the water surface before construction begins or as required to facilitate easier installation. The Contractor is responsible for testing all fusible joints in accordance with AWWA C-906 standards.

5.8.3 Coatings and Paint

The Contractor shall furnish all labor, materials, equipment and incidentals necessary to provide protective coatings and paint to all surfaces as shown on the Drawings and described herein. The work shall include, but not necessarily be limited to, cleaning, surface preparation, application, touchup, repair and all related work. All exposed piping, valves, and metal appurtenances shall be painted. Surfaces to be painted shall be clean, dry, and all foreign materials shall be removed from the surface. Iron and steel surfaces shall be prepared in accordance with the surface preparation specifications of the Steel Structures Painting Council (SSPC). The minimum surface preparation shall be SSPC-SP3. All exposed metal pipe, valves, conduits and fittings shall be primed with one coat of No. 621-04 red (ALKYD) Blox-Rust metal primer or approved equal. This shall be followed with two coats of forest green 312-81 heavy-duty enamel, non-VOC epoxy, or approved equal to match the nearest structure's paint color. Stainless steel or other corrosion resistant components do not require coating or painting unless specifically directed by the Project Engineer.

5.10 Pipe Anchor Assembly

The Pipe Anchor Assemblies shall be constructed above the water surface and installed at 9 foot spacing intervals flush with the existing ground after completion of the foundation sub-grade preparation. The pipe anchor assembly shall consist of two fabricated stainless steel 14" pipe anchor hold downs mounted by four stainless steel ¾" X 8" anchor bolts at 4" from the edge of a 3.5' X 2' X 1' concrete slab with #5 rebar at 18" OC both ways. The pipe anchor hold downs shall be 6" wide by 23.5" long by ½" thick with a half circle 14" diameter pipe brace, four ¼" thick lateral reinforcements, four 7/8" anchor bolt holes each at 1.75" from the slab outside edge or approved equal. The ¾" X 8" anchor bolts shall be cast in place or installed at approximately 5" of depth in the 3.5' x 2' x 1' concrete slab with the "I" or "J" end below the rebar reinforcement located 4" from the slab surface. The Contractor is responsible for confirming that the Pipe Anchor Assembly design meets the pipe manufacturer's design criteria for the site conditions. The specific pipe anchoring system design shall be approved prior to installation by the Project Engineer and shall be in accordance with all regulatory agencies and state, federal, and locals rules and regulations.

5.11 Gate 5 Modification

The lowest intake/outlet gate, Gate 5, is connected to the Newell Creek Dam (NCD) Intake Structure at elevation 470 feet, approximately 108 feet underwater when Loch Lomond Reservoir is full. Historical records and a recent bathymetric study indicate that Gate 5's location is subject to sedimentation buildup that has prevented gate operation. The Gate 5 Modification includes an approximately sixty foot extension and screen assembly to relocate the gate inlet/outlet opening out of this high sedimentation zone.

5.11.1 Screen Assembly

The Gate 5 Modification Screen Assembly shall meet or exceed Department of Fish and Game and California Regional Water Quality Board Fish Screening Criteria, an alternative design submitted by the Contractor shall be approved by the Project Engineer and in compliance with requirements of the regulatory agencies. The Gate 5 Modification Screen Assembly consists of a 12" DI pipe 90° base bend, 4.5' X 9.5' X 0.75' concrete foundation, and stainless steel fabricated intake screen. The 12" DI pipe 90° base bend shall be AWWA C151 ductile iron (DI) or approved equal with fusion-bonded epoxy interior and exterior coating conforming to AWWA C104, latest revision. The base bend shall be mounted to the Screen Assembly concrete slab foundation per fitting manufacturer's specifications with four 7/8" x 9" anchor bolts. The screen shall be a Hendrick Screen Company stainless steel 36" diameter x 54" screen with 1/2" slot width #125 V-wire and AWWA C226 flange or approved equal. All screen designs shall be ASTM A276 stainless steel material and construction with a Class 150 12" flanged inlet connection with insulated flanged joint to prevent galvanic corrosion. All hardware that comes into contact with the stainless steel screen shall either be stainless steel or be insulated to protect against galvanic corrosion as shown on the Plans and shall be approved by the Project Engineer. Unless otherwise specified by the Project Engineer, the screen slot entrance velocity shall not exceed 0.5 fps at an 8 million gallon per day (MGD) maximum flow rate per DFG Fish Screening Criteria. The intake screen construction shall include an integral stainless steel flow distributing core tube or approved equal to reduce slot entrance velocity.

5.11.2 12" X 54' HDPE Pipe

Approximately fifty four feet of AWWA C-906 DR-11 12" HDPE pipe or approved equal shall connect the 54 inch pipe spool at the Gate 5 valve box to the screen assembly with fusible flanged connections per pipe manufacturer's specifications and as shown on the Project Plans. The fusible flange adaptor shall have a butt-fused joint and a ductile iron pipe size (DIPS) AWWA C228 stainless steel bolt ring with all stainless steel bolts, nuts, and washers. Assemble the HDPE pipes and flanges above the water surface before construction begins or as required to facilitate easier installation. The Contractor is responsible for testing all fusible joints in accordance with AWWA C-906 standards.

5.11.3 Valve Vault Modification

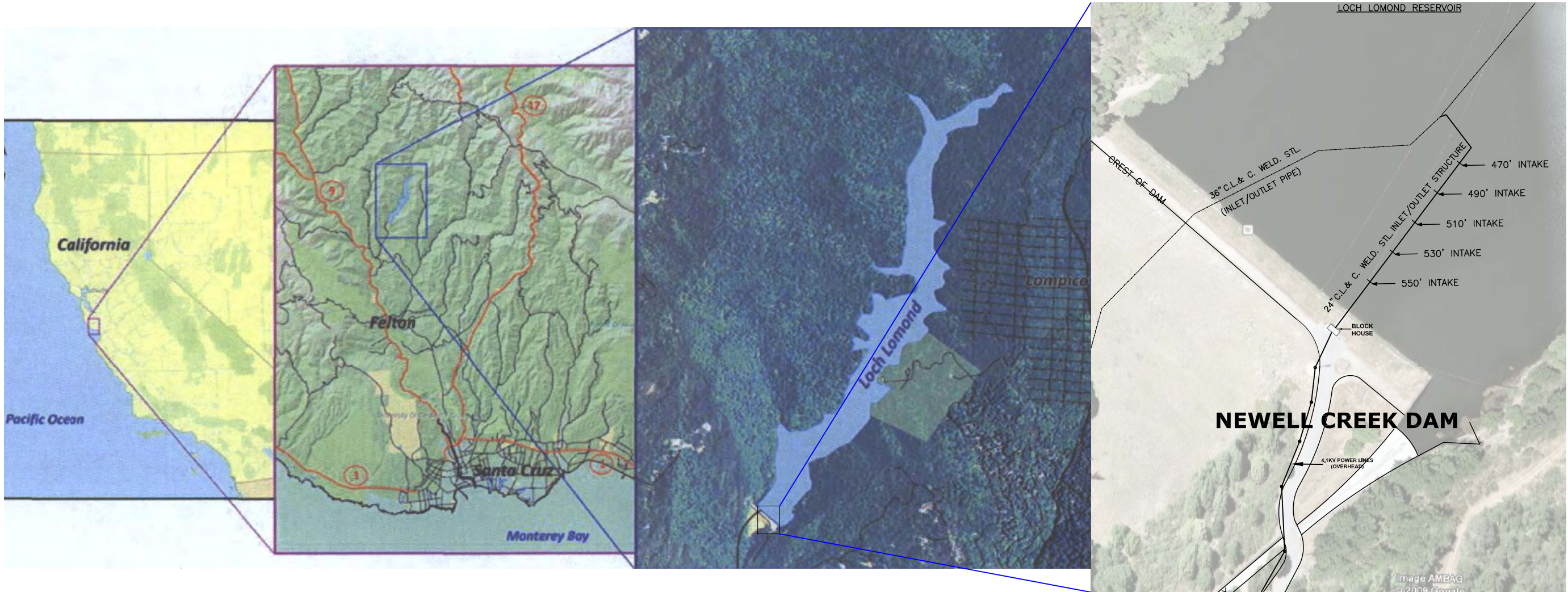
Excavate to at least 12 inches deep by approximately 10 feet long or as required to install the 12" X 54" HDPE pipe spool to the knife gate and allow enough space to connect the 12" X 54' HDPE pipe extension. The excavation shall be 4 feet wide at the valve box, taper down to the pipe width in 10 feet, and have a 1 to 10 slope from the 12 inch excavation depth at the valve box to the existing ground surface and new pipe alignment 10 feet away or as required by the pipe manufacturer's specifications. The excavation shall allow the 12" X 54' HDPE pipe to gradually bend to the new alignment per pipe manufacturer's specifications. Saw cut a minimum of a 20 inch diameter hole or as required in the existing valve box to allow the pipe flange of the 12" X 54" HDPE pipe spool to be connected to the knife gate. Connect the assembled 12" X 54" spool to the knife gate with stainless steel bolts, nuts, and washers through the valve box saw cut and grout into place per ACI 546.2R for underwater repair of concrete. The Gate 5 Modification 12" X 54' HDPE pipe extension shall be mounted to the 12" X 54" HDPE pipe spool with AWWA C228 stainless steel bolt rings, ductile iron pipe size (DIPS) flange adaptors, and stainless steel bolts, washers and nuts. The existing valve vault shall be sealed at all openings including a valve vault cover to prevent sedimentation and debris from preventing reliable valve operation. The new valve vault cover shall be a hot dipped galvanized (HDG) ASTM 572 Grade 50 7.5' x 4.5' x 1/2" steel plate or other corrosion resistant material as approved by the Project Engineer. The existing 3/4" x 8" anchor bolts are located on the shorter sides of the trash rack at 18" OC as

shown. If reuse of the existing 3/4" x 8" anchor bolts is possible, do not install the nuts when installing the new valve vault cover. Remove the existing 3/4" x 8" trash rack anchors if necessary to remove the existing trash rack and screen. Install four new stainless steel 7/8" x 9" anchor bolts at 24" OC as shown with stainless steel nuts and washers with two inches of bolt extending above the valve vault cover. The valve vault cover shall have six 1.5" anchor bolt holes at 18" OC which line up with the existing six anchor bolts and four 1" anchor bolt holes at 24" OC for new anchor bolts as shown. All the anchor bolts are centered in the shorter sides of the 9" wide valve box walls. All the valve vault cover anchor bolt holes are located 1 1/2" (1.5") from the shorter outside edge as shown.



WATER DEPARTMENT

NEWELL CREEK DAM INLET/OUTLET GATE REPAIRS : INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION



EXPANDED VIEW SITE MAP



INDEX

SHEET	DRAWING NAME
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3	DEAD LOAD ANCHORAGE
4	DEAD LOAD SCREEN ASSEMBLY DETAILS
5	HELICAL SCREW ANCHORAGE
6	HELICAL SCREW SCREEN ASSEMBLY DETAILS

		CITY OF SANTA CRUZ WATER DEPARTMENT 212 Locust Street, Suite C Santa Cruz, CA 95060	
AUTHORIZED RCE NO.		DATE	
DATE:	09/20/2010	INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION	SCALE: NTS
DESIGNER:	R. ERNST		SHEET 1 OF 6
CHECKED:	IR		DRAWING NO. 3728B
CWO NO.:	09 - 010	TITLE SHEET AND EXPANDED VIEW SITE MAP	

