

**REQUEST FOR PROPOSAL**  
**ENGINEERING SERVICES FOR**  
**REPLACEMENT OF THE ARBOR STREET STORM DRAIN**  
**PUMP STATION**

**No. P.W. 10-14-15**

**CITY OF ALAMEDA**  
**PUBLIC WORKS DEPARTMENT**

November 4, 2014

**IMPORTANT DATES:**

Proposal Due Date: December 4, 2014 at 2:00 pm  
Consultant Interviews: December 16 & 17, 2014  
Council Award Date : February 3, 2015  
Projected Agreement Start Date: February 23, 2015  
Contract Documents Due Date: August 31, 2015  
Advertise for Bids: November 6, 2015  
Council Awards: January 19, 2016  
Construction NTP: April 14, 2016  
Construction Completed: October 30, 2016  
Consultant Contract Ends: December 31, 2016

**CONTACT:**

Laurie Kozisek, Acting Senior Engineer  
City Hall West  
Public Works Department  
950 W. Mall Square, Room 110  
Alameda, CA 94501  
Office: (510) 747-7930 / Fax: (510) 769-6030

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Attachment A: Arbor Street Pump Station, SDPS Assessment Report prepared by Psomas, dated July 12, 2011.

## I. INTRODUCTION

The City of Alameda Public Works Department is proposing to replace the Arbor Street Storm Drain Pump Station. The City is seeking the services of qualified consultants to design and prepare complete construction documents, and provide construction support.

### A. Background

The Arbor Street Storm Drain Pump Station is situated along the northern shoreline of Alameda, adjacent to the Oakland Estuary, north of Buena Vista Avenue and Arbor Street, in an easement that is partly in the Alameda Yacht Club parking lot and partly in Marina Park. The Arbor Street Storm Drain Pump Station was originally constructed in 1948, and remodeled in 1994. The Storm Drain Pump Station Assessment, prepared by Psomas in 2011, recommends replacement of this pump station, based upon the condition of the pump station and the volumes projected in the Storm Drain Master Plan and 18" Sea Level Rise Analysis prepared by Schaaf & Wheeler in 2008.

The Arbor Street Storm Drain Pump Station consists of four submersible pumps with a total station capacity of approximately 32,000 gpm. The current 10 year storm flow is approximately 65,000 gpm. The proposed 10-year storm flow, once the three northern storm drain pump stations are hydraulically connected, is estimated to be 88,000 gpm. Sea level rise will impact the pump station, both by increasing the required lift, and by occasionally flooding the structure in its current location. The new pump station will require a new outfall from the pump station to the Oakland Estuary, a standby generator, and an automatic trash rack. Reconstruction will include removal of the original dry well that was abandoned in 1994. Construction cost is without contingency is estimated at \$2.1 million.

## II. SCOPE OF SERVICES

For this Request for Proposal (RFP), the scope of work includes, but is not limited to, the following:

1. Review the Storm Drain Pump Station Assessment, the Storm Drain Master Plan, the 18" Sea Level Rise Addendum, and the existing pump station plans.
2. Perform brief site visits to reconfirm the findings in the assessment documents. If the site visit yields additional work that is required or recommended, then the Consultant shall recommend such work to the City for consideration to be added to the final scope of work.
3. Schedule and attend project meetings.
4. Prepare plans, technical specifications, and engineer's estimate for demolition of existing pump station, installation of new pump station, and provisions for interim storm water handling. Submit 60%, 90%, 100% and bid set engineering plans to the City for review

and comment. Final Bid Set construction documents must be signed by the Consultant's representative, who shall be a registered professional engineer certified in the State of California. Final construction documents will be reviewed and signed by the City Engineer and the Maintenance Superintendent.

5. Include in the design, four each 90 hp Flygt submersible propeller pumps or acceptable equivalent, pump barrels, wet well, pump discharge structure, 400 kw standby generator with fuel tanks and automatic transfer switch, automatic trash rack, programmable logic controller (PLC), motor control center (MCC), supervisory control and data acquisition (SCADA), electrical service, electrical panel, antenna, intrusion alarms, ventilation, backflow preventer, hose bib, flap gates, 72" outfall, fencing and gates, site lighting, and asphalt surfacing of entire site. Jet grouting may be necessary due to soil conditions and high groundwater. Portions of SCADA may be reusable. If feasible, include upstream 5 mm screen total trash capture device.
6. Coordinate with the City's Maintenance Department to ensure the equipment to be selected will match equipment already installed in other storm drain pump stations to the maximum extent possible.
7. Determine if an asbestos and/or lead investigation is required, and if so, provide.
8. If the proposed work (including outfall and trash capture device(s)) is outside of the current permanent storm drain easement and City property, prepare drawings showing required additional easement. City will work with property owners to acquire the property.
9. As a separate option, provide environmental services necessary to produce a CEQA document and obtain shoreline-related permits. If this is not within the capabilities of the proposer or a subconsultant of the proposer, provide a line item for coordinating with a City-contracted environmental consultant.
10. Provide assistance during the City Plan Review process.
11. Provide construction management services in the form of submittal reviews, responses to requests for information (RFIs), construction site inspections, and other construction support if requested.

### III. PROPOSAL FORMAT

All proposals shall include the following minimum information:

A. Name of the Entity

Name of entity submitting the proposal, its mailing address, telephone and facsimile number, and the name of contact individual if further information is desired. In case of joint venture or other joint-prime relationship, an officer of each venture partner will sign.

B. Project Team

In response to this Request for Proposal (RFP), the prime Consultant should have a minimum of five years experience of pump stations mechanical and electrical design and construction management. The team shall have all necessary state, and federal certification applicable to the project. List prime and sub-consultants with individual addresses, telephone numbers and areas of expertise. Briefly describe the project responsibility of each team member.

C. Description of Organization, Management and Team Members

A description of the team/consultant organization, and a work plan that identifies the personnel to be assigned to each task. The organization description should clearly identify who will be the project manager and the day-to-day contact person for the job. Contract terms will not permit substitution of lead personnel without prior approval by Owner. A description of the qualifications of the professional personnel to be employed with a summary of similar work performed and a resume for each professional.

D. Scope of Work

The proposal should contain a description of each work task with an explanation of how the proposer plans to approach the tasks and the steps that will be taken to complete the task including analytical methods and tools. Proposer must demonstrate that they understand the magnitude and importance of each individual task. Tasks should be organized into phases constituting measurable deliverables.

E. Proposed Project Schedule

Time is of the essence for this agreement. The proposal shall include a schedule to undertake the work program. Consultant shall incorporate review period of all agencies into the schedule. Updated project schedule shall be provided at each meeting.

F. Proposed Fees

The proposal should contain a brief discussion of the consultant's preferred method of determining compensation. The amount of compensation should be broken down for each task including the cost of reimbursables. Proposed compensation rates for various job titles will be fixed during the entire project duration.

#### IV. SELECTION PROCESS

Selection will be based upon:

1. Responsiveness to the Request for Proposal.
2. Technical quality of the approach and methodology.
3. Key staff to be assigned to the project, their roles, prior experience, and available time to dedicate to the project.
4. Record of the firm in accomplishing work on other projects of a similar nature, including references.
5. The City's perception of the firm's ability to do the work.
6. Proximity to the project site, relative response time, availability to meet on site, and available alternatives to meeting in person.
7. Willingness to comply with the proposed Sample Consultant Agreement.
8. Cost, while not determinative, may be considered in the selection process.

#### V. PROPOSAL DUE DATE AND DELIVERY

Three (3) sealed copies of the proposal, clearly marked with the project description, should be submitted no later than:

Monday, December 4, 2014 at 2:00 p.m.

to the address below. All copies received by that time will be date and time stamped. Proposals will not be accepted after this time. FAXed or electronic proposals **will not** be accepted. Hand carried proposals will be accepted.

