



City of Sacramento City Council

915 I Street, Sacramento, CA, 95814

www.CityofSacramento.org

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Meeting Date: 5/12/2011

Report Type: Consent

Title: Contract Award: Folsom Blvd. Water Transmission Main Project, Florin-Perkins Rd. to S. Watt Avenue Project (Z14004200)

Report ID: 2011-00382

Location: District 6

Recommendation: Adopt a Resolution: 1) authorizing the City Manager to make the following budget appropriations for revenues and expenditures in the total amount of \$3,050,000: (a) Establish revenue budget in the amount of \$2,000,000 in Fund 6001(Water Development Fees), and establish expenditure budgets in the amount of \$1,250,000 in the Wholesale Connection Fee Improvement Project (Z14006700) and in the amount of \$750,000 in the T-Main CA-America Rosemont Project (Z14004200); (b) Accept and establish revenue and expenditure budgets in the amount of \$750,000 for the CALFED Proposition 50 grant in the project; and (c) Establish revenue and expenditure budgets in the amount of \$300,000 for the reimbursement of service connection cost from California American Water Company (Cal Am) in the projec; 2) authorizing the City Manager to make the following budget appropriations for revenues and expenditures for the balance of the Connection Fees payable under the Cal Am Wholesale Water Supply Agreement in the estimated amount of \$2,105,073, upon receipt as follows: (a) Establish revenue budget in the amount of \$2,105,073 in Fund 6001; (b) Budget appropriations in the amount of \$1,500,000 in the Conjunctive Use