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GENERAL AND CITY OF SANTA CRUZ WATER DEPARTMENT NOTES

- ALL WORK ON THE WATER SYSTEM SHALL BE IN CONFORMANCE WITH THE CITY OF SANTA CRUZ WATER DEPARTMENT STANDARD SPECIFICATIONS, LATEST REVISION.
- AT THE TIME OF BID OPENING AND THROUGHOUT CONSTRUCTION ACTIVITIES THE CONSTRUCTION CONTRACTOR SHALL HOLD A VALID CLASS A CONTRACTOR'S LICENSE, COMMERCIAL DIVING LICENSES, AND CERTIFICATIONS PER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910, SUBPART T - COMMERCIAL DIVING OPERATIONS.
- THE CONSTRUCTION CONTRACTOR SHALL SUBMIT AT LEAST 2 COPIES OF THE PROJECT SCHEDULE AND SUBMITTALS FOR ALL MATERIALS THAT WILL BECOME THE PROPERTY OF SCWD. DELIVER TO THE PROJECT ENGINEER PRIOR TO START OF CONSTRUCTION AND WITH SUFFICIENT TIME TO VERIFY COMPLIANCE: 212 LOCUST STREET, SUITE C SANTA CRUZ, CA 95060
- A MINIMUM OF TWO WORKING DAYS ADVANCED WRITTEN NOTICE SHALL BE GIVEN TO THE CITY OF SANTA CRUZ WATER DEPARTMENT (SCWD) BEFORE ANY PORTION OF THE CONSTRUCTION BEGINS. A MINIMUM OF THREE WORKING DAYS ADVANCED NOTICE SHALL BE GIVEN TO THE SCWD IN ORDER TO SCHEDULE A SHUT DOWN OF THE SYSTEM. VALVES CONNECTED TO THE EXISTING SYSTEM SHALL BE OPERATED BY SCWD PERSONNEL ONLY. SCWD SHALL NOT BE HELD RESPONSIBLE FOR CONSTRUCTION DELAYS DUE TO INABILITY TO OBTAIN A COMPLETE SHUTDOWN.
- THE CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE IN A NEAT AND CLEAN CONDITION AT ALL TIMES. ALL TRASH SHALL BE REMOVED FROM THE SITE AS NEEDED AND AT THE END OF EACH WORK DAY. AREAS SHALL BE SWEEPED AS NEEDED AND AT THE END OF EACH WORK DAY. IF DUST PROBLEMS SHOULD OCCUR, DUST CONTROL SHALL BE PROVIDED BY THE CONTRACTOR AT CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE SCWD AND OTHER REGULATORY AGENCIES.
- CONTRACTOR SHALL KEEP ON SITE AND READY AT ALL TIMES DURING CONSTRUCTION ALL EQUIPMENT AND MATERIALS NEEDED TO BE IMPLEMENTED TO ENSURE THE PROTECTION OF ALL SURFACE WATER BODIES AND STORM DRAIN SYSTEMS FROM RUNOFF WHICH MAY BE CONTAMINATED BY SEDIMENT, SAW CUT SLURRY OR OTHER POLLUTION IN THE EVENT OF EMERGENCY WATER FACILITY BREAKAGE, DREDGING ACTIVITY, OR WET WEATHER EVENT THAT MAY ERODE STOCKPILES OR EXPOSED SOIL AREAS.
- THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR USE OF ADEQUATE TOILET FACILITIES AT THE WORK SITE. SUCH FACILITIES SHALL BE SUBJECT TO THE ACCEPTANCE OF THE CITY AS TO LOCATION AND TYPE.
- ALL WORK DONE AND ALL MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE SUBJECT TO THE INSPECTION AND APPROVAL OF THE ENGINEER. THE ENGINEER AND ENGINEER'S REPRESENTATIVES SHALL AT ALL TIMES HAVE ACCESS TO THE WORK DURING ITS CONSTRUCTION AND SHALL BE FURNISHED WITH EVERY REASONABLE FACILITY AND ASSISTANCE FOR ASCERTAINING THAT THE MATERIALS AND THE WORKMANSHIP ARE IN ACCORDANCE WITH THE REQUIREMENTS AND INTENT OF THE CONTRACT DRAWINGS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL COMPARE THESE DRAWINGS WITH EXISTING CONDITIONS AT THE SITE AND WITH ALL OTHER APPLICABLE DRAWINGS. THE CONTRACTOR SHALL VERIFY MEASUREMENTS OF ALL EXISTING FEATURES AFFECTING THEIR WORK, AND SHALL REPORT ANY DISCREPANCIES TO THE SCWD ENGINEER FOR CLARIFICATION AND ADJUSTMENT BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS SHOWN ON THESE DRAWINGS WITH THE REQUIREMENTS OF EXISTING CONDITIONS AND ALL RELATED NEW EQUIPMENT.
- ALL CONCRETE SHALL BE PORTLAND CEMENT CLASS A CONCRETE WITH A COMPRESSIVE STRENGTH AT 28 DAYS OF 3000 LBS/IN2, A MINIMUM OF 565 POUNDS OF CEMENT PER CUBIC YARD OF CONCRETE BY WEIGHT, AND A SLUMP RANGE OF 2 TO 4 INCHES. CITY SHALL BE RESPONSIBLE FOR STRENGTH TESTING OF CONCRETE AS REQUIRED.
- REFER TO THE AMERICAN CONCRETE INSTITUTE (ACI) 302.1R, LATEST REVISION, GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION FOR THE GATE 5 MODIFICATION SCREEN ASSEMBLY FOUNDATION AND TO ACI 546.2R, LATEST REVISION, GUIDE TO UNDERWATER REPAIR OF CONCRETE FOR CONCRETE GROUT.
- ALL REINFORCING BARS, ANCHOR BOLTS, INSERTS, AND OTHER EMBEDDED HARDWARE SHALL BE ACCURATELY SET AND SECURELY HELD IN PLACE TO MAINTAIN POSITIONS DURING PLACEMENT OF CONCRETE. ALL REINFORCING STEEL SHALL BE GRADE 40 REBAR FROM NEW STOCK FREE FROM RUST, DIRT OR OIL AND OTHER COATINGS WHICH ADVERSELY AFFECT BONDING CAPACITY CONFORMING TO ASTM A615. REINFORCING BAR BENDS AND STANDARD HOOKS SHALL CONFORM TO ACI 318-05. ALL BENDS SHALL BE STANDARD HOOKS UNLESS OTHERWISE NOTED. ALL BARS SHALL BE IN SINGLE LENGTH RUNS AS SHOWN WITHOUT SPLICES.
- REFER TO THE MARINE GEOPHYSICAL SURVEY LOCH LOMOND RESERVOIR, CALIFORNIA BY SEA ENGINEERING, INC. DATED 12/15/08 AND THE LOCH LOMOND RESERVOIR SEDIMENT SAMPLING REPORT BY A+ ENVIRONMENTAL SOLUTIONS DATED 11/02/09 FOR ADDITIONAL INFORMATION ON SITE CONDITIONS SUCH AS BATHYMETRY, GEOPHYSICAL ATTRIBUTES, AND SOIL CHARACTERISTICS.
- THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT ENGINEER TO ENSURE ALL INSPECTION AND PERMIT REQUIREMENTS ARE FULFILLED FOR VARIOUS AGENCIES INCLUDING BUT NOT LIMITED TO THE CITY OF SANTA CRUZ, STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES DIVISION OF SAFETY OF DAMS (DSOD), CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, AND ARMY CORPS OF ENGINEERS HEREINAFTER REFERRED TO AS REGULATORY AGENCIES.
- PRIOR TO INSTALLATION BY DIVERS PER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910, SUBPART T - COMMERCIAL DIVING OPERATIONS, THE CONTRACTOR SHALL CONSTRUCT, ABOVE THE WATER SURFACE, THE KNIFE GATE VALVE ASSEMBLIES, THE PIPE ANCHOR ASSEMBLIES, GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY, AND TWO HDPE PIPE SEGMENTS COMPLETE WITH BUTT-FUSED JOINTS, STAINLESS STEEL 12" BOLT RINGS, 12" DUCTILE IRON PIPE SIZE (DIPS) FLANGE ADAPTORS, AND STAINLESS STEEL BOLTS, WASHERS, AND NUTS.
- THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND MAINTAINING A SAFE WORK ENVIRONMENT AND MINIMIZING ENVIRONMENTAL IMPACTS INCLUDING BUT NOT LIMITED TO LOCH LOMOND RESERVOIR AND NEWELL CREEK TURBIDITY MONITORING. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF SANTA CRUZ AND REGULATORY AGENCIES TO DEVELOP ADEQUATE ENVIRONMENTAL CONTROLS, CONSTRUCTION PROCEDURES, OSHA APPROVED COMMERCIAL DIVING SAFE PRACTICES, AND AN APPROVED WRITTEN ENVIRONMENTAL PLAN OF ACTION PRIOR TO CONSTRUCTION ACTIVITIES.

MATERIALS NOTES

- ALL CONDUCTORS SHALL BE 12 AWG OR LARGER 600V THWN MOISTURE RESISTANT CLASS B STRANDED UNLESS OTHERWISE STATED. ALL SUBMERGED CONDUCTORS SHALL MEET OR EXCEED NATIONAL ELECTRICAL CODE (NEC) DIRECT BURIED REQUIREMENTS FOR SIGNAL CABLES AND HAVE SCOTCHLOCK CAST RESIN KITS OR APPROVED EQUAL AT ALL SPLICES AND CONNECTIONS.
- ALL HYDRAULIC HOSES AND CONNECTORS SHALL HAVE A MINIMUM INSIDE DIAMETER OF $\frac{3}{8}$ " AND BE SAE J517 APPROVED FOR MARINE APPLICATIONS AND NSF APPROVED FOR USE IN POTABLE WATER SYSTEMS.
- THE KNIFE GATES SHALL BE 12" CAST 316 STAINLESS STEEL ROVALVE S17D12 OR APPROVED EQUAL AND HAVE ONLY STAINLESS STEEL WETTED PARTS AND HARDWARE.
- THE 12" SPOOL PIECE SHALL BE AN AMES STAINLESS STEEL 12" X 12" X 6" AWWA C226-06 CLASS 150 12" STAINLESS STEEL FLANGED SPOOL WITH AWWA C228-08 CLASS 150 FLANGES OR APPROVED EQUAL. THE 12" SPOOL PIECE SHALL BE DRILLED THROUGH TO ANSI B16.5/150 STANDARDS ON THE VALVE SIDE AND BE CAPABLE OF BEING MOUNTED ON A CONCRETE WALL BY TWELVE $\frac{7}{8}$ " INCH DIAMETER STAINLESS STEEL ANCHOR BOLTS ON A 17 INCH DBC.
- THE STAINLESS STEEL HYDRAULIC ACTUATOR SHALL BE ANSI/AWWA C541-08 APPROVED AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS. THE STAINLESS STEEL HYDRAULIC ACTUATOR SHALL BE ANSI/AWWA C541-08 RDC MODEL HC3.25-A8D1MZ OR APPROVED EQUAL. THE HYDRAULIC OIL SHALL CONFORM TO NSF AND ANSI/AWWA C541-08 SPECIFICATIONS FOR USE IN POTABLE WATER SYSTEMS.
- THE PROXIMITY SWITCHES SHALL BE GO SWITCH MODEL 73-13528-3DD OR APPROVED EQUAL.
- THE SELECTED TRASH RACK AND SCREEN ASSEMBLIES FOR GATES 1 THRU 4, GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY INCLUDING FABRICATED INTAKE SCREEN, AND PIPE ANCHOR ASSEMBLIES INCLUDING STAINLESS STEEL PIPE ANCHOR HOLD DOWNS SHALL BE ASSEMBLED, APPROVED BY THE PROJECT ENGINEER, AND AVAILABLE ON SITE BEFORE SUBMERGED CONSTRUCTION BEGINS. THE GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY AND PIPE ANCHOR ASSEMBLY FOUNDATIONS SHALL BE CAST ABOVE THE WATER, ASSEMBLED PER PROJECT PLANS,AND INSPECTED BY THE PROJECT ENGINEER PRIOR TO INSTALLATION.
- ALL HOT DIPPED GALVANIZED (HDG) COMPONENTS INCLUDING BUT NOT LIMITED TO THE GALVANIZED TRASH RACK, IF SELECTED, AND GATE 5 VALVE VAULT COVER SHALL BE ASTM A-123, ASTM A-153, ASTM A-143, ASTM A-384, AND ASTM A-385 COMPLIANT. THE HDG ASSEMBLY SHALL BE GRADE 100 WITH A MINIMUM GALVANIZED THICKNESS OF 3.9 MILS OR 100 MICRONS. ALL HDG COMPONENTS SHALL BE INSPECTED AND APPROVED BY THE PROJECT ENGINEER PRIOR TO INSTALLATION. ANY DAMAGED AREAS SHALL BE REPAIRED IN ACCORDANCE WITH ASTM A-780.
- IF THE GALVANIZED TRASH RACK IS SELECTED, THE TRASH RACK SHALL HAVE 6"X $\frac{1}{2}$ "X6'10" FLAT BARS AT 4" ON CENTER WITH $\frac{3}{4}$ " REINFORCEMENT AND 4' X 6' 10" STAINLESS STEEL EXPANDED METAL #16 OR #18 SCREEN WITH $\frac{1}{2}$ " MESH AND FOUR STAINLESS STEEL 4"X $\frac{1}{4}$ " SQUARE WASHERS, $\frac{1}{2}$ " X 9" J-BOLTS, AND $\frac{1}{2}$ " NUTS PER ASSEMBLY, SEE SHEET 5. ALTERNATIVE INTAKE TRASH RACK SCREEN DESIGNS MAY BE SUBMITTED FOR APPROVAL BY THE PROJECT ENGINEER.
- IF THE STAINLESS STEEL TRASH RACK IS SELECTED, THE RASH RACK SHALL HAVE JOHNSON SCREENS COMPANY 48" X 78" V-WIRE #118 SCREEN WITH $\frac{1}{2}$ " SLOT. $\frac{1}{4}$ " X 5" FLAT BAR SUPPORTS AT 3" ON CENTER, 6" X 6" X $\frac{3}{8}$ " X 4' ANGLE MOUNTING BRACKET ON ANCHOR SIDES, AND 4" X 6" X $\frac{3}{8}$ " X 7.5' ANGLE BAR ON ALL OTHER SIDES OR APPROVED EQUAL. THE FRAME AND MOUNTING BRACKET 6" ANGLE SURFACE SHALL BE OUTSIDE THE VALVE VAULT AND WELDED TO THE $\frac{1}{4}$ " X 5" FLAT BAR SUPPORTS AND #118 V-WIRE SCREEN SO THE SCREEN IS FLUSH WITH THE TOP OF THE ANGLE MOUNTING BRACKET AND ANGLE FRAME.
- THE 12" HDPE PIPE SHALL BE DR-11.0 HDPE OR APPROVED EQUAL WITH BUTT-FUSED JOINTS, STAINLESS STEEL 12" BOLT RINGS, 12" DUCTILE IRON PIPE SIZE (DIPS) FLANGE ADAPTORS, AND STAINLESS STEEL BOLTS, WASHERS, AND NUTS.
- THE GATE 5 TRASH RACK AND SCREEN SHALL BE REPLACED WITH A 7.5' X 4.5' X $\frac{1}{4}$ " HDG STEEL PLATE OR OTHER CORROSION RESISTANT MATERIAL AS APPROVED BY THE PROJECT ENGINEER.
- THE 12" PIPE 90° BASE BEND SHALL BE AWWA C151 DUCTILE IRON OR APPROVED EQUAL AND HAVE FUSION -BONDED EPOXY INTERIOR AND EXTERIOR COATING CONFORMING TO AWWA C116, LATEST REVISION. THE BASE BEND SHALL BE MOUNTED TO THE CONCRETE SLAB WITH FOUR STAINLESS STEEL $\frac{7}{8}$ " X 9" ANCHOR BOLTS EMBEDDED 6" INTO THE CONCRETE SLAB PER ANCHOR MANUFACTURER'S SPECIFICATIONS.
- THE FABRICATED INTAKE SCREEN SHALL BE ALL ASTM STAINLESS STEEL MATERIAL AND CONSTRUCTION STANDARDS WITH AN AWWA C226/228 12" FLANGE, INTEGRAL FLOW DISTRIBUTING CORE TUBE TO REDUCE SLOT ENTRANCE VELOCITY, AND $\frac{1}{2}$ " SLOT WIDTH. UNLESS OTHERWISE SPECIFIED BY THE PROJECT ENGINEER,THE SCREEN HOLE ENTRANCE VELOCITY SHALL NOT EXCEED 0.5 FPS AT AN 8 MGD MAXIMUM FLOW RATE PER FISH SCREENING CRITERIA. THE INTAKE SCREEN SHALL BE A STAINLESS STEEL HENDRICK SCREEN COMPANY 36"Ø X 54" DRUM SCREEN WITH #125 V-WIRE, $\frac{1}{2}$ " SLOT WIDTH SIZE, AND AWWA C226 12" FLANGE OR APPROVED EQUAL.
- THE GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY FOUNDATION SHALL BE 4.5' X 9.5' X 9" CONCRETE SLAB WITH #5 REBAR @ 12" OC BOTH WAYS AND CENTERED IN THE SLAB WIDTH. EACH 9" X 24" EDGE BEAM SHALL HAVE ONE ADDITIONAL #5 REBAR LONGITUDINALLY LOCATED 4.5" FROM THE BOTTOM OF THE EDGE BEAM WIDTH. ALL SLAB REINFORCEMENT @ 12" OC PERPENDICULAR TO THE EDGE BEAM SHALL BE SPLICED INTO THIS LONGITUDINAL REBAR.
- THE PIPE ANCHOR HOLD DOWNS SHALL BE 6" X 23.5" X $\frac{1}{2}$ " ASTM STAINLESS STEEL MATERIAL AND CONSTRUCTION WITH A HALF CIRCLE 14" DIAMETER PIPE BRACE THAT IS $\frac{1}{2}$ " THICK, FOUR $\frac{1}{4}$ " LATERAL REINFORCEMENTS AND FOUR $\frac{7}{8}$ " ANCHOR BOLT HOLES 1 $\frac{3}{4}$ " (1.75") FROM THE OUTSIDE EDGE, OR APPROVED EQUAL.
- THE PIPE ANCHOR ASSEMBLY FOUNDATION SHALL BE 3.5' X 2' X 1' CONCRETE SLAB WITH FOUR $\frac{3}{4}$ " X 8" ANCHOR BOLTS CAST IN PLACE PER PIPE ANCHOR HOLD DOWN AT APPROXIMATELY 5" OF DEPTH IN THE SLAB WITH THE "L" OR "J" END BELOW #5 REBAR REINFORCEMENT LOCATED 4" FROM THE SLAB SURFACE AT 18" OC BOTH WAYS. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THAT THE PIPE ANCHOR ASSEMBLY DESIGN MEETS THE PIPE MANUFACTURER'S DESIGN CRITERIA FOR THE SITE CONDITIONS. THE SPECIFIC PIPE ANCHORING SYSTEM DESIGN INCLUDING STAINLESS STEEL PIPE ANCHOR HOLD DOWNS SHALL BE APPROVED PRIOR TO INSTALLATION BY THE PROJECT ENGINEER AND SHALL BE IN ACCORDANCE WITH ALL REGULATORY AGENCIES AND STATE, FEDERAL, AND LOCALS RULES AND REGULATIONS.