Proposals should be addressed to:

**City Hall West  
Public Works Department  
950 West Mall Square, Room 110  
Alameda, CA 94501  
Attention: Laurie Kozisek, Acting Senior Engineer**

#### VI. CONDITIONS OF REQUEST

##### A. General Conditions

The City reserves the right to cancel or reject all or a portion, or portions, of the request for proposals without notice. Further, the City makes no representations that any agreement will be awarded to any organization submitting a proposal. The City reserves the right to reject any and all proposals submitted in response to this request or any addenda thereto.

The City also reserves the right to reject any subconsultant or individual working on a consultant team and to replace the sub-consultant or individual with a mutually acceptable replacement.

Any changes to the proposal requirements will be made by written addendum.

B. Liability of Costs and Responsibility

The City shall not be liable for any costs incurred in response to this request for proposals. All costs shall be borne by the person or organization responding to the request. The person or organization responding to the request shall hold the City harmless from any and all liability, claim or expense whatsoever incurred by or on behalf of that person or organization. All submitted material becomes the property of the City of Alameda.

The selected lead consultant will be required to assume responsibility for all services offered in the proposal whether or not they possess them within their organization. The selected lead consultant will be the sole point of contact with regard to contractual matters, including payment of any and all charges resulting from the contract.

C. Validity

The proposer agrees to be bound by its proposal for a period of one hundred and twenty (120) working days commencing December 4, 2014, during which time the City may request clarification or correction of the proposal for the purpose of evaluation. Amendments or clarifications shall not affect the remainder of the proposal, but only that portion so amended or clarified.

D. Standard Consultant Agreement

A sample Consultant agreement has been provided in Appendix A for the proposer's review and comment. If a proposer wishes to take exception to any of the terms and conditions contained in the consultant agreement, these should be identified specifically; otherwise it will be assumed that the proposer is willing to enter into the agreement as it is written. Failure to identify contractual issues of dispute can later be the basis for the City disqualifying a proposer. Any exceptions to terms, conditions, or other requirements must be clearly stated. Otherwise, the City will consider that all items offered are in strict compliance with the RFP, and the successful proposer will be responsible for compliance. The City will consider such exceptions as part of the evaluation process which may constitute grounds for rejection of the proposal. The consultant agreement will not be executed by the City without first being signed by the proposer.

E. Permits and Licenses

Proposer, and all of proposer's sub-consultants, at its and/or their sole expense, shall obtain and maintain during the term of any agreement, all appropriate permits, certificates and licenses including, but not limited to, a City Business License which will be required in connection with the performance of services hereunder.

F. Oral and Written Explanation

The City will not be bound by oral explanations or instructions given at any time during the review process or after the award. Oral explanations given during the review process and after award become binding when confirmed in writing by an authorized City official. Written responses to question(s) asked by one proposer will be provided to all proposers who received Requests for Proposals.

G. Proposer's Representative

The person signing the proposal must be a legal representative of the firm authorized to bind the firm to an agreement in the event of the award.

H. Deliverables

Three bound copies, one loose copy (suitable for reproduction) of the final construction documents and a computer disk/hard drive containing all final documents in and all information are to be provided. (Engineering plans are to be in AutoCAD format 2010 or earlier. Specifications in Microsoft Word format).

Final Bid Set construction documents must be signed by the Consultant's representative, who shall be a registered professional engineer certified in the state of California. Final construction documents must also be reviewed and signed by the City of Alameda City Engineer and Maintenance Superintendent.

The Consultant will develop a system to assemble, organize, store and utilize data in an electronic format. At the outset of the agreement, the Consultant will submit a description of the software to be used in preparation of the complete construction documents

APPENDIX A:

City's Standard Consultant Agreement

ATTACHMENTS:

Attachment A: Arbor Street Pump Station, SDPS Assessment Report prepared by Psomas, dated July 12, 2011.

# **APPENDIX A**

## **City's Standard Consultant Agreement**

## CONSULTANT AGREEMENT

THIS AGREEMENT, entered into this \_\_\_\_ day of \_\_\_\_\_, 2014, by and between CITY OF ALAMEDA, a municipal corporation (hereinafter referred to as "City"), and **COMPANY NAME**, a (California corporation, partnership, sole proprietor, individual) whose address is **ADDRESS**, hereinafter called the Consultant, in reference to the following:

### **RECITALS:**

- A. City is a municipal corporation duly organized and validly existing under the laws of the State of California with the power to carry on its business as it is now being conducted under the statutes of the State of California and the Charter of the City.
- B. The Arbor Street Storm Drain Pump Station is in need of replacement. The City issued a request for proposals and reached out to the Consultant's on the City's bidders list, interviewed qualified firms, and selected the firm that best meets the City's needs.
- C. Consultant is specially trained, experienced and competent to perform the special services which will be required by this Agreement.
- D. Consultant possesses the skill, experience, ability, background, certification and knowledge to provide the services described in this Agreement on the terms and conditions described herein.
- E. City and Consultant desire to enter into an agreement for the preparation of contract documents and construction phase assistance for the Arbor Street Storm Drain Pump Station Replacement project, No. P.W. 10-14-15, upon the terms and conditions herein.

NOW, THEREFORE, it is mutually agreed by and between the undersigned parties as follows:

- 1. **TERM:**  
The term of this Agreement shall commence on the \_\_\_\_ day of \_\_\_\_\_, 2014 and shall terminate on the \_\_\_\_ day of \_\_\_\_\_, 2014 unless terminated earlier as set forth herein.
- 2. **SERVICES TO BE PERFORMED:**  
Consultant agrees to perform all necessary work at its own cost and expense, to furnish all labor, tools, equipment, materials, except as otherwise specified, and to do all necessary work included in Exhibit A as requested. The Consultant acknowledges that the work plan included in Exhibit A is tentative and does not commit the City to request Consultant to perform all tasks included therein.

3. COMPENSATION TO CONSULTANT:

Consultant shall be compensated for services performed pursuant to this Agreement in the amount set forth in Exhibit "A" which is attached hereto and incorporated herein by this reference. Payment shall be made by checks drawn on the treasury of the City, to be taken from the Urban Runoff Fund (CIP 904714).

Payment will be made by the City in the following manner: On the first day of each month, Consultant shall submit a written estimate of the total amount of work done the previous month. Payment will be for time and direct costs and are not to exceed budget. Pricing and accounting of charges are to be according to the fee schedule in Exhibit "B" unless mutually agreed upon in writing. Extra work must be approved in writing by City prior to performance and shall be paid on a Time and Material basis using Exhibit "B" schedule.

Total compensation for work is \$\_\_\_\_\_, with a \_\_\_\_\_ percent contingency in the amount of \$\_\_\_\_\_ for a total not to exceed of \$\_\_\_\_\_. Use of contingency shall be for items of work outside the original scope and requires prior written authorization by the City.

4. TIME IS OF THE ESSENCE:

Consultant and City agree that time is of the essence regarding the performance of this Agreement.

5. STANDARD OF CARE:

Consultant agrees to perform all services hereunder in a manner commensurate with the prevailing standards of like professionals in the San Francisco Bay Area and agrees that all services shall be performed by qualified and experienced personnel who are not employed by the City nor have any contractual relationship with City.

6. INDEPENDENT PARTIES:

Consultant hereby declares that it is engaged as an independent business and it agrees to perform its services as an independent contractor. The manner and means of conducting the work are under the control of Consultant, except to the extent they are limited by statute, rule or regulation and the express terms of this Agreement. No civil service status or other right of employment will be acquired by virtue of Consultant's services. None of the benefits provided by City to its employees, including but not limited to, unemployment insurance, workers' compensation plans, vacation and sick leave are available from City to Consultant, its employees or agents. Deductions shall not be made for any state or federal taxes, FICA payments, PERS payments, or other purposes normally associated with an employer-employee relationship from any fees due Consultant. Payments of the above items, if required, are the responsibility of Consultant.