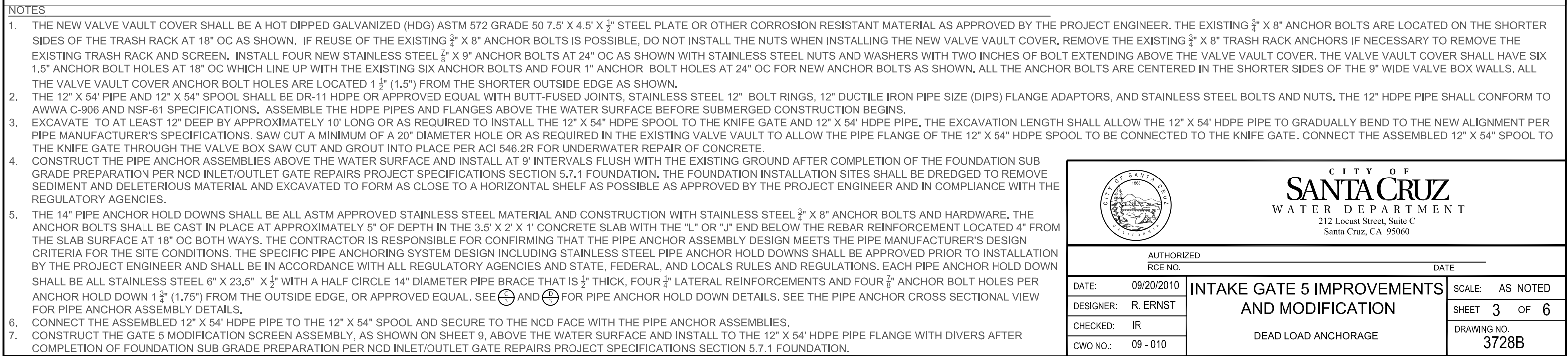
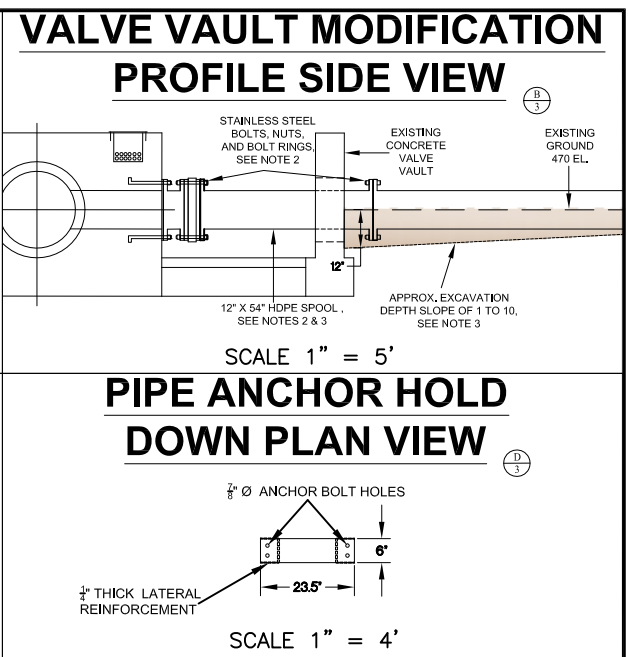
ABBREVIATIONS

AC	ASPHALTIC CONCRETE
BV	BUTTERFLY VALVE
BO	BLOWOFF
CI	CAST IRON
CMP	CORRUGATED METAL PIPE
CY	CUBIC YARD
DBC	DIAMETER BASE CENTER
DI	DUCTILE IRON
DIPS	DUCTILE IRON PIPE SIZE
DWG	DRAWING
EC	ELECTRICAL CONDUIT
(E)	EXISTING
FB	FLAT BAR (STEEL)
FLG	FLANGE
F-PVC	FUSIBLE POLYVINYL CHLORIDE
G	GALVANIZED
GV	GATE VALVE
GRS	GALVANIZED RIGID STEEL
HDG	HOT DIPPED GALVANIZED
HDPE	HIGH-DENSITY POLYETHYLENE
ID	INSIDE DIAMETER
LF	LINEAR FEET
MJ	MECHANICAL JOINT
(N)	NEW
OC	ON CENTER
OD	OUTSIDE DIAMETER
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
SS	STAINLESS STEEL
TYP	TYPICAL
W/	WITH
WM	WATER MAIN
WS	WELDED STEEL

EMERGENCY
TELEPHONE
NUMBERS

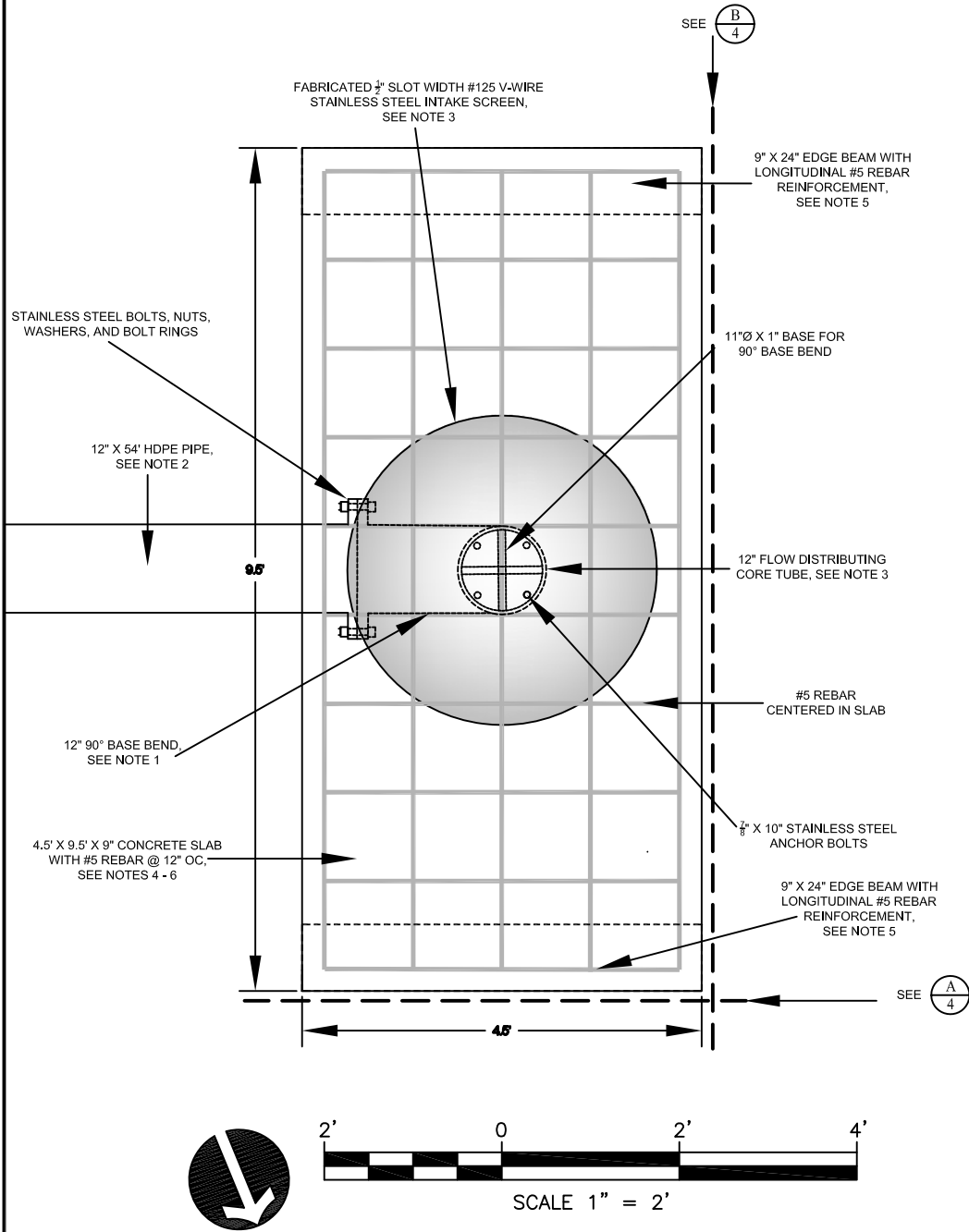
POLICE DEPARTMENT	911
PG&E	(800) 743-5000
FIRE DEPARTMENT	911
AT&T (TELEPHONE)	611
U.S.A.	(800) 227-2600
WATER DEPARTMENT	(831) 420-5220
AT&T PHONE COMPANY	(800) 310-2355

 CITY OF SANTA CRUZ WATER DEPARTMENT 212 Locust Street, Suite C Santa Cruz, CA 95060			
AUTHORIZED RCE NO.		DATE	
DATE: 09/20/2010	INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION	SCALE: NTS	
DESIGNER: R. ERNST		SHEET 2 OF 6	
CHECKED: IR		DRAWING NO. 3728B	
CWO NO.: 09 - 010	GENERAL & DEAD LOAD NOTES		

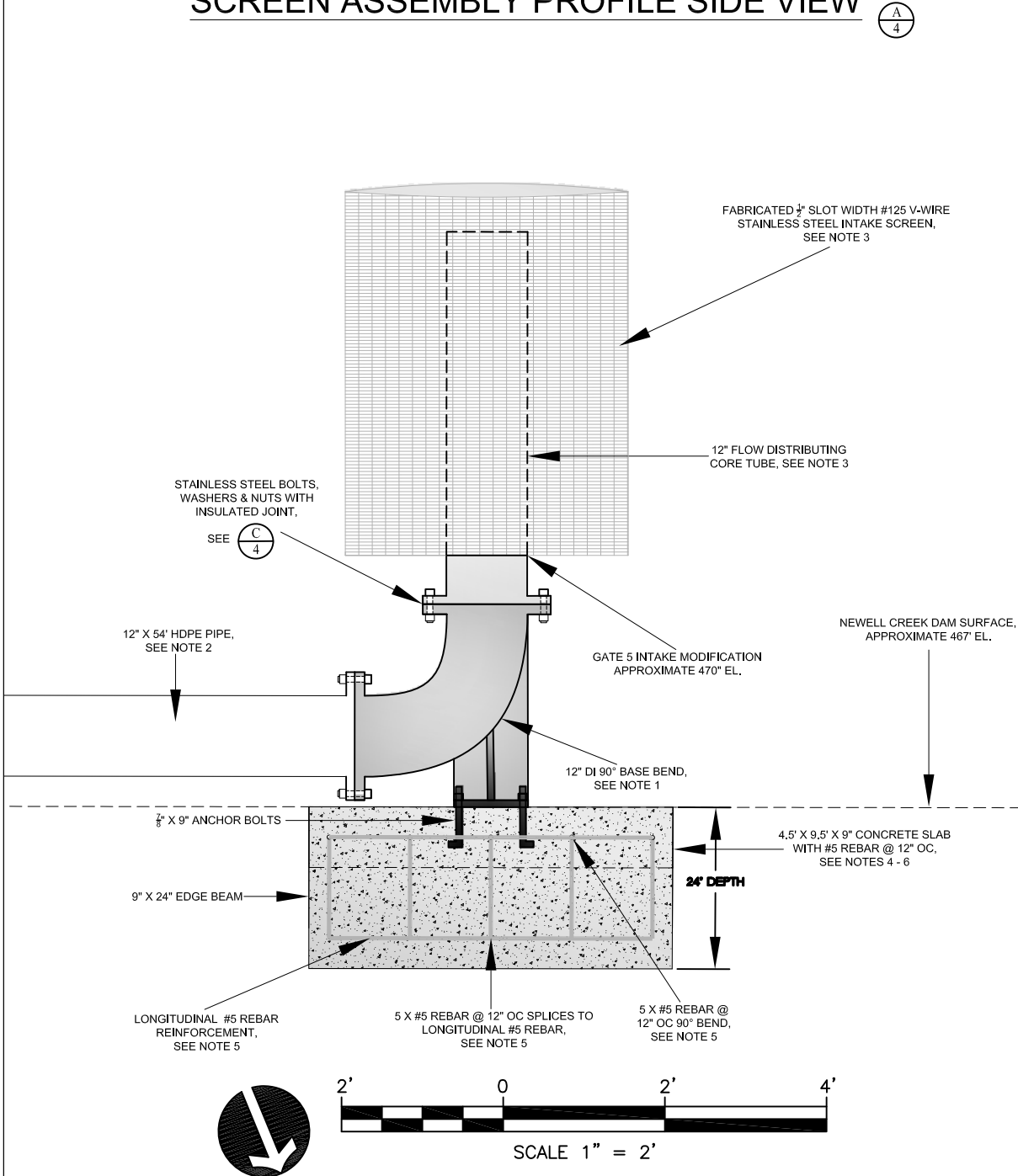


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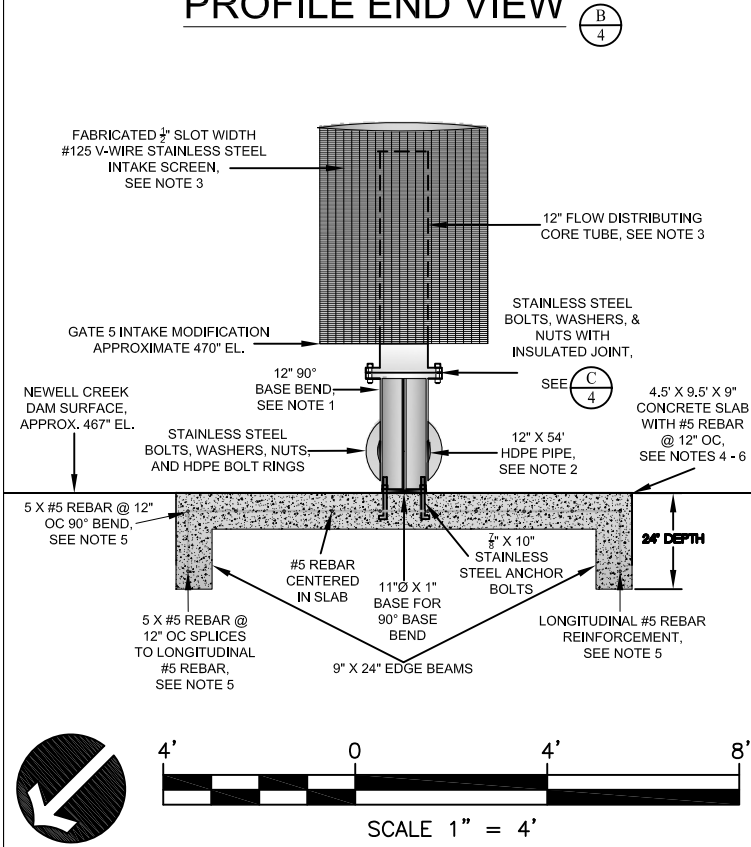
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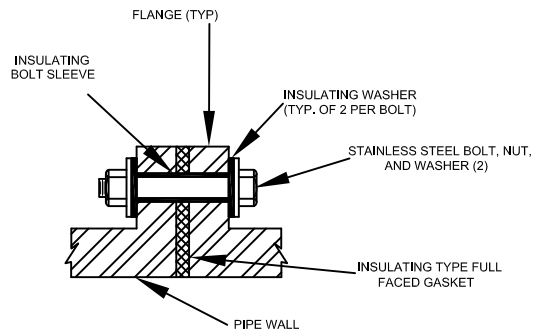
SCREEN ASSEMBLY PROFILE SIDE VIEW



SCREEN ASSEMBLY PROFILE END VIEW



INSULATING FLANGED JOINT NTS



NOTES

1. THE 12" PIPE 90° BASE BEND SHALL BE AWWA C151 DUCTILE IRON OR APPROVED EQUAL AND HAVE FUSION-BONDED EPOXY INTERIOR AND EXTERIOR COATING CONFORMING TO AWWA C116, LATEST REVISION. THE BASE BEND SHALL BE MOUNTED TO THE CONCRETE SLAB WITH FOUR STAINLESS STEEL $\frac{1}{2}$ " X 9" ANCHOR BOLTS EMBEDDED 6" INTO THE CONCRETE SLAB PER ANCHOR MANUFACTURER'S SPECIFICATIONS.
2. THE 12" X 54" PIPE SHALL BE DR-11 HDPE OR APPROVED EQUAL WITH BUTT-FUSED JOINTS, STAINLESS STEEL 12" BOLT RINGS, 12" DUCTILE IRON PIPE SIZE (DIPS) FLANGE ADAPTORS, AND STAINLESS STEEL BOLTS AND NUTS. THE 12" HDPE PIPE SHALL CONFORM TO AWWA C-906, C-901, AND NSF-61 SPECIFICATIONS. ASSEMBLE THE HDPE PIPES AND FLANGES ABOVE THE WATER SURFACE BEFORE SUBMERGED CONSTRUCTION BEGINS.
3. THE FABRICATED INTAKE SCREEN SHALL BE ALL ASTM STAINLESS STEEL MATERIAL AND CONSTRUCTION WITH AN AWWA C226/228 12" FLANGE, INTEGRAL FLOW DISTRIBUTING CORE TUBE TO REDUCE SLOT ENTRANCE VELOCITY, AND $\frac{1}{2}$ " SLOT WIDTH. UNLESS OTHERWISE SPECIFIED BY THE PROJECT ENGINEER, THE SCREEN HOLE ENTRANCE VELOCITY SHALL NOT EXCEED 0.5 FPS AT AN 8 MGD MAXIMUM FLOW RATE PER FISH SCREENING CRITERIA. THE INTAKE SCREEN SHALL BE A STAINLESS STEEL HENDRICK SCREEN COMPANY 36"Ø X 54" DRUM SCREEN WITH #125 V-WIRE, $\frac{1}{2}$ " SLOT WIDTH SIZE, AND AWWA C226 12" FLANGE OR APPROVED EQUAL.
4. THE GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY FOUNDATION SLAB SHALL BE CONSTRUCTED ABOVE THE WATER SURFACE AND INSTALLED FLUSH WITH THE GROUND AFTER FOUNDATION PREPARATION PER THE NCD INLET/OUTLET GATE REPAIRS PROJECT SPECIFICATIONS SECTION 5.7.1 FOUNDATION. THE FOUNDATION INSTALLATION SITE SHALL BE DREDGED TO REMOVE SEDIMENT AND DELETERIOUS MATERIAL AND EXCAVATED TO FORM AS CLOSE TO A HORIZONTAL SHELF INCLUDING EDGE BEAM EXCAVATIONS AS POSSIBLE BUT NOT TO EXCEED A MAXIMUM OF A 3' CUT INTO THE NCD SLOPE OR AS REQUIRED BY THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES DIVISION OF SAFETY OF DAMS.
5. THE GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY FOUNDATION SLAB SHALL BE 4.5' X 9.5' X 9" CONCRETE SLAB WITH #5 REBAR @ 12" OC BOTH WAYS AND CENTERED IN THE SLAB WIDTH. EACH 9" X 24" EDGE BEAM SHALL HAVE ONE ADDITIONAL #5 REBAR LONGITUDINALLY LOCATED 4.5" FROM THE BOTTOM OF THE EDGE BEAM WIDTH. ALL SLAB REINFORCEMENT @ 12" OC PERPENDICULAR TO THE EDGE BEAM SHALL BE SPLICED INTO THIS LONGITUDINAL REBAR.
6. THE INTAKE SCREEN GATE 5 MODIFICATION SCREEN ASSEMBLY INCLUDING 12" 90° BASE BEND, FOUNDATION SLAB, AND FABRICATED INTAKE SCREEN SHALL BE CONSTRUCTED ABOVE THE WATER SURFACE AND CONNECTED TO THE 12" X 54' HDPE PIPE BY DIVERS PER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910, SUBPART T - COMMERCIAL DIVING OPERATIONS.



CITY OF
SANTA CRUZ
WATER DEPARTMENT
212 Locust Street, Suite C
Santa Cruz, CA 95060

AUTHORIZED
RCE NO.

DATE

DATE: 09/20/2010

DESIGNER: R. ERNST

CHECKED: IR

CWO NO.: 09 - 010

INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION

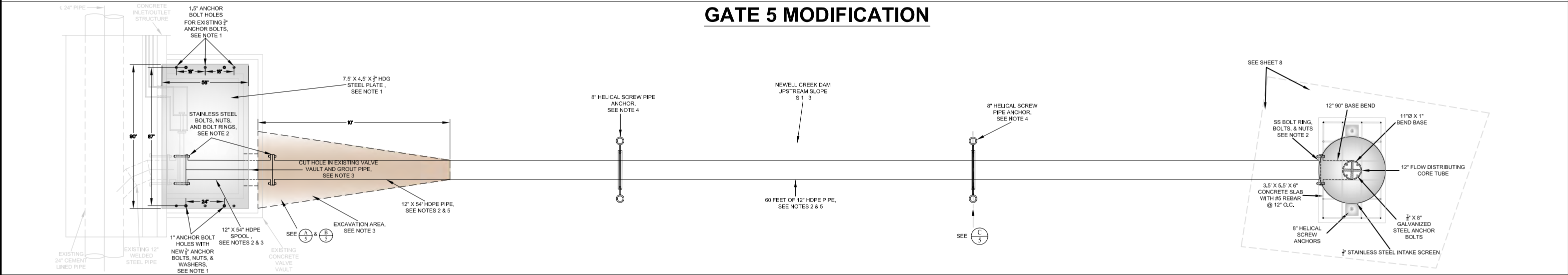
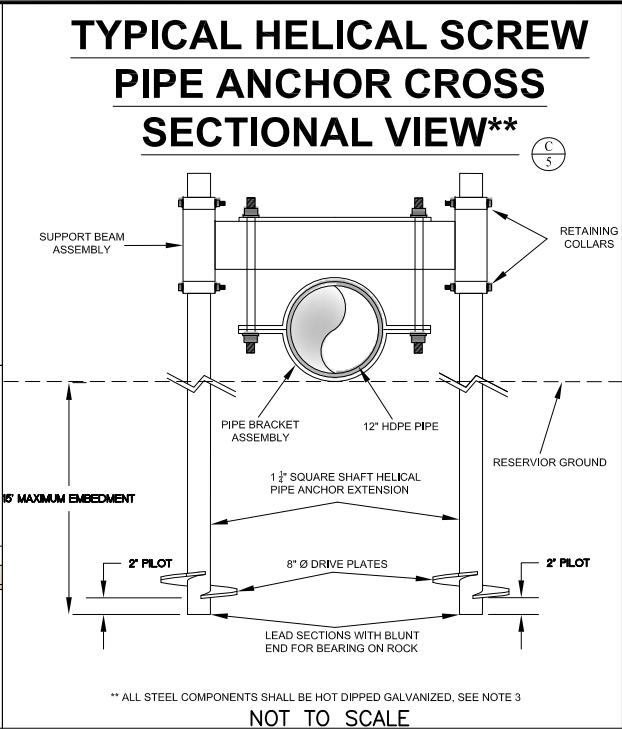
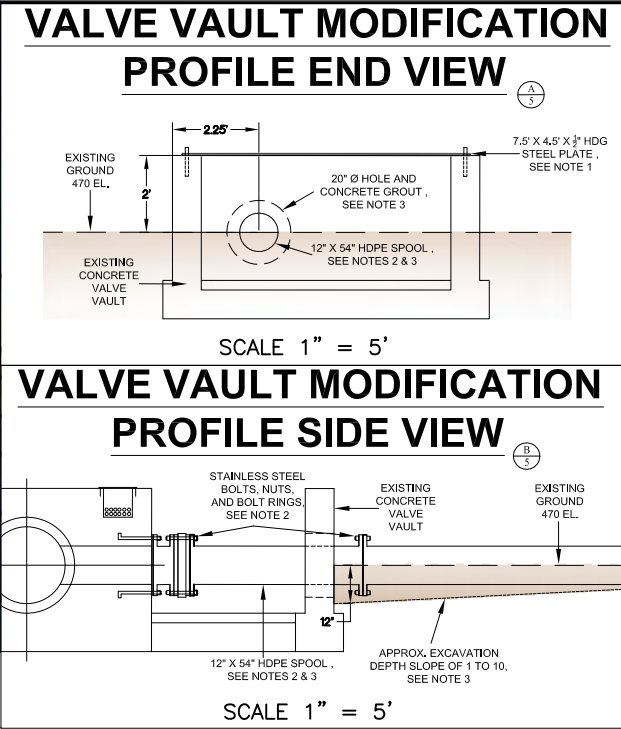
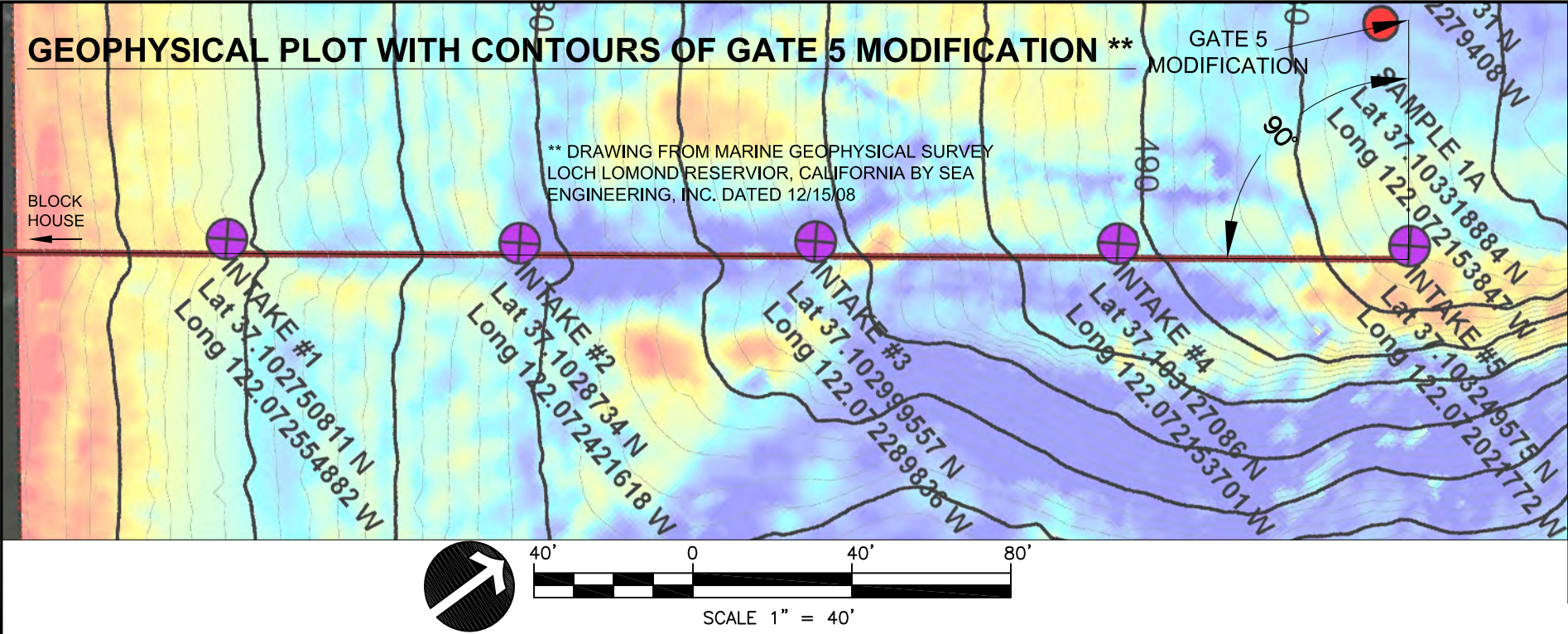
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SCALE: AS NOTED