7. IMMIGRATION REFORM AND CONTROL ACT (IRCA):

Consultant assumes any and all responsibility for verifying the identity and employment authorization of all of his/her employees performing work hereunder, pursuant to all applicable IRCA or other federal, or state rules and regulations. Consultant shall indemnify, defend, and hold City harmless from and against any loss, damage, liability, costs or expenses arising from any noncompliance of this provision by Consultant.

8. NON-DISCRIMINATION:

Consistent with City's policy that harassment and discrimination are unacceptable employer/employee conduct, Consultant agrees that harassment or discrimination directed toward a job applicant, a City employee, or a citizen by Consultant or Consultant's employee or subcontractor on the basis of race, religious creed, color, national origin, ancestry, handicap, disability, marital status, pregnancy, sex, age, or sexual orientation will not be tolerated. Consultant agrees that any and all violations of this provision shall constitute a material breach of this Agreement.

9. HOLD HARMLESS:

Indemnification:

Consultant shall indemnify, defend, and hold harmless City, its City Council, boards, commissions, officials, employees, Alameda West Lagoon Homeowners Association, and volunteers ("Indemnitees") from and against any and all loss, damages, liability, claims, suits, costs and expenses whatsoever, including reasonable attorneys' fees ("Claims"), arising from or in any manner connected to Consultant's negligent act or omission, whether alleged or actual, regarding performance of services or work conducted or performed pursuant to this Agreement. If Claims are filed against Indemnitees which allege negligence on behalf of the Consultant, Consultant shall have no right of reimbursement against Indemnitees for the costs of defense even if negligence is not found on the part of Consultant. However, Consultant shall not be obligated to indemnify Indemnitees from Claims arising from the sole negligence or willful misconduct of Indemnitees.

Indemnification For Claims for Professional Liability:

As to Claims for professional liability only, Consultant's obligation to defend Indemnitees (as set forth above) is limited to the extent to which its professional liability insurance policy will provide such defense costs.

10. INSURANCE:

On or before the commencement of the term of this Agreement, Consultant shall furnish City with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of insurance coverage in compliance with paragraphs 10A, B, C, D and E. Such certificates, which do not limit Consultant's indemnification, shall also contain substantially the following statement: "Should any of the above insurance covered by this certificate be canceled or coverage reduced before the expiration date thereof, the insurer affording coverage shall provide thirty (30) days' advance written notice to the City of Alameda by certified mail, Attention: Risk Manager." It is agreed that Consultant shall maintain in force at all times during the performance of this Agreement all appropriate coverage of insurance required by this Agreement with an insurance company that is acceptable to City and licensed to do insurance business in the State of California. Endorsements naming the City, its City Council, boards, commissions, officials, employees, and volunteers as additional insured shall be submitted with the insurance certificates.

A. COVERAGE:

Consultant shall maintain the following insurance coverage:

(1) Workers' Compensation:

Statutory coverage as required by the State of California.

(2) Liability:

Commercial general liability coverage in the following minimum limits:

Bodily Injury:           \$1,000,000 each occurrence  
                                  \$2,000,000 aggregate - all other

Property Damage:     \$1,000,000 each occurrence  
                                  \$2,000,000 aggregate

If submitted, combined single limit policy with aggregate limits in the amounts of \$2,000,000 will be considered equivalent to the required minimum limits shown above.

(3) Automotive:

Comprehensive automotive liability coverage (any auto) in the following minimum limits:

Bodily Injury:           \$1,000,000 each occurrence  
Property Damage:       \$1,000,000 each occurrence  
                                  or  
Combined Single Limit:   \$2,000,000 each occurrence

(4) Professional Liability:

Professional liability insurance which includes coverage for the professional acts, errors and omissions of Consultant in the amount of at least \$2,000,000.

B. SUBROGATION WAIVER:

Consultant agrees that in the event of loss due to any of the perils for which he/she has agreed to provide comprehensive general and automotive liability insurance, Consultant shall look solely to his/her insurance for recovery. Consultant hereby grants to City, on behalf of any insurer providing comprehensive general and automotive liability insurance to either Consultant or City with respect to the services of Consultant herein, a waiver of any right to subrogation which any such insurer of said Consultant may acquire against City by virtue of the payment of any loss under such insurance.

C. FAILURE TO SECURE:

If Consultant at any time during the term hereof should fail to secure or maintain the foregoing insurance, City shall be permitted to obtain such insurance in the Consultant's name or as an agent of the Consultant and shall be compensated by the Consultant for the costs of the insurance premiums at the maximum rate permitted by law and computed from the date written notice is received that the premiums have not been paid.

D. ADDITIONAL INSURED:

City, its City Council, boards, commissions, officials, employees, and volunteers shall be named as an additional insured under all insurance coverages, except any professional liability insurance, required by this Agreement. The naming of an additional insured shall not affect any recovery to which such additional insured would be entitled under this policy if not named as such additional insured. An additional insured named herein shall not be held liable for any premium, deductible portion of any loss, or expense of any nature on this policy or any extension thereof. Any other insurance held by an additional insured shall not be required to contribute anything toward any loss or expense covered by the insurance provided by this policy.

E. SUFFICIENCY OF INSURANCE:

The insurance limits required by City are not represented as being sufficient to protect Consultant. Consultant is advised to confer with Consultant's insurance broker to determine adequate coverage for Consultant.

11. CONFLICT OF INTEREST:

Consultant warrants that it is not a conflict of interest for Consultant to perform the services required by this Agreement. Consultant may be required to fill out a conflict of interest form if the services provided under this Agreement require Consultant to make certain governmental decisions or serve in a staff capacity as defined in Title 2, Division 6, Section 18700 of the California Code of Regulations.

12. PROHIBITION AGAINST TRANSFERS:

Consultant shall not assign, sublease, hypothecate, or transfer this Agreement, or any interest therein, directly or indirectly, by operation of law or otherwise, without prior written consent of City. Any attempt to do so without said consent shall be null and void, and any assignee, sublessee, hypothecate or transferee shall acquire no right or interest by reason of such attempted assignment, hypothecation or transfer. However, claims for money by Consultant from City under this Agreement may be assigned to a bank, trust company or other financial institution without prior written consent. Written notice of such assignment shall be promptly furnished to City by Consultant.

The sale, assignment, transfer or other disposition of any of the issued and outstanding capital stock of Consultant, or of the interest of any general partner or joint venturer or syndicate member or cotenant, if Consultant is a partnership or joint venture or syndicate or cotenancy, which shall result in changing the control of Consultant, shall be construed as an assignment of this Agreement. Control means fifty percent (50%) or more of the voting power of the corporation.

13. SUBCONTRACTOR APPROVAL:

Unless prior written consent from City is obtained, only those people and subcontractors whose names and resumes are attached to this Agreement shall be used in the performance of this Agreement.

In the event that Consultant employs subcontractors, such subcontractors shall be required to furnish proof of workers' compensation insurance and shall also be required to carry general,

automobile and professional liability insurance in reasonable conformity to the insurance carried by Consultant. In addition, any work or services subcontracted hereunder shall be subject to each provision of this Agreement.

14. PERMITS AND LICENSES:

Consultant, at his/her sole expense, shall obtain and maintain during the term of this Agreement, all appropriate permits, certificates and licenses including, but not limited to, a City Business License, that may be required in connection with the performance of services hereunder.

15. REPORTS:

A. Each and every report, draft, work product, map, record and other document, hereinafter collectively referred to as "Report", reproduced, prepared or caused to be prepared by Consultant pursuant to or in connection with this Agreement, shall be the exclusive property of City. Consultant shall not copyright any Report required by this Agreement and shall execute appropriate documents to assign to City the copyright to Reports created pursuant to this Agreement. Any Report, information and data acquired or required by this Agreement shall become the property of City, and all publication rights are reserved to City.