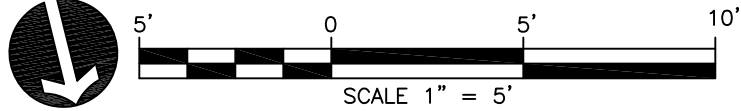
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3728B

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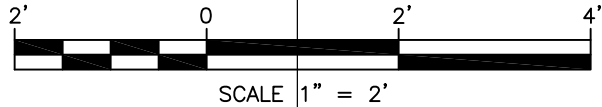
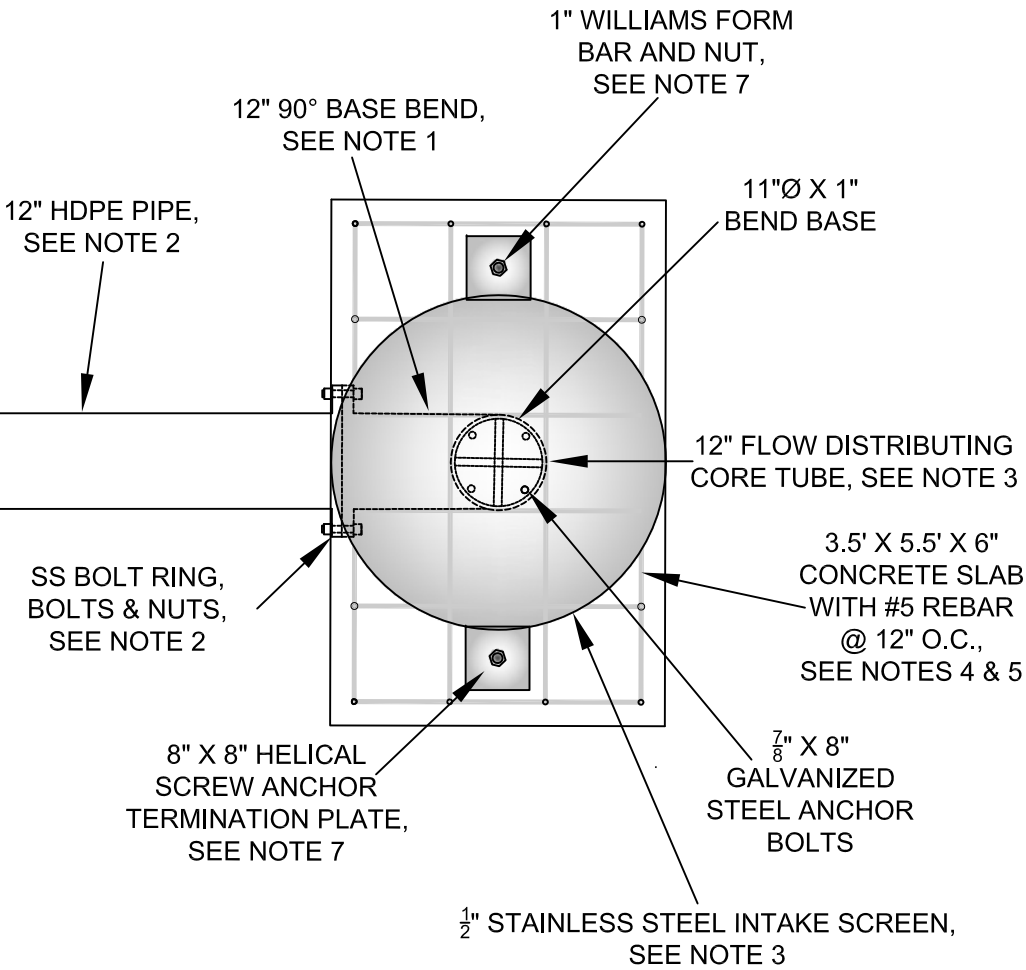
- NOTES**
1. THE NEW VALVE VAULT COVER SHALL BE A HOT DIPPED GALVANIZED (HDG) ASTM 572 GRADE 50 7.5' X 4.5' X ½" STEEL PLATE OR OTHER CORROSION RESISTANT MATERIAL AS APPROVED BY THE PROJECT ENGINEER. THE EXISTING ¾" X 8" ANCHOR BOLTS ARE LOCATED ON THE SHORTER SIDES OF THE TRASH RACK AT 18" OC AS SHOWN. IF REUSE OF THE EXISTING ¾" X 8" ANCHOR BOLTS IS POSSIBLE, DO NOT INSTALL THE NUTS WHEN INSTALLING THE NEW VALVE VAULT COVER. REMOVE THE EXISTING ¾" X 8" TRASH RACK ANCHORS IF NECESSARY TO REMOVE THE EXISTING TRASH RACK AND SCREEN. INSTALL FOUR NEW STAINLESS STEEL 7/8" X 9" ANCHOR BOLTS AT 24" OC AS SHOWN WITH STAINLESS STEEL NUTS AND WASHERS WITH TWO INCHES OF BOLT EXTENDING ABOVE THE VALVE VAULT COVER. THE VALVE VAULT COVER SHALL HAVE SIX 1.5" ANCHOR BOLT HOLES AT 18" OC WHICH LINE UP WITH THE EXISTING SIX ANCHOR BOLTS AND FOUR 1" ANCHOR BOLT HOLES AT 24" OC FOR NEW ANCHOR BOLTS AS SHOWN. ALL THE ANCHOR BOLTS ARE CENTERED IN THE SHORTER SIDES OF THE 9" WIDE VALVE BOX WALLS. ALL THE VALVE VAULT COVER ANCHOR BOLT HOLES ARE LOCATED 1 ½" (1.5") FROM THE SHORTER OUTSIDE EDGE AS SHOWN.
 2. THE 12" X 54' PIPE AND 12" X 54" SPOOL SHALL BE DR-11 HDPE OR APPROVED EQUAL WITH BUTT-FUSED JOINTS, STAINLESS STEEL 12" BOLT RINGS, 12" DUCTILE IRON PIPE SIZE (DIPS) FLANGE ADAPTORS, AND STAINLESS STEEL BOLTS AND NUTS. THE 12" HDPE PIPE SHALL CONFORM TO AWWA C-906 AND NSF-61 SPECIFICATIONS. ASSEMBLE THE HDPE PIPES AND FLANGES ABOVE THE WATER SURFACE BEFORE SUBMERGED CONSTRUCTION BEGINS.
 3. EXCAVATE TO AT LEAST 12" DEEP BY APPROXIMATELY 10' LONG OR AS REQUIRED TO INSTALL THE 12" X 54" HDPE SPOOL TO THE KNIFE GATE AND 12" X 54' HDPE PIPE. THE EXCAVATION LENGTH SHALL ALLOW THE 12" X 54' HDPE PIPE TO GRADUALLY BEND TO THE NEW ALIGNMENT PER PIPE MANUFACTURER'S SPECIFICATIONS. SAW CUT A MINIMUM OF A 20" DIAMETER HOLE OR AS REQUIRED IN THE EXISTING VALVE VAULT TO ALLOW THE PIPE FLANGE OF THE 12" X 54" HDPE SPOOL TO BE CONNECTED TO THE KNIFE GATE. CONNECT THE ASSEMBLED 12" X 54" SPOOL TO THE KNIFE GATE THROUGH THE VALVE BOX SAW CUT AND GROUT INTO PLACE PER ACI 546.2R FOR UNDERWATER REPAIR OF CONCRETE.
 4. THE PIPE ANCHORS SHALL BE HELICAL SCREW PIPELINE SUPPORTS INSTALLED PER MANUFACTURER'S SPECIFICATIONS WITH 50 KIPS ULTIMATE TENSION STRENGTH, 25 KIPS WORKING LOAD, AND 15 KIPS LOCK OFF LOAD OR AS APPROVED BY THE PROJECT ENGINEER. THE HELICAL PIPELINE SUPPORTS SHALL BE CHANCE HELICAL SCREW ANCHORS TYPE SS125 WITH ONE 8" HELICAL SCREW AND 1.25" ROUND CORNER SQUARE SHAFT WITH 12" HDPE PIPELINE ANCHOR ASSEMBLY OR APPROVED EQUAL SPACED AT TWENTY FOOT INTERVALS WITH FIFTEEN FOOT ANCHOR SHAFTS AND SHALL CONFORM TO ASTM A29, A36, A572, AND A252 SPECIFICATIONS AND HOT DIPPED GALVANIZED (HDG) IN ACCORDANCE WITH ASTM A-123, ASTM A-153, ASTM A-143, ASTM A-384, AND ASTM A-385. THE HDG ASSEMBLY SHALL BE GRADE 100 WITH A MINIMUM GALVANIZED THICKNESS OF 3.9 MILS OR 100 MICRONS. ALL HDG COMPONENTS SHALL BE INSPECTED AND APPROVED BY THE PROJECT ENGINEER PRIOR TO INSTALLATION. ANY DAMAGED AREAS SHALL BE REPAIRED IN ACCORDANCE WITH ASTM A-780. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THAT THE PIPE ANCHOR DESIGN MEETS THE MANUFACTURER'S DESIGN CRITERIA FOR THE SITE CONDITIONS. THE PIPELINE INSTALLATION SITE SHALL BE DREDGED TO REMOVE SEDIMENT AND DELETERIOUS MATERIAL AS APPROVED BY THE PROJECT ENGINEER AND IN COMPLIANCE WITH THE REGULATORY AGENCIES.
 5. CONSTRUCT THE GATE 5 MODIFICATION SCREEN ASSEMBLY, AS SHOWN ON SHEET 8, ABOVE THE WATER SURFACE AND INSTALL TO THE 12" X 54' HDPE PIPE FLANGE WITH DIVERS AFTER COMPLETION OF FOUNDATION SUB GRADE PREPARATION PER NCD INLET/OUTLET GATE REPAIRS PROJECT SPECIFICATIONS SECTION 5.7.1 FOUNDATION. CONNECT THE ASSEMBLED 12" X 54' HDPE PIPE TO THE 12" X 54" SPOOL AND SECURE TO THE NCD FACE WITH THE HELICAL PIPE ANCHOR ASSEMBLIES.



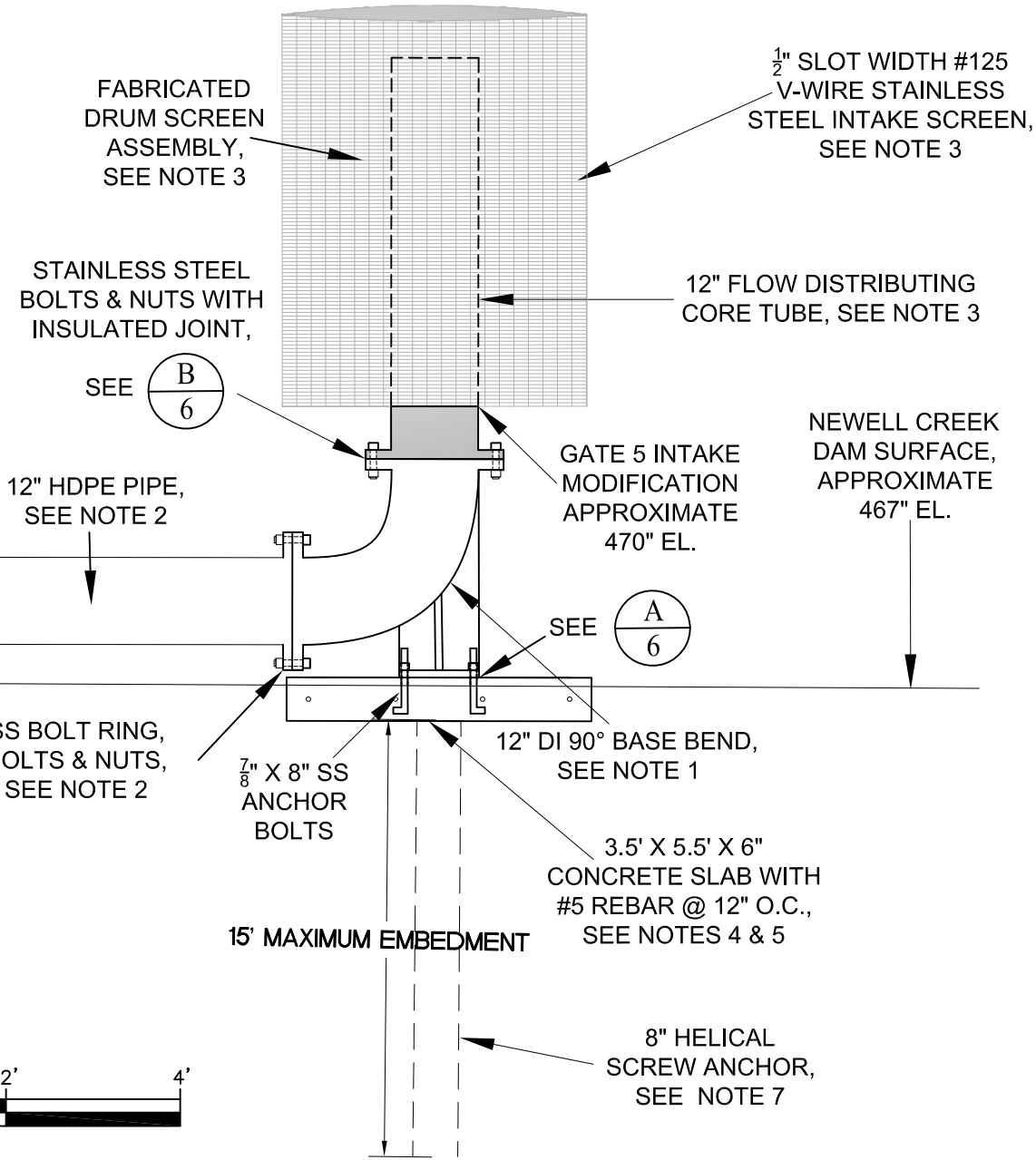
		CITY OF SANTA CRUZ WATER DEPARTMENT 212 Locust Street, Suite C Santa Cruz, CA 95060	
AUTHORIZED RCE NO.		DATE	
DATE:	09/20/2010	INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION	SCALE: AS NOTED
DESIGNER:	R. ERNST		SHEET 5 OF 6
CHECKED:	IR		DRAWING NO. 3728B
CWO NO.:	09 - 010	HELICAL SCREW ANCHORAGE	

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SCREEN ASSEMBLY PLAN VIEW

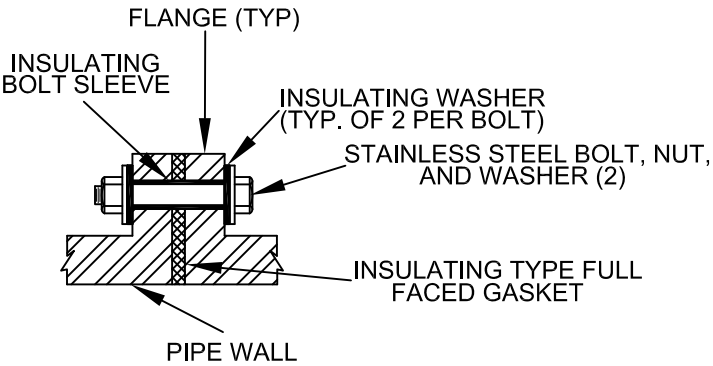


SCREEN ASSEMBLY PROFILE VIEW



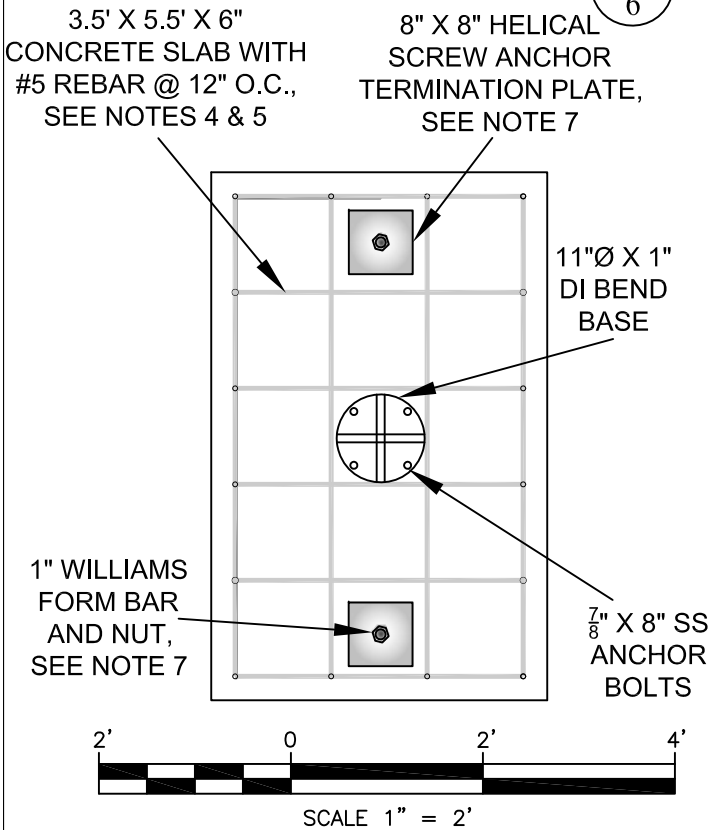
INSULATING FLANGED JOINT NTS

(B/6)



FOUNDATION DETAILS

(A/6)



NOTES

1. THE 12" PIPE 90° BASE BEND SHALL BE AWWA C151 DUCTILE IRON OR APPROVED EQUAL AND HAVE FUSION-BONDED EPOXY INTERIOR AND EXTERIOR COATING CONFORMING TO AWWA C116, LATEST REVISION. THE BASE BEND SHALL BE MOUNTED TO THE CONCRETE SLAB WITH FOUR STAINLESS STEEL 7/8" X 8" ANCHOR BOLTS EMBEDDED 5" INTO THE CONCRETE SLAB PER ANCHOR MANUFACTURER'S SPECIFICATIONS.
2. THE 12" X 54' PIPE SHALL BE DR-11 HDPE OR APPROVED EQUAL WITH BUTT-FUSED JOINTS, STAINLESS STEEL 12" BOLT RINGS, 12" DUCTILE IRON PIPE SIZE (DIPS) FLANGE ADAPTORS, AND STAINLESS STEEL BOLTS AND NUTS. THE 12" HDPE PIPE SHALL CONFORM TO AWWA C-906, C-901, AND NSF-61 SPECIFICATIONS. ASSEMBLE THE HDPE PIPES AND FLANGES ABOVE THE WATER SURFACE BEFORE SUBMERGED CONSTRUCTION BEGINS.
3. THE FABRICATED INTAKE SCREEN SHALL BE ALL ASTM STAINLESS STEEL MATERIAL AND CONSTRUCTION WITH AN AWWA C226/228 12" FLANGE, INTEGRAL FLOW DISTRIBUTING CORE TUBE TO REDUCE SLOT ENTRANCE VELOCITY, AND 1/2" SLOT WIDTH. UNLESS OTHERWISE SPECIFIED BY THE PROJECT ENGINEER, THE SCREEN HOLE ENTRANCE VELOCITY SHALL NOT EXCEED 0.5 FPS AT AN 8 MGD MAXIMUM FLOW RATE PER FISH SCREENING CRITERIA. THE INTAKE SCREEN SHALL BE A STAINLESS STEEL HENDRICK SCREEN COMPANY 36"Ø X 54" DRUM SCREEN WITH #125 V-WIRE, 1/2" SLOT WIDTH SIZE, AND AWWA C226 12" FLANGE OR APPROVED EQUAL.
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5. THE GATE 5 MODIFICATION INTAKE SCREEN ASSEMBLY FOUNDATION SLAB SHALL BE 3.5' X 5.5' X 6" CONCRETE SLAB WITH #5 REBAR @ 12" OC AND CENTERED IN THE SLAB WIDTH.
6. THE INTAKE SCREEN GATE 5 MODIFICATION SCREEN ASSEMBLY INCLUDING 12" 90° BASE BEND, FOUNDATION SLAB, AND FABRICATED INTAKE SCREEN SHALL BE CONSTRUCTED ABOVE THE WATER SURFACE AND CONNECTED TO THE 12" X 54' HDPE PIPE BY DIVERS PER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910, SUBPART T - COMMERCIAL DIVING OPERATIONS.
7. THE CONCRETE SLAB SHALL HAVE TWO ASTM /ASCE 20-96 HELICAL SCREW FOUNDATION SUPPORTS INSTALLED PER MANUFACTURER'S SPECIFICATIONS WITH 50 KIPS ULTIMATE TENSION STRENGTH, 25 KIPS WORKING LOAD, AND 15 KIPS LOCK OFF LOAD OR AS APPROVED BY THE PROJECT ENGINEER. THE FOUNDATION SUPPORTS SHALL BE CHANCE HELICAL SCREW ANCHORS TYPE SS125 WITH ONE 8" HELICAL SCREW AND 1.25" ROUND CORNER SQUARE SHAFT WITH TC-SS125F(G)WF7 ADAPTOR OR APPROVED EQUAL.



CITY OF
SANTA CRUZ
WATER DEPARTMENT
212 Locust Street, Suite C
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AUTHORIZED RCE NO.		DATE	
DATE:	09/20/2010	INTAKE GATE 5 IMPROVEMENTS AND MODIFICATION	SCALE: AS NOTED
DESIGNER:	R. ERNST		SHEET 6 OF 6
CHECKED:	IR		DRAWING NO. 3728B
CWO NO.:	09 - 010		HELICAL SCREW SCREEN ASSEMBLY DETAILS



Loch Lomond Reservoir Sediment Sampling Report

November 2, 2009

Prepared for:

The City of Santa Cruz
Water Department

Place of Performance:

Loch Lomond Reservoir
Felton, CA 95018-8995

Primary Point of Contact:

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APPENDICES

- Appendix A City of Santa Cruz Map of Intake Area Sediment Samplings 1A and 2A
 - Site Vicinity Map
 - Site Location Map
 - City of Santa Cruz Map of Intake Area Sediment Samples 1A and 2A
 - City of Santa Cruz Map of Intake Pipeline and Manifold Locations and Sediment Samples SB-1 and SB-2 Collection Points
- Appendix B McCampbell Analytical Laboratory Analytical Results (October 29, 2009)
- Appendix C Photographs

Loch Lomond Reservoir Sediment Sampling Report

1.0 INTRODUCTION

A+ Environmental Solutions (ES) appreciates the opportunity to work at the Loch Lomond Reservoir site. This report documents ES' efforts to define the sediment sampling conducted in the area of Intake #5 at approximately 83 feet below water. The primary purpose of this report is to determine if the sediment historically has been impacted by metals (specifically copper) used to reduce algae blooms in the reservoir water. This information is needed in order to determine if sediment can be dredged and redeposited underwater within the reservoir or hauled away as hazardous material.

ES utilized a 4' x 2" acetate liner with sediment catch manufactured by Geoprobe® to collect samples at four different locations in the Loch Lomond Reservoir.

2.0 SITE INFORMATION

The project site is located at Loch Lomond Reservoir in Felton, California 95018-8995. The area of interest is located in the vicinity of Intake #5. Over many years it has been covered with approximately 6' of material that may be a result of a landslide within the reservoir.

2.1 Site Activities

Sediment samples were taken near Intake #5 to be analyzed. An ES geologist and professional SCUBA diver made four dives to points seen in Appendix A:

1. Sediment Sample 1A at Lat 37.103318884 N, Long 122.072153847 W
2. Sediment Sample 2A at Lat 37.103398731 N, Long 122.072279408 W
3. Sediment Boring Sites SB-1 and SB-2 around Intake #5

3.0 SAMPLING PROTOCOLS AND PROCEDURES

- Soil samples were analyzed for CAM 17 metals as specified in our bid of September 25, 2009. Three samples per sediment boring were composited per boring. Analyses were performed by McCampbell Analytical, a State of California Certified Analytical Laboratory.
- The soil samples were analyzed on a 5-day priority basis.
- All samples were collected under the supervision of a State of California Professional Geologist/Hydrogeologist.
- At 83-foot depth in the Loch Lomond Reservoir, four 4' long, 2" wide acetate liners with a sediment trap were driven into the subsurface until they would penetrate no further.
- Two sampling devices were used:
 1. A modified 4' x 2" continuous core sampler approximately 15' long and weighing 100 lbs was dropped from the surface like a dart. This dart penetrated the sediment layer to a depth of approximately 3 feet. A 30-lb slide hammer was mounted on the sediment sampler to further drive the sampler into the reservoir bottom. A 4' long, 2" wide acetate liner with a sediment catch was fitted inside the sampler in order to retrieve a sediment core. The sediment sampling device was withdrawn using a 1000-lb boat-mounted windlass.

Unfortunately, when the sampler was withdrawn to the surface, most of the sample was lost in the water column due to the very fine sediment being sampled.

2. We equipped a professional SCUBA diver wearing a dry suit and full-face mask and helmet with diver-to-surface voice communication. The diver descended to the desired sampling locations which were marked with a surface buoy. A 4' x 2" clear acetate liner was fitted with a sediment catching device. Once the liner was withdrawn, two water-tight 2" caps were placed on each end of the sample liner. A red cap was placed on the bottom, with a black cap on top.

Once sediment cores were lifted to the surface, they were composited into 1-liter wide-mouth amber glass jars with Teflon-lined closure, which were supplied by McCampbell Analytical Laboratories. All samples were placed in an ice chest, and a chain-of-custody form was completed. Samples were transported via courier to McCampbell Labs at 1534 Willow Pass Road, Pittsburg, CA 94565-1701 where they were analyzed for CAM 17 metals.