B. All Reports prepared by Consultant may be used by City in execution or implementation of:

- (1) The original Project for which Consultant was hired;
- (2) Completion of the original Project by others;
- (3) Subsequent additions to the original project; and/or
- (4) Other City projects as appropriate.

C. Consultant shall, at such time and in such form as City may require, furnish reports concerning the status of services required under this Agreement.

D. All Reports required to be provided by this Agreement shall be printed on recycled paper. All Reports shall be copied on both sides of the paper except for one original, which shall be single sided.

E. No Report, information or other data given to or prepared or assembled by Consultant pursuant to this Agreement shall be made available to any individual or organization by Consultant without prior approval by City.

16. RECORDS:

Consultant shall maintain complete and accurate records with respect to sales, costs, expenses, receipts and other such information required by City that relate to the performance of services under this Agreement.

Consultant shall maintain adequate records of services provided in sufficient detail to permit an evaluation of services. All such records shall be maintained in accordance with generally accepted accounting principles and shall be clearly identified and readily accessible. Consultant shall provide free access to such books and records to the representatives of City or its designees at all

proper times, and gives City the right to examine and audit same, and to make transcripts therefrom as necessary, and to allow inspection of all work, data, documents, proceedings and activities related to this Agreement. Such records, together with supporting documents, shall be kept separate from other documents and records and shall be maintained for a period of three (3) years after receipt of final payment.

If supplemental examination or audit of the records is necessary due to concerns raised by City's preliminary examination or audit of records, and the City's supplemental examination or audit of the records discloses a failure to adhere to appropriate internal financial controls, or other breach of contract or failure to act in good faith, then Consultant shall reimburse City for all reasonable costs and expenses associated with the supplemental examination or audit.

17. NOTICES:

All notices, demands, requests or approvals to be given under this Agreement shall be given in writing and conclusively shall be deemed served when delivered personally or on the second business day after the deposit thereof in the United States Mail, postage prepaid, registered or certified, addressed as hereinafter provided.

All notices, demands, requests, or approvals from Consultant to City shall be addressed to City at:

City of Alameda  
Public Works Department  
950 West Mall Square, Room 110  
Alameda, CA 94501  
Attention: Laurie Kozisek, Acting Senior Engineer  
Office: (510) 747-7930 / Fax: (510) 769-6030

All notices, demands, requests, or approvals from City to Consultant shall be addressed to Consultant at:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

18. TERMINATION:

In the event Consultant fails or refuses to perform any of the provisions hereof at the time and in the manner required hereunder, Consultant shall be deemed in default in the performance of this Agreement. If such default is not cured within a period of two (2) business days after receipt by Consultant from City of written notice of default, specifying the nature of such default and the steps necessary to cure such default, City may terminate the Agreement forthwith by giving to the Consultant written notice thereof.

City shall have the option, at its sole discretion and without cause, of terminating this Agreement by giving seven (7) days' prior written notice to Consultant as provided herein. Upon termination of this Agreement, each party shall pay to the other party that portion of compensation specified in this Agreement that is earned and unpaid prior to the effective date of termination.

19. PURCHASES OF MINED MATERIALS REQUIREMENT:

Consultant shall ensure that all purchases of mined materials such as construction aggregate, sand and gravel, crushed stone, road base, fill materials, and any other mineral materials must originate from a surface mining operation identified on the AB3098 List per the Surface Mining and Reclamation Act of 1975 (SMARA).

Within five days of award of contract, Consultant shall submit a report to City which lists the intended suppliers for the above materials and demonstrates that the suppliers are in compliance with the SMARA requirements. The AB3098 List is maintained by the Department of Conservation's Office of Mine Reclamation (OMR) and can be viewed at: [www.conservation.ca.gov/OMR/ab\\_3098\\_list/index.htm](http://www.conservation.ca.gov/OMR/ab_3098_list/index.htm). Note that the list changes periodically and should be reviewed accordingly.

20. COMPLIANCES:

Consultant shall comply with all applicable state and federal laws and all ordinances, rules and regulations enacted or issued by City.

21. CONFLICT OF LAW:

This Agreement shall be interpreted under, and enforced by the laws of the State of California excepting any choice of law rules which may direct the application of laws of another jurisdiction. The Agreement and obligations of the parties are subject to all valid laws, orders, rules, and regulations of the authorities having jurisdiction over this Agreement (or the successors of those authorities.)

Any suits brought pursuant to this Agreement shall be filed with the courts of the County of Alameda, State of California.

22. ADVERTISEMENT:

Consultant shall not post, exhibit, display or allow to be posted, exhibited, displayed any signs, advertising, show bills, lithographs, posters or cards of any kind pertaining to the services performed under this Agreement unless prior written approval has been secured from City to do otherwise.

23. WAIVER:

A waiver by City of any breach of any term, covenant, or condition contained herein shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant, or condition contained herein, whether of the same or a different character.

24. INTEGRATED CONTRACT:

This Agreement represents the full and complete understanding of every kind or nature whatsoever between the parties hereto, and all preliminary negotiations and agreements of whatsoever kind or nature are merged herein. No verbal agreement or implied covenant shall be held to vary the provisions hereof. Any modification of this Agreement will be effective only by written execution signed by both City and Consultant.

25. INSERTED PROVISIONS:

Each provision and clause required by law to be inserted into the Agreement shall be deemed to be enacted herein, and the Agreement shall be read and enforced as though each were included herein. If through mistake or otherwise, any such provision is not inserted or is not correctly inserted, the Agreement shall be amended to make such insertion on application by either party.

26. CAPTIONS:

The captions in this Agreement are for convenience only, are not a part of the Agreement and in no way affect, limit or amplify the terms or provisions of this Agreement.

IN WITNESS WHEREOF, the parties have caused the Agreement to be executed on the day and year first above written.

CONSULTANT  
(Type of Corporation)

CITY OF ALAMEDA  
A Municipal Corporation

\_\_\_\_\_  
Name  
Title

\_\_\_\_\_  
John A. Russo  
City Manager

\_\_\_\_\_  
Name  
Title

RECOMMENDED FOR APPROVAL:

\_\_\_\_\_  
Robert G. Haun  
Public Works Director

APPROVED AS TO FORM:  
City Attorney

\_\_\_\_\_  
Andrico Penick  
Assistant City Attorney

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY  
CG 20 10 10 93

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED - OWNERS, LESSEES or CONTRACTORS FORM B**

This endorsement modifies insurance provided under the following:

**COMMERCIAL GENERAL LIABILITY COVERAGE PART**

**SCHEDULE**

Name of Person or Organization:

City of Alameda  
Public Works Department  
Alameda Point, Building 1  
950 West Mall Square, Room 110  
Alameda, CA 94501-7558



(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

**REF:** \_\_\_\_\_  
**The City of Alameda, its City Council, boards and commissions, officers, employees, Alameda West Lagoon Homeowners Association, and volunteers are additional insured for work done on their behalf by the named insured.**

PRIMARY INSURANCE:  
IT IS UNDERSTOOD AND AGREED THAT THIS INSURANCE IS PRIMARY AND ANY OTHER INSURANCE MAINTAINED BY THE ADDITIONAL INSURED SHALL BE EXCESS ONLY AND NOT CONTRIBUTING WITH THIS INSURANCE.

SEVERABILITY OF INTEREST:  
IT IS AGREED THAT EXCEPT WITH RESPECT TO THE LIMIT OF INSURANCE, THIS COVERAGE SHALL APPLY AS IF EACH ADDITIONAL INSURED WERE THE ONLY INSURED AND SEPARATELY TO EACH INSURED AGAINST WHOM CLAIM IS MADE OR SUIT IS BROUGHT.

WAIVER OF SUBROGATION:  
IT IS UNDERSTOOD AND AGREED THAT THE COMPANY WAIVES THE RIGHT OF SUBROGATION AGAINST THE ABOVE ADDITIONAL INSURED (S), BUT ONLY AS RESPECTS THE JOB OR PREMISES DESCRIBED IN THE CERTIFICATE ATTACHED HERETO.