3.1 Boat and Equipment Decontamination

Prior to launching the boat at Loch Lomond Reservoir, the A+ Environmental Solutions vessel and dive equipment were cleaned, inspected by Loch Lomond Park Rangers, and found not to require further decontamination. The boat used at the reservoir had not been in fresh lake water for approximately 5 years. All SCUBA gear used had never before been used in fresh water. The purpose of the decontamination procedure was to prevent the introduction and spread of invasive biological species in the Loch Lomond Reservoir.

4.0 SEDIMENT SAMPLING RESULTS

ES mobilized staff and equipment to Loch Lomond Reservoir in Felton, California on Tuesday, October 20, 2009. Samples in the area of Intake #5 designated as SB-1 and SB-2 (see Appendix A – City of Santa Cruz Map of Intake Pipeline and Manifold Locations and Sediment Samples 1 and 2 Collection Points) had a maximum bottom penetration of 3 feet. Both Samples 1A and 2A (see Appendix A – City of Santa Cruz Map of Intake Area) have a maximum penetration of 1 foot. Clay was observed on samplers refusal was encountered on all samples.

The ES field geologist located each location prior to commencing sampling activities using line-of-site measurements triangulating from known points on shore, and a GPS with coordinates provided by Mr. Ryan R. Ernst, Assistant Engineer II with the Water Department, City of Santa Cruz. A three-dimensional portable sonar was also used to locate the intake pipe and the Intake gate. A buoy with a 15-lb mushroom anchor and 85-foot line was deployed to mark the sampling locations underwater and on the surface of the Reservoir.

The laboratory analyses attached in Appendix A show copper levels in the samples were measured to be 28 mg/kg in Sample 1 and 30 mg/kg in Sample 2 using EPA method 6020A. The results are below San Francisco Water Quality Control Board (SFWQCB) 2007 Environmental Screening Levels (ESL) for shallow soil drinking water source of 225 mg/kg.

As shown in Table 1, only one significantly high level of metals was found in the sediment samples tested. Arsenic levels in the sludge Samples SB-1 and SB-2 were found to contain 2.5 ml/kg and 2.4 ml/kg, respectively. That is 6.6 times the SFWQCB action level. Although the arsenic in the sludge sample is likely to be naturally occurring, dredging and depositing this sludge underwater within the reservoir is a concern if stirring up the sediment incorporates a high concentration of arsenic in the drinking water supply. A+ Environmental Solutions recommends testing the sludge according to AC Title 22's wet extraction test method to determine the amount of these metals that may be concentrated in the water column. Citric acid is usually used to conduct this test, I recommend using water from Loch Lomond Reservoir in place of the citric acid solution. The solution of water and sediment is then agitated on a rotary extractor for 48 hours. The sample is then centrifuged and filtered allowing the laboratory to measure the quantity of metals absorbed into the water. This test would provide a conservative estimate of metals that could diffuse in the water should dredged sediments be deposited back in the reservoir.

The metals detected in the Reservoir are within the realm of what one would expect to find in levels in this area. Santa Cruz area soils are known to have high levels of naturally occurring arsenic. Action levels for shallow soil that is a source of drinking water used by SFWQCB is .378 ml/kg. These sediment sample results are much higher.

4.1 Sediment Description/Sediment Core Description

Area Around Intake #5

The two sediment samples from the vicinity of Intake #5 – Samples SB-1 and SB-2 appear to be identical in color and grain size. The sediment was very fine, estimated below 200 sieve size in the Uniform Soil Classification System (USCS). Globules of clay were observed and estimated to be approximately 6" around, interbedded in the fine sediment in SB-1 and SB-2. This was estimated by penetrating the sediment samples in an area multiple times. A maximum 3-foot depth sediment sample was achieved. Clay was observed on the sediment sampler. The estimated 6 ft of sediment located around Intake #5 is a mix of very fine sediment and rounded clay balls approximately 6" in diameter, between 1.5 ft to 3 ft below sediment surface. Using a Munsell Soil Color Chart, the sediment color is 10YR 3/2 – very dark, grayish brown. The clay color is 10YR 2/2 – very dark brown. The silt is classified as OH in USCS. The clay is CL – a medium plastic, clean clay.

Sonar showed the silt to be approximately 6 ft deep.

4.2 Sediment Description – Samples 1A and 2A

Sediment samples 1A and 2A were taken in the collection points indicated on City of Santa Cruz Map of Intake Pipeline and Manifold Locations (see Appendix A). A maximum core sample of 1 foot was obtained as the sludge samples would penetrate no further. Sediment and sludge was approximately 12" thick, clay was encountered at 12" below the reservoir bottom. Sediment and clay below are the same color and grain size as that seen in Samples SB-1 and SB-2 described above. No sand was observed.

TABLE 1
Analytical Results

	Matrix	Sludge Sample 1 mg/kg	Sludge Sample 2 Mg/kg	SFWQCD 2007 ESLs in Shallow Soil Source of Drinking Water mg/kg	Drinking Water Limit µg/l
Antimony	Sludge	ND	ND	-	-
Arsenic	Sludge	2.5	2.4	.378	10
Barium	Sludge	62	61	750	1,000
Beryllium	Sludge	ND	ND	-	-
Cadmium	Sludge	0.64	0.72	1.67	5
Chromium	Sludge	18	18	7500 (Chr III)	50
Cobalt	Sludge	2.2	2.1	40	
Copper	Sludge	28	30	225	5,000
Lead	Sludge	4.1	4.0	200	15
Mercury	Sludge	ND	ND	-	-
Molybdenum	Sludge	1.2	1.7	40	NA
Nickel	Sludge	11	11	150	100
Selenium	Sludge	0.58	0.58	10,000	50
Silver	Sludge	ND	ND	-	-
Thallium	Sludge	ND	ND	2	-
Vanadium	Sludge	27	26	15.2	50 (old AL)*
Zinc	Sludge	43	41	600	5,000
%SS	Sludge	106	113		

Water samples are reported in µg/L, product / oil / non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil / sludge / solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

NA means not applicable to this sample or instrument.

ND means not detected above reporting limit.

* No MCL

5.0 CONCLUSIONS

The bottom sediment layers tested during this study around Intake #5 at Loch Lomond Reservoir. We found it to contain background levels of metals as expected. Arsenic levels were, however, above some guidelines and A+ Environmental Solutions recommends further testing to evaluate the impact of depositing dredged sediment back into the reservoir. Very fine sediments were present in this area to a depth of 3 feet. Clay clods were present intermittently allowing various sediment probes' depths from a minimum of 12 inches to a maximum of 3 feet.

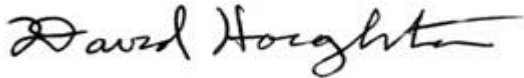
The area sampled at Points 1A and 2A had about 1 foot of very fine, highly compressible sediment underlaid by clay.

6.0 CERTIFICATION AND DISTRIBUTION

To the best of our knowledge, all statements made in this report are true and correct. This investigation is based on data provided by client and others, site conditions observed, samples taken and analytical data. No warranty whatsoever is made that this report/investigation addresses all contamination found on the site.

If you have any questions or require additional information regarding this report, please contact me in my office (831-476-9200) or my cell (831-247-8047).

Respectfully submitted,



David Houghton
Site Supervisor/CEO, A+ Environmental Solutions
Environmental Scientist
California Professional Hydrogeologist #914
California Professional Geologist #8491
California Engineering, HazMat, and C57 Contractor #843915
US Coast Guard Licensed Master Captain #1100416



APPENDIX A

SITE VICINITY MAP

SITE LOCATION MAP

**CITY OF SANTA CRUZ MAP OF
INTAKE AREA SEDIMENT SAMPLES 1A AND 2A**

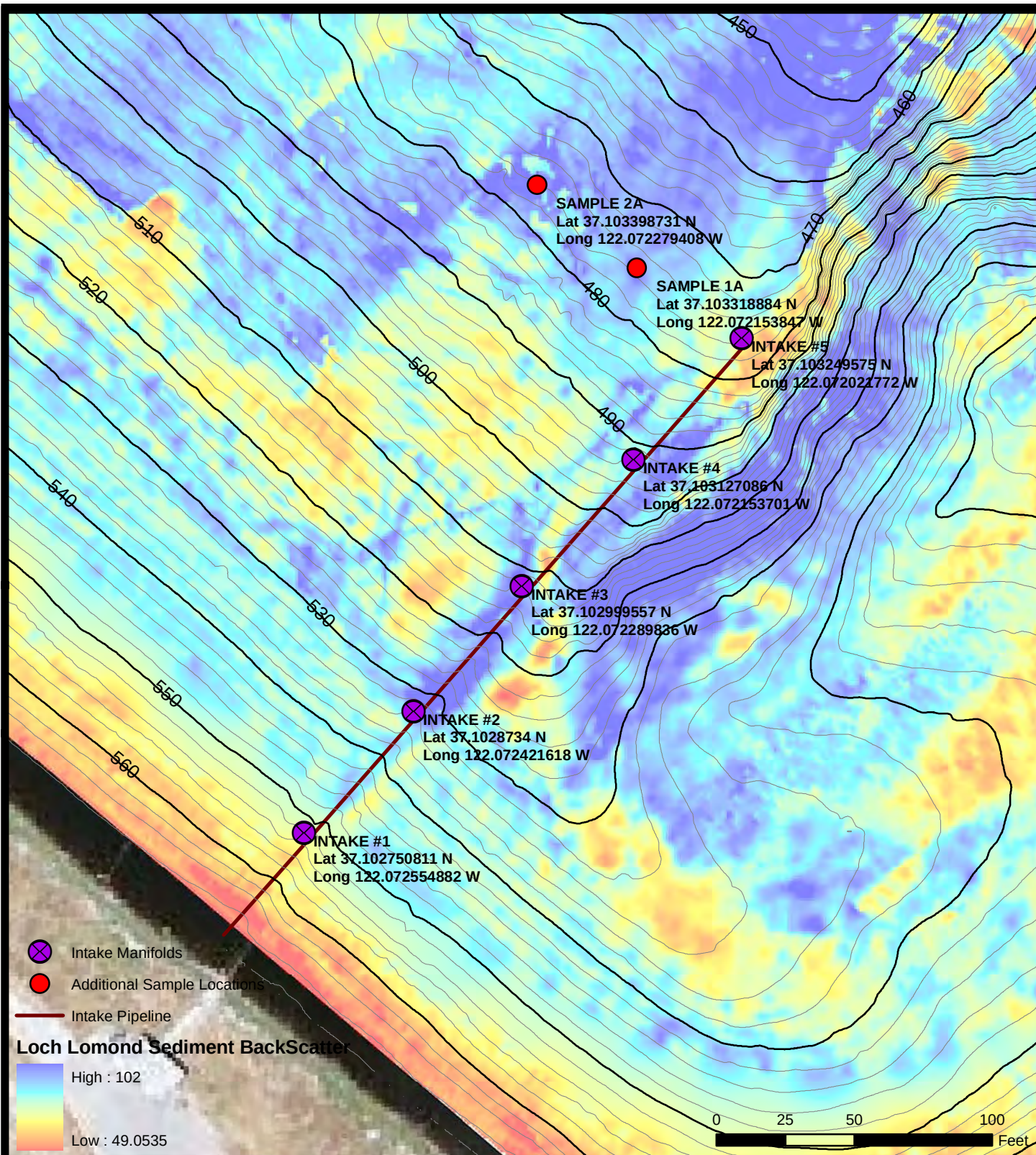
**CITY OF SANTA CRUZ MAP OF
INTAKE PIPELINE AND MANIFOLD LOCATIONS
AND SEDIMENT SAMPLES SB-1 AND SB-2 COLLECTION POINTS**



Vicinity Map of Loch Lomond Reservoir, Felton, California



Location Map of Loch Lomond Reservoir, Felton, California



Notes:

Coordinate locations are approximate but are accurate to the best of our ability.

Coordinate system is WGS1984.

Sediment backscatter data is from 2008 Geophysical Survey performed by Sea Engineering, Inc.

Lighter colors indicate softer bottom types, darker colors indicate harder bottom types.

Lake water elevation as of Oct 08, 2009 is 572.35



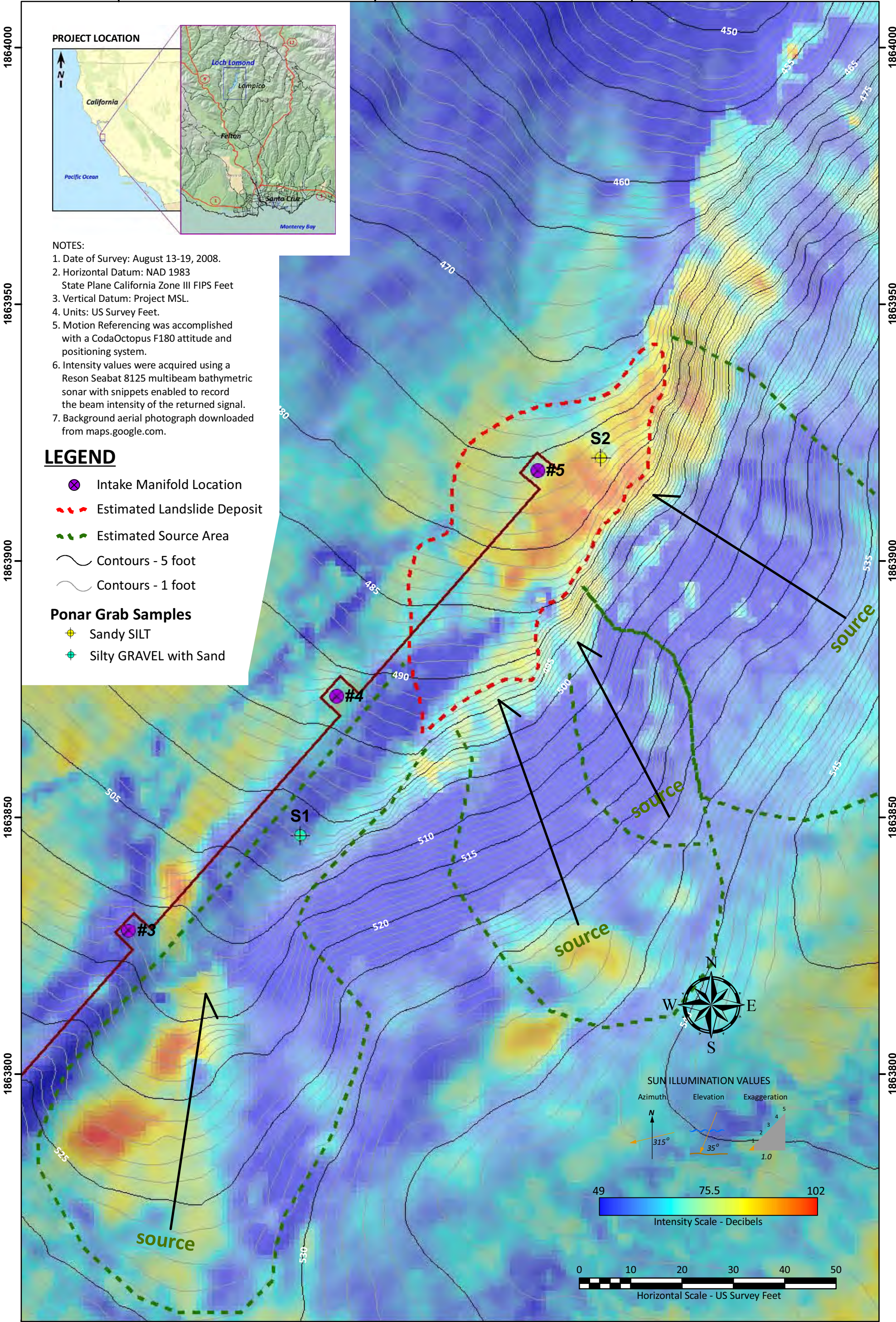
City of Santa Cruz Loch Lomond Reservoir Intake Area Sediment Sampling Exhibit