NOTICE OF CANCELLATION:  
IT IS UNDERSTOOD AND AGREED THAT IN THE EVENT OF CANCELLATION OF THE POLICY FOR ANY REASON OTHER THAN NON-PAYMENT OF PREMIUM, 30 DAYS WRITTEN NOTICE WILL BE SENT TO THE CERTIFICATE HOLDER BY MAIL. IN THE EVENT THE POLICY IS CANCELED FOR NON-PAYMENT OF PREMIUM, 10 DAYS WRITTEN NOTICE WILL BE SENT TO THE ABOVE.



# **ATTACHMENT A**

**Storm Drain Pump Station Assessment Report  
Prepared by Psomas, dated July 12, 2011  
(portions applying to Arbor Street Pump Station)**

**FINAL REPORT**  
**STORM DRAIN PUMP STATION ASSESSMENT**  
**CITY OF ALAMEDA**

July 12, 2011

Prepared for:  
**CITY OF ALAMEDA, PUBLIC WORKS DEPARTMENT**  
950 West Mall Square, Room 110  
Alameda, California 94501-7575

Prepared by:  
**PSOMAS**  
Gregory Ow  
165 Lennon Lane  
Suite 105  
Walnut Creek, CA 94598  
Project No. P6DOD08719

## **1.0 Executive Summary**

The City of Alameda's existing storm drain pump stations were evaluated to determine their ability to convey storm water flows from a 10-year storm event during the current 10-year high tide, as well as during the anticipated future 10-year high tide. The reliability and capacity of these stations is of the utmost importance due to the low elevations in the majority of Alameda and potential for flooding from wet weather events during high tides. Chapter 2 contains a summary of stations that were evaluated for this study, along with a summary of design criteria for each station.

Another goal of the assessment was to identify needed improvements to provide reliable, safe, and efficient pump station facilities. Psomas worked closely with Fard Engineers, and The Crosby Group to determine the electrical and structural inadequacies at each station and to identify where improvements are needed. Pump station assessment and recommended improvements are provided in Chapter 5. Photographs taken during field assessments are included in Appendix C.

Psomas worked with Pumping Efficiency Testing Services (PETS) to perform field pump testing at most of the pump stations to determine actual pump flow rates and pump head, as well as pump efficiency. PETS used the field test data to provide an analysis of where pump rehabilitation and/or replacement could result in energy cost savings for the City. The results of the pump testing are presented in Chapter 3. Pump testing data sheets are included in Appendix A.

### **1.1 Capital Improvement Program**

Chapter 6 presents the organization of the recommended improvements developed in Chapters 3 and 5 into capital improvement program (CIP) projects. The CIP projects were prioritized into the following three categories:

- Level 1 - High Priority – defined as projects which are necessary to prevent a significant risk of flooding from heavy storm water runoff events.
- Level 2 - Necessary Projects – defined as projects that must be done to improve pump station capacity and/or reliability or safety.
- Level 3 - Discretionary Projects – defined as those that are needed in the long-term, but where the City has a significant level of control as to when they should be implemented.

### **1.2 Cost Evaluation**

All project costs presented herein were estimated at a planning-level of accuracy (plus 50 percent to minus 25 percent). The project costs include an estimating contingency of 30 percent and an implementation cost of 55 percent. Components of the implementation cost are as follows:

Engineering Design	10 %
Construction Contingency	30 %
Project Administration / Legal & Permitting	15%
<b>Total</b>	<b>55 %</b>

For more information concerning the estimated costs for improvements at each station, refer to Appendix D.

### 1.3 Recommended Improvements

A summary of the recommended improvements and their associated level of priority and estimated costs are listed in Table 1-1.

**Table 1-1 Recommended Improvements**

Station	Level of Priority	Summary of Improvements	Estimated Cost <sup>(1)</sup>
Arbor	1	Complete Pump Station Replacement. Outfall replacement. Install Standby Generator and Automatic Trash Rack.	\$3,891,000
Central/Eastshore	1	Complete Pump Station Replacement. Outfall Replacement. Install Standby Generator and Automatic Trash Rack.	\$2,805,000
Golf Course	2	Install Wiring in Conduit; Provide Anti-Slip Surfacing; Install Fire Extinguisher	\$6,000
Golf Course	3	Install Paved Driveway, Standby Generator, and Fence Around Control Panel. Provide Site lighting and Wash Down Facilities. Coatings and Repairs.	\$198,000
Harbor Bay System I	3	Provide Wash Down Facilities. Minor Structural Repair. Provide Control Panel Alarm and Fire Extinguisher.	\$17,000
Harbor Bay System II	3	Replace Pump. Install Standby Generator. Replace hatches. Site Lighting and Alarms.	\$257,000
Main Street	2	Install Ladder & Handrailing; Install Ventilation & Fire Extinguisher; Anchors for Control Panel & Pump Controller and Level Sensors	\$84,000
Main Street	3	Install Standby Generator. Replace Hatches. Provide Station Wash Down Facilities.	\$158,000
Northside	1	Replace Pumps. Other improvements per City of Alameda Northside Pump Station Upgrades Project No. PW 02-10-06.	\$900,000 <sup>(2)</sup>
Northside	2	Replace Pumps with New Pumps. Replace Checker Plate to Remove Trip Hazard.	\$587,000
Third Street	2	Replace Hatch. Provide System for Wet Well Entry. Recoat piping. Replace Site Fence. Provide wash down facilities and Standby Generator.	\$86,500

### 2.1.1 Arbor Pump Station

The Arbor Pump Station is located on the northern side of Alameda off of Buena Vista Avenue near the Alameda Yacht Club. The station was originally constructed in 1948 with two pumps located in a dry well. In 1994 the dry well was abandoned, and the wet well was modified for installation of four submersible pumps. Each pump discharges through individual 24-inch diameter pipes equipped with flaps gates into a discharge structure. Flow is conveyed from the discharge structure by gravity through a 54-inch outfall to the San Francisco Bay. Design criteria for the Arbor Pump Station is summarized in Table 2-1.

**Table 2-1 Arbor Pump Station Design Criteria**

Criteria	Value
Number of pumps	4
Type of pump	Submersible, propeller type
Manufacturer & Model	Paco Model SP16A
Pump barrel diameter (inches)	30
Pump discharge diameter (inches)	24
Pump capacity, each (gpm)	7,900 <sup>(1)</sup>
Pump total dynamic head (feet)	15 <sup>(1)</sup>
Total pump station capacity (gpm)	31,600 <sup>(1)</sup>
Motor horsepower (hp)	40
Motor nameplate amperes (A)	53.3
Motor manufacturer	Reliance
Motor type	P
Motor frame	X320TY
Motor voltage & phase	460 volt, 3 phase
Motor revolutions per minute (rpm)	1170
Pump controls	Automatic; bubbler level control
Main Switchboard Electrical Criteria	
Enclosure type	NEMA 3R
Switchboard nameplate amperes (A)	400
Main breaker (A)	300
Power supply	480 volt, 3 phase, 4W
Inlet and Outlet Piping	
Inlet pipe diameter (inches)	54
Outfall pipe diameter (inches)	54

Notes:

1. Values for pump design capacity, total dynamic head (TDH), and station capacity provided by Schaaf and Wheeler.

### 3.0 Pump Station Hydraulic Capacity

Each storm water pump station’s hydraulic capacity and ability to meet the design 10-year storm water flows at current 10-year high tide and future high tide was evaluated and is presented herein. Pump testing was conducted on some stations as well to compare actual pumping capacity against design pumping capacity. The method to determine the existing station’s hydraulic capacity is presented first, followed by the results of the hydraulic analysis and pump testing for each station.

#### 3.1 Storm Water Flow and High Tide Design Basis

The first step in assessing the City’s storm water pump stations was to determine the required storm water volume the station must convey for the design 10-year storm event, and the ability of the pumps to convey that flow during the 10-year high tide and at the anticipated future 10-year high tide. The 10-year storm water flows were provided by Schaaf & Wheeler, and are summarized in Table 3-1. The 10-year high tide high tide level was determined from the 2008 Storm Drain Master Plan. The anticipated future high tide elevation was determined to be 18 inches above the current 10 year high tide, per “The Climate Change Impacts to Storm Drain Improvements Addendum to the Storm Drain Master Plan” prepared by Schaaf & Wheeler in 2009. The values for the 10-year high tide and anticipated future high tide were confirmed by communication with Schaaf and Wheeler and are as follows:

- The 10-year high tide elevation = 4.56 feet National Geodetic Vertical Datum (NGVD).
- The anticipated future high tide elevation = 6.06 feet NGVD (assumed to be 18 inches higher than current tide levels).

**Table 3-1 Design 10-year Storm Water Flow Influent to Each Station**

Pump Station	10-Year Storm Water Flow (gallons per minute) <sup>(1)</sup>
Arbor Pump Station	88,420 <sup>(2)</sup>
Central/Eastshore Pump Station	19,750 <sup>(2)</sup>
Golf Course Pump Station	5,390
Harbor Bay System I Pump Station	NA <sup>(3)</sup>
Harbor Bay System II Pump Station	NA <sup>(3)</sup>
Main Street Pump Station	2,560
Northside Pump Station	60,000 <sup>(2)</sup>
Third Street Pump Station	2,065
Webster Street Pump Station	2,700

Notes:

1. Design 10-year storm water flows provided by Schaaf & Wheeler.
2. Design 10-year storm water flow into station following improvements to the storm water collection system and construction of a new outfall as recommended in Schaaf & Wheeler’s storm drain master plan. Flow information provided by Schaaf & Wheeler.

3. NA = Not Applicable. Pumps are designed to maintain lagoon water surface levels and are not storm water pumps.

## **3.2 Hydraulic Analysis**

### **3.2.1 Existing Pump Curves**

A hydraulic analysis was performed for each pump station. Pump curves for all stations except Harbor Bay System I and II were created using data provided by Schaaf and Wheeler. Pump curves for Harbor Bay System I and II were developed based on record drawings and information provided from Prime Pump Corporation and the City.

### **3.2.2 System Curves**

System curves were developed for pump discharges and forcemains (as applicable), and/or for determining outfall capacity (for gravity flow to the San Francisco Bay).

A hydraulic analysis of pump station gravity outfall piping was performed for the following stations:

- Arbor Pump Station
- Central/Eastshore Pump Station
- Golf Course Pump Station
- Main Street Pump Station
- Northside Pump Station

For the following stations, system curves were developed for pump forcemains only:

- Harbor Bay System I Pump Station
- Harbor Bay System II Pump Station
- Third Street Pump Station
- Webster Street Pump Station

The Harbor Bay System I Pump Station discharges into a small structure, which is located in the San Francisco Bay. It does not have an outfall. The Harbor Bay System II Pump Station discharges into a structure with an outfall. The outfall was not analyzed because it is a 48-inch diameter pipe, which is clearly more than adequate for the one 10 horsepower pump at the station. The Third Street Pump Station discharges into the storm drain collection system and the Webster Street Pump Station discharges through a forcemain into the San Francisco Bay.

In order to develop the system curves for each pump station, the following information was required:

- Pump static lift (determined from pump operating levels and the elevation at discharge)
- Outfall pipe length, diameter, and material
- Hazen-Williams Coefficient of Roughness (C-Value)

- Minor losses (K-Value)

### 3.2.2.1 Pump Static Lift

To develop system curves for the existing storm drain pump stations, the pump static lift must be determined. Static lift is the difference in suction and discharge elevation for the pump. To determine suction elevation, pump operating levels were added to the existing wet well floor elevations (obtained from record drawings) and adjusted to NGVD.

Where possible, pump operating levels were determined from station pump control panels in the field. In some cases, actual operating levels were unknown, and record drawings were consulted for determining suction elevation.

The discharge elevation must be determined in one of two ways:

- For non-submerged discharges, the pump's discharge pipe centerline elevation is used for the discharge elevation.
- For submerged discharges, the discharge elevation is equal to the water surface elevation above the discharge.

For the pump stations with pump discharge structures, the water elevation at discharge is dependent upon outfall capacity. During a storm event and high tide, the water level in the pump discharge structure will rise to a level where there is sufficient head above the tide level to push incoming flow through the outfall. Water elevations in pump discharge structures were determined by calculating the head required to push incoming flows from a 10-year storm event through outfalls during the anticipated future 10-year high tide level. Table 3-2 summarizes suction and discharge elevations used for static lift. The minimum and maximum static lifts are used to determine pump and station operating flow ranges.

**Table 3-2 Pump Suction and Discharge Elevations**

Pump Station	Elevation Pumps On (ft NGVD)	Elevation Pumps Off (ft NGVD)	Discharge Elevation (ft NGVD)	Pump Discharge Pipe Centerline Elevation (ft NGVD)	Minimum Static Lift <sup>(1)</sup> (ft)	Maximum Static Lift <sup>(2)</sup> (ft)
Arbor	-0.4	-3.4	9.1 <sup>(3)</sup>	3.8	4.2	12.5
Central / Eastshore	-1.7	-5.2	11.1 <sup>(3)</sup>	4.1	5.8	16.3
Golf Course	-4.6 <sup>(4)</sup>	-6.1 <sup>(4)</sup>	6.2 <sup>(3)</sup>	NA <sup>(5)</sup>	9.3 <sup>(7)</sup>	12.3
Harbor Bay System I <sup>(8)</sup>	0.2	NA <sup>(5)</sup>	6.1 <sup>(6)</sup>	NA <sup>(5)</sup>	4.4	5.9
Harbor Bay System II <sup>(8)</sup>	-0.1	NA <sup>(5)</sup>	6.1 <sup>(6)</sup>	NA <sup>(5)</sup>	4.7	6.2
Main Street	-0.6	-3.1	6.7 <sup>(3)</sup>	3.4	4.0	9.8

Pump Station	Elevation Pumps On (ft NGVD)	Elevation Pumps Off (ft NGVD)	Discharge Elevation (ft NGVD)	Pump Discharge Pipe Centerline Elevation (ft NGVD)	Minimum Static Lift <sup>(1)</sup> (ft)	Maximum Static Lift <sup>(2)</sup> (ft)
Northside	-0.3	-2.3	7.0 <sup>(3)</sup>	4.5	4.8	9.3
Third Street	3.4 <sup>(4)</sup>	-1.6 <sup>(4)</sup>	3.7 <sup>(9)</sup>	3.7	0.3	6.0
Webster	-3.0	-6.0	6.1 <sup>(6)</sup>	NA <sup>(5)</sup>	7.2 <sup>(7)</sup>	12.1

Notes:

1. Minimum static lift is equal to the pump centerline elevation minus the elevation when pumps turn on.
2. Maximum static lift is equal to the discharge elevation minus the elevation when pumps turn off.
3. Water elevation in pump discharge structure required to push incoming flows from a 10-year storm event through outfall during the anticipated future 10-year high tide level of 6.06 ft.
4. Data obtained from record drawings.
5. NA = Not applicable.
6. Discharge elevation equal to the anticipated future 10-year high tide level.
7. Because this is a forcemain, minimum static lift based on discharge water surface elevation rather than on pump discharge pipe centerline elevation.
8. Pump on elevation equal to average lagoon elevation from record drawings. Minimum static lift equal to 10-year high tide elevation minus pump on elevation. Maximum static lift equal to anticipated future high tide elevation minus pump on elevation.
9. Assumes free discharge into storm drain collection system. Discharge elevation equal to pump discharge pipe centerline elevation.