6103150

6103200

6103250



PROJECT LOCATION



NOTES:

1. Date of Survey: August 13-19, 2008.
2. Horizontal Datum: NAD 1983
State Plane California Zone III FIPS Feet
3. Vertical Datum: Project MSL.
4. Units: US Survey Feet.
5. Motion Referencing was accomplished with a CodaOctopus F180 attitude and positioning system.
6. Intensity values were acquired using a Reson Seabat 8125 multibeam bathymetric sonar with snippets enabled to record the beam intensity of the returned signal.
7. Background aerial photograph downloaded from maps.google.com.

LEGEND

- Intake Manifold Location
- Estimated Landslide Deposit
- Estimated Source Area
- Contours - 5 foot
- Contours - 1 foot

Ponar Grab Samples

- Sandy SILT
- Silty GRAVEL with Sand



DRAWN BY: Tony Ramirez
CHECKED BY: Ken Israel
APPROVED BY: Ken Israel
REVISION #: 1.1
REVISION DATE: December 15, 2008
SEI PROJECT #: 35058

Intake Pipeline and Manifold Locations

Loch Lomond Reservoir Marine Geophysical Survey
Santa Cruz County, California
City of Santa Cruz Water Department

SHEET

8 of 10

APPENDIX B

MCCAMPBELL ANALYTICAL LABORATORY ANALYTICAL RESULTS (OCTOBER 29, 2009)

 McC Campbell Analytical, Inc. "When Quality Counts"		1534 Willow Pass Road, Pittsburg, CA 94565-1701 Web: www.mcccampbell.com E-mail: main@mcccampbell.com Telephone: 877-252-9262 Fax: 925-252-9269	
A+ Environmental Solutions 6898 Soquel Ave. Santa Cruz, CA 95062	Client Project ID: Loch Lomond Res.	Date Sampled: 10/20/09	
		Date Received: 10/22/09	
	Client Contact: David Houghton	Date Reported: 10/28/09	
	Client P.O.:	Date Completed: 10/28/09	

WorkOrder: 0910698

October 28, 2009

Dear David:

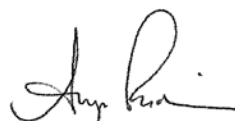
Enclosed within are:

- 1) The results of the 2 analyzed samples from your project: **Loch Lomond Res.,**
- 2) A QC report for the above samples,
- 3) A copy of the chain of custody, and
- 4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McC Campbell Analytical Laboratories for your analytical needs.

Best regards,



Angela Rydelius
 Laboratory Manager
 McC Campbell Analytical, Inc.

0910698



CHAIN OF CUSTODY RECORD

RUSH

24 HR

48 HR

72 HR



Coelt (Normal)

No

Write On (IDW)

No

[illegible]

REC'D SEALED & INTACT VIA C/O 10/22/09

McC Campbell Analytical, Inc.



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 0910698

ClientCode: ESSC

☐ WaterTrax

☐ WriteOn

☐ EDF

☐ Excel

☐ Fax

☒ Email

☐ HardCopy

☐ ThirdParty

☐ J-flag

Report to:

David Houghton
A+ Environmental Solutions
6898 Soquel Ave.
Santa Cruz, CA 95062
(831) 476-9200 FAX (831) 475-5322

Email: ceo@envir-solutions.com
cc:
PO:
ProjectNo: Loch Lomond Res.

Bill to:

David Houghton
A+ Environmental Solutions
6898 Soquel Ave
Santa Cruz, CA 95062

Requested TAT: 5 days

Date Received: 10/22/2009

Date Printed: 10/22/2009

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
0910698-001	Sample 1	Sludge	10/20/2009 11:50	☐	A											
0910698-002	Sample 2	Sludge	10/20/2009 12:30	☐	A											

Test Legend:

1	CAM17MS Sludge	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Melissa Valles

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



McC Campbell Analytical, Inc.

"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mcccampbell.com E-mail: main@mcccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Sample Receipt Checklist

Client Name: **A+ Environmental Solutions**

Date and Time Received: **10/22/2009 1:08:47 PM**

Project Name: **Loch Lomond Res.**

Checklist completed and reviewed by: **Melissa Valles**

WorkOrder N°: **0910698** Matrix Sludge

Carrier: CA OverNight

Chain of Custody (COC) Information

Chain of custody present?	Yes ☒	No ☐
Chain of custody signed when relinquished and received?	Yes ☒	No ☐
Chain of custody agrees with sample labels?	Yes ☒	No ☐
Sample IDs noted by Client on COC?	Yes ☒	No ☐
Date and Time of collection noted by Client on COC?	Yes ☒	No ☐
Sampler's name noted on COC?	Yes ☒	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☒
Shipping container/cooler in good condition?	Yes ☒	No ☐	
Samples in proper containers/bottles?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☒	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☒
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☒
Sample labels checked for correct preservation?	Yes ☒	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☒
Samples Received on Ice?	Yes ☒	No ☐	

(Ice Type: BLUE ICE)

* NOTE: If the "No" box is checked, see comments below.

=====

Client contacted:

Date contacted:

Contacted by:

Comments:

**McC Campbell Analytical, Inc.**

"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mcccampbell.com E-mail: main@mcccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

A+ Environmental Solutions 6898 Soquel Ave. Santa Cruz, CA 95062	Client Project ID: Loch Lomond Res.	Date Sampled: 10/20/09
		Date Received 10/22/09
	Client Contact: David Houghton	Date Extracted 10/22/09
	Client P.O.:	Date Analyzed 10/24/09

CAM / CCR 17 Metals*

Lab ID	0910698-001A	0910698-002A			Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	Sample 1	Sample 2				
Matrix	Sludge	Sludge			Sludge	W
Extraction Type	TOTAL	TOTAL			mg/Kg	mg/L

ICP-MS Metals, Concentration*

Analytical Method: 6020A

Extraction Method: SW3050B

Work Order: 0910698

Dilution Factor	1	1			1	1
Antimony	ND	ND			0.5	NA
Arsenic	2.5	2.4			0.5	NA
Barium	62	61			5.0	NA
Beryllium	ND	ND			0.5	NA
Cadmium	0.64	0.72			0.25	NA
Chromium	18	18			0.5	NA
Cobalt	2.2	2.1			0.5	NA
Copper	28	30			0.5	NA
Lead	4.1	4.0			0.5	NA
Mercury	ND	ND			0.05	NA
Molybdenum	1.2	1.7			0.5	NA
Nickel	11	11			0.5	NA
Selenium	0.58	0.58			0.5	NA
Silver	ND	ND			0.5	NA
Thallium	ND	ND			0.5	NA
Vanadium	27	26			0.5	NA
Zinc	43	41			5.0	NA
%SS:	106	113				

Comments

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

TOTAL = acid digestion.

WET = Waste Extraction Test (STLC).

DI WET = Waste Extraction Test using de-ionized water.



QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Sludge

QC Matrix: Soil

WorkOrder: 0910698

EPA Method: 6020A			Extraction: SW3050B			BatchID: 46651			Spiked Sample ID: 0910684-002A				
Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Antimony	ND	50	99.1	101	1.76	10	101	103	1.38	75 - 125	20	75 - 125	20
Arsenic	1.3	50	101	103	1.83	10	106	107	0.563	75 - 125	20	75 - 125	20
Barium	15	500	95.7	97.9	2.26	100	96.8	97.4	0.638	75 - 125	20	75 - 125	20
Beryllium	ND	50	92.2	95.4	3.35	10	108	108	0	75 - 125	20	75 - 125	20
Cadmium	ND	50	100	103	2.06	10	107	106	0.0939	75 - 125	20	75 - 125	20
Chromium	61	50	NR	NR	NR	10	112	113	0.802	75 - 125	20	75 - 125	20
Cobalt	24	50	95.1	100	3.62	10	109	110	0.547	75 - 125	20	75 - 125	20
Copper	120	50	NR	NR	NR	10	111	112	0.808	75 - 125	20	75 - 125	20
Lead	6.0	50	101	103	1.70	10	106	107	1.03	75 - 125	20	75 - 125	20
Mercury	0.63	1.25	102	105	1.66	0.25	104	102	1.71	75 - 125	20	75 - 125	20
Molybdenum	ND	50	100	102	2.11	10	104	105	0.863	75 - 125	20	75 - 125	20
Nickel	30	50	101	104	2.14	10	108	109	1.11	75 - 125	20	75 - 125	20
Selenium	ND	50	106	105	0.736	10	109	111	1.27	75 - 125	20	75 - 125	20
Silver	ND	50	97.2	98.7	1.53	10	105	105	0	75 - 125	20	75 - 125	20
Thallium	ND	50	103	105	2.29	10	104	104	0	75 - 125	20	75 - 125	20
Vanadium	130	50	NR	NR	NR	10	112	113	1.33	75 - 125	20	75 - 125	20
Zinc	58	500	99.4	102	1.98	100	108	110	1.19	75 - 125	20	75 - 125	20
%SS:	106	250	107	109	2.22	250	104	106	1.26	70 - 130	20	70 - 130	20
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions: NONE													

BATCH 46651 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0910698-001A	10/20/09 11:50 AM	10/22/09	10/24/09 12:45 PM	0910698-002A	10/20/09 12:30 PM	10/22/09	10/24/09 12:53 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = $100 * (MS - Sample) / (Amount Spiked)$; RPD = $100 * (MS - MSD) / ((MS + MSD) / 2)$.

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

APPENDIX C

PHOTOGRAPHS

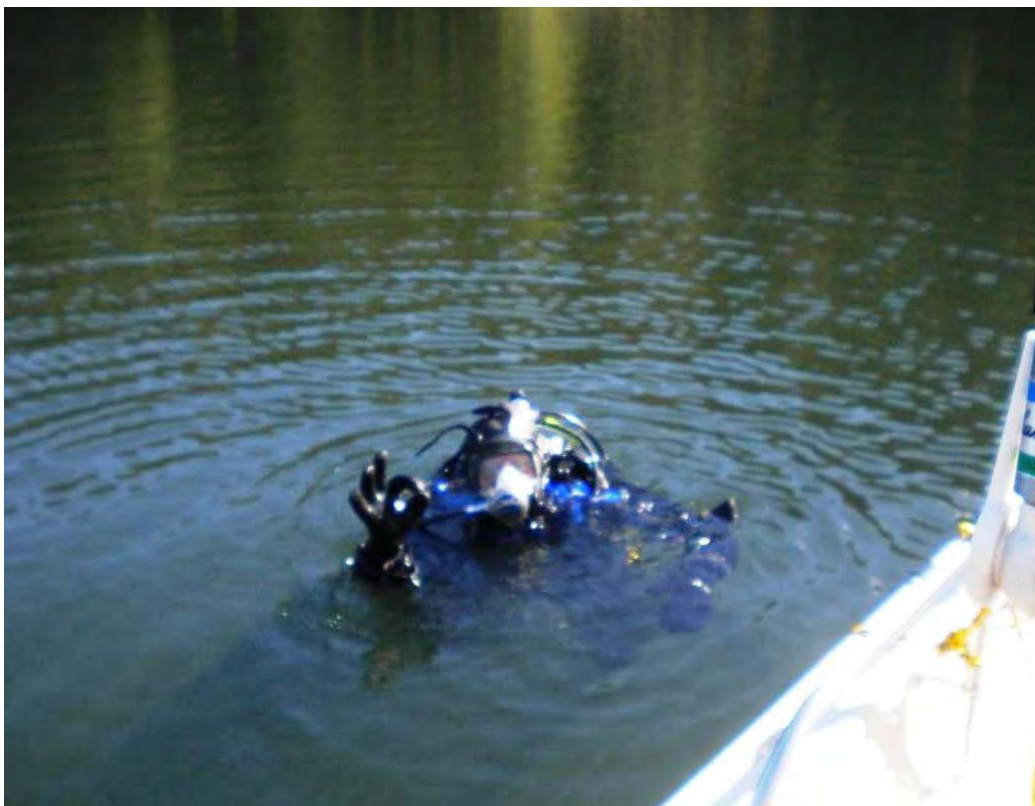


Photo 1: Professional diver with full face mask, diver-to-surface voice communications, and drysuit.



Photo 2: Sludge sample collected in 4' x 2" acetate liner.



Photo 3: Modified Geoprobe® sludge soil sampler with underwater slide hammer mounted on boat.



Photo 4: Modified Geoprobe® sludge soil sampler with underwater slide hammer ready to deploy.