### 3.2.2.2 Pipe Length, Diameter, and Material

Pipe length, diameter, and material for pump discharges and forcemains/outfalls were determined at each station from the City's record drawings and field verified wherever possible. Outfall lengths could not be determined from record drawings for Arbor Pump Station and Golf Course Pump Station. For these stations, outfall lengths from Schaaf and Wheeler's model created for the 2008 "Storm Drain Master Plan" was used.

### 3.2.2.3 Hazen-Williams Coefficient of Roughness (C-Value)

To determine friction head loss in the system, a coefficient of roughness (C-value) must be determined for the piping. Higher C-values indicate less resistance to flow. New pipelines with cement mortar lining (CML) and cast iron pipe (CIP) with no lining are expected to have C-values in the vicinity of 120. C-values can be affected by corrosion, grease accumulation and air accumulation at high points. Pipelines in service for many years typically have C-values about 20 points below that of a new pipe. For the purposes of the hydraulic modeling, a C value of 100 was used. It was further assumed that outfall piping was clear and free of sediment accumulation for the entire length.

### 3.2.2.4 Minor Loss Coefficient (K-Value)

System curve development also requires that minor losses are taken into account. Minor losses occur in the system as a result of fittings in the line, changes in direction, valves, or pipe entrances or exits. The number and type of fittings and valves were determined from record drawings and verified in the field where possible.

### 3.3 Pump Station Hydraulic Capacity Summary

The results of the hydraulic analysis and pump testing for each station are presented in this section. The hydraulic analysis and pump testing results are compared to the design 10-year storm water flow and pump station design capacity in Table 3-3.

**Table 3-3 Summary - Pump Station Hydraulic Capacity**

Pump Station	10-Year Storm Water Flow (gpm) <sup>(1)</sup>	Pump Station Design Capacity (gpm) <sup>(2)</sup>	Hydraulic Model (gpm)	Pump Test Results (gpm)
Arbor	88,420	31,600	32,000	Confined space, unable to test
Central/Eastshore	19,750	8,600	8,000	5,000 gpm at 15 ft TDH
Golf Course <sup>(3)</sup>	5,390	19,200	13,000	8,000 gpm at 12 ft TDH
Harbor Bay System I	NA <sup>(3)</sup>	Unknown	12,500	13,600 gpm at 4 ft TDH
Harbor Bay System II	NA <sup>(3)</sup>	Unknown	1,500	740 gpm at 6 ft TDH
Main Street	2,560	13,500	15,750	Confined space, unable to test
Northside	60,000	72,000	59,000	51,400 gpm at 9 ft TDH
Third Street	2,065	1,650	1,800	1,600 gpm at 5 ft TDH
Webster	2,700	5,250	5,000	5,200 gpm at 10 ft TDH <sup>(4)</sup>

Notes:

1. Design 10-year storm water flows provided by Schaaf & Wheeler.
2. Station capacity obtained from the 2008 Schaaf and Wheeler Storm Drain Master Plan Report.
3. NA = Not Applicable. Pumps are designed to maintain lagoon water surface levels and are not storm water pumps.
4. One pump was out of service during testing. Pump test results assume pump that was not tested is refurbished and able to pump the average of the two tested pumps (1730 gpm at 10 ft TDH).

### 3.2.2.4 Minor Loss Coefficient (K-Value)

System curve development also requires that minor losses are taken into account. Minor losses occur in the system as a result of fittings in the line, changes in direction, valves, or pipe entrances or exits. The number and type of fittings and valves were determined from record drawings and verified in the field where possible.

### 3.3 Pump Station Hydraulic Capacity Summary

The results of the hydraulic analysis and pump testing for each station are presented in this section. The hydraulic analysis and pump testing results are compared to the design 10-year storm water flow and pump station design capacity in Table 3-3.

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Central/Eastshore	19,750	8,600	8,000	5,000 gpm at 15 ft TDH
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Harbor Bay System II	NA <sup>(3)</sup>	Unknown	1,500	740 gpm at 6 ft TDH
Main Street	2,560	13,500	15,750	Confined space, unable to test
Northside	60,000	72,000	59,000	51,400 gpm at 9 ft TDH
Third Street	2,065	1,650	1,800	1,600 gpm at 5 ft TDH
Webster	2,700	5,250	5,000	5,200 gpm at 10 ft TDH <sup>(4)</sup>

Notes:

1. Design 10-year storm water flows provided by Schaaf & Wheeler.
2. Station capacity obtained from the 2008 Schaaf and Wheeler Storm Drain Master Plan Report.
3. NA = Not Applicable. Pumps are designed to maintain lagoon water surface levels and are not storm water pumps.
4. One pump was out of service during testing. Pump test results assume pump that was not tested is refurbished and able to pump the average of the two tested pumps (1730 gpm at 10 ft TDH).

## **3.4 Arbor Pump Station**

### **3.4.1 Pump Testing**

The Arbor Pump Station pumps could not be safely tested because of limited access to discharge piping and confined space.

### **3.4.2 Pump Hydraulic Analysis**

A hydraulic analysis of the Arbor Pump Station confirmed the design pump station capacity of approximately 32,000 gpm when all four pumps are operating (see Table 3-3). According to Schaaf and Wheeler (personal communication with Dan Schaaf), the design 10-year storm flow is estimated to be approximately 88,420 gpm (following completion of improvements to the storm water collection system leading into the pump station). Hydraulic limitations in the collection system upstream currently limit the influent flow to the station to approximately 64,600 gpm. The pump station is undersized to handle the design storm water flow of 88,420 gpm, as well as the current maximum flow of 64,600 gpm. Figure 3-1 (in Appendix B) shows required pump station capacity, pumping capacity when all 4 pumps are operational, and the system curve for the Arbor Pump Station.

### **3.4.3 Outfall Hydraulic Analysis**

The existing 54-inch outfall and pump discharge structure were analyzed to verify capacity to handle the design storm water flow at the current 10-year high tide and future high tide.

Based on record drawings, the top of the pump discharge structure is at an elevation of approximately 6.4 feet NGVD, which would allow water to rise to an approximate elevation of 5.4 feet inside the structure. At the current 10-year high tide elevation of 4.56 feet, the existing pump discharge structure and outfall have approximately 40,000 gpm hydraulic capacity which exceeds the existing pumping capacity (32,000 gpm), but is insufficient to handle flows from the design 10-year storm (88,420 gpm). The anticipated future high tide elevation of 6.06 feet is higher than the ceiling elevation of the discharge structure (5.2 feet) which would lead to flooding in any storm event. Figure 3-2 (in Appendix B) shows the existing 54-inch outfall system curves and the water elevations within the discharge structure.

### **3.4.4 Recommendation**

New pumps are required to convey the design 10-year storm water volume of 88,420 gpm. The outfall must be increased in size to 72-inches to convey this flow at a velocity of 7.0 feet per second or less. Figure 3-3 (in Appendix B) shows the system curves for the proposed 72-inch outfall and the elevation that the new pump discharge structure must

exceed to avoid flooding. A completely new pump station and upsized outfall (72-inches) is recommended for the following reasons:

- Pumping capacity is inadequate to convey the design 10-year storm inflow.
- The existing pump barrel (30-inch) must be increased to 48-inch for the size pump required to convey the design storm water volume. The size of the station can not accommodate barrels of this size without compromising the integrity of the pump deck (only 6-inches of concrete would remain between pump barrels in the current configuration).
- The hydraulics of the pump station are not ideal. Influent enters the wet well perpendicular to the pumps and is not evenly distributed to the pumps. This can cause vortexing and/or other issues, which affects the efficiency of pump operation.
- A new discharge structure is required to accommodate the larger outfall pipe.
- Because the anticipated future high tide is higher than the top of the existing pump discharge structure, the station is subject to flooding during any storm event at the future high tide elevation.
- Additional operations and maintenance deficiencies are listed in Chapter 5.

A preliminary pump selection determined that four 90 hp pumps will be required to handle the 10-year storm water inflow. Information on the proposed 90 hp Flygt submersible propeller pumps is included in Appendix E.

## 5.0 Pump Station Evaluations & Recommendations

Each pump station was reviewed by Psomas, Fard Engineers, and The Crosby Group based on the evaluation criteria outlined in Chapter Four. Psomas and sub consultants visited each site and met with the City's operations & maintenance staff to discuss their concerns and inadequacies at each station. Results of the site evaluations and recommendations are presented herein.

### 5.1 Arbor Pump Station

A summary of the Arbor Pump Station evaluation and recommended improvements is presented in Table 5-1.

**Table 5-1  
Arbor Pump Station Evaluation & Recommendations**

Evaluation Criteria	Evaluation Summary	Recommended Improvement
Pumping Systems and Capacity	The existing pump capacity is insufficient to handle the flow from a 10-year storm.	Provide new pump station (see Chapter 3).
	The existing 54-inch outfall does not have capacity to handle the flow from a 10-year storm at the current 10-year high tide or anticipated future high tide.	Provide new 72-inch outfall pipe (see Chapter 3).
Reliability and Redundancy	The station does not have standby power capabilities.	Provide new standby power generator. A 400 kilowatt (KW) generator was assumed for estimating purposes.
	The 30-inch pump barrel for pump 1 was recently replaced. Barrels for the other three pumps are corroded and in poor condition.	New pump barrels provided with new pump station. Inspect and salvage 30-inch barrel for future City projects.
SCADA System	SCADA system is in overall good condition.	Perform regular upgrades to the Wonderware system and radio communication upgrades to digital per Section 5.10.1.
Electrical and Instrumentation	An electrical junction box located between pump 3 and 4 makes access for maintenance purposes difficult. The box must be relocated in order to remove pump barrels.	Provide better access in design for new pump station.
	The existing pump controllers are old and it is hard to find spare parts.	Provide new pump "Vision" or pump commander controls with new pump station. Include electronic pressure transducers/ level transmitters to replace existing bubbler type level sensors.
	The main switchboard has inadequate clearance in front of it per NEC (< 42 inches).	Design new pump station's electrical switchgear to have the required minimum clearances per NEC.

Evaluation Criteria	Evaluation Summary	Recommended Improvement
	There are no exterior light fixtures or site lighting.	Design new station with exterior lighting.
	Existing 400 amp electrical service is insufficient for the proposed new pumps.	Provide new electrical service for new pumps and equipment. A 600 amp 480 volt service was assumed for estimating purposes.
Operations and Maintenance	Access to piping and pump barrels within the wet well is difficult and considered a confined space. One of the two hatches is difficult to open, and only one ladder is provided to enter the wet well.	Design new pump station to eliminate the need for confined space entry to access pumps and associated piping/instrumentation.
	The galvanized steel access hatch above the trash rack is heavy and requires two operators to lift. The grating located over the pumps is constructed of steel and is also heavy and difficult to remove.	Design new pump station with aluminum hatches with lift assist that can be easily opened.
	There is currently a manual trash rack that requires confined space entry. The rack is very labor intensive to clean.	Design new pump station with an automatic trash rack that dumps trash into dumpsters located above grade.
	The pump station does not have wash down facilities.	Design new pump station with backflow preventer and hose bib for station wash down.
	Ladders into the pump discharge box and the wet well do not have ladder up assistance.	Design new pump station with ladder up assistance provided on all ladders.
	There is currently no ventilation within the wet well or at the trash rack. The existing fan is not functional.	Design new pump station to eliminate confined space entry and/or with adequate ventilation to eliminate confined space hazards.
	Missing a fire extinguisher.	Provide fire extinguisher in design for new pump station.
Structural	There is an existing concrete pad that is cracked at two locations, and is not wide enough.	Provide new pump station.
Site Security	Access to the station is shared with the Alameda Yacht Club through a gate in the 6-foot tall wooden fence. The gate on this fence is often left open and allows access to the station's control panel and the Alameda Yacht Club storage area.	Design new pump station to have controls located integrally within the pump station site. Provide a PVC lined chain link fence with slats and barbed wire on all sides of the pump station.
	There are no alarms on hatches at the station.	Design new station to have intrusion alarms provided on all access points to the station.

## **5.10 SCADA System**

### **5.10.1 Existing SCADA System**

The SCADA system which monitors the City's storm water pump stations is made up of four components.

1. The control center: The control center is a SCADA software product called Wonderware, which is running on a windows based personal computer. Wonderware sends and receives data from the pump station controllers. It then displays this information to the operation's personnel on a graphical interface.
2. The communication method: The control center SCADA computer communicates with the pump stations using a licensed 900MHz Microwave Data System (MDS) analog radio system. The radios are currently being replaced with dual mode (analog/digital) radios. All radios will continued to be run in analog mode until they are all replaced, at which time all the radios will be converted to digital mode.
3. The pump station controller: There are currently two controllers at each pump station. A Motorola Moscad which handles the communication with the radio, and a controller to monitor/control the pumps and associated instrumentation. The connection between these two controllers is through their inputs and outputs (I/O). Any piece of information, for example pump run confirm, requires a separate I/O pair (output of one controller feeds the input of the other) to be wired together in order to communicate that information between the controllers, and then back to the control center. The City is in the process of upgrading the controllers (the Non-Moscad controller) with the "Pump Vision" controller. It is a Unitronics V350 Controller which is prepackaged as a "ready to go" pump station controller supplied by California Motor Control (CMC). It comes with standard pump control software and operator interface screens.
4. Instrumentation: The primary data monitored at the pump station is the wet well level. The pump station controller operates the pumps based on this level. The City is replacing the "bubbler type" level sensors with "electronic pressure transducers/ level transmitters" level sensors. The bubbler systems are outdated and have significant parts that could fail, making their reliability less than desirable.

### **5.10.2 Assessment**

The City's SCADA system is in overall good condition. The physical condition of the control equipment is good; such as the pump station controllers, control enclosures and instrumentation. The antennas are mounted well and are also in good condition.

The City is in the process of standardizing their pump station controllers and level transmitters which will help Operators become familiar with the station controls and make system operation more reliable.

The most important observation is the use of two controllers at each storm water pump station which minimizes flexibility and adds costs to the operation of the stations. The City is not using the features of the Moscad Controller. All the pump logic and operator interaction is done with the “Pump Vision” Controller. Having the controllers in this configuration prevents the control center SCADA computer from accessing or changing all the control information that is in the “Pump Vision” controller, without installing more wired connections. Information such as:

- Viewing and changing the pump start/stop level set points.
- Changing the pump status (ON/OFF/AUTO).
- Viewing all the alarms monitored or derived by the controller.

#### **5.10.2.1 Recommended Improvements:**

The recommended improvements for the City of Alameda’s SCADA system are outlined below.

- The City’s existing Wonderware system meets the City’s needs as long as the software and hardware are upgraded at intervals to remain supported by the vendor.
- The City’s radio replacements should be completed and converted to digital. The City should prepare to split the frequency now before it’s required by the FCC (in a year or two). Having two frequencies will improve the SCADA system performance. Once the split is made, the City should use both frequencies in their system so as not to lose one since frequencies in the 952/928 MHz range for data communication are extremely difficult to obtain.
- The City’s level sensor replacements should be completed and the remnants of the bubbler systems should be removed.
- The City’s upgrade to the “Pump Vision” controllers should be completed, to eliminate the very outdated pump station controllers which are at the end of their useful life.
- The City should prepare a SCADA System Strategic Plan. The City has varied needs for all the sites the SCADA system monitors. The best way to address these needs is to have a strategic plan so when changes are made they move toward an efficient, integrated system. The Strategic Plan should address the issues of:
  - Future FCC requirements
  - Future operational needs
  - The added complexities to monitoring and control caused by having two controllers at each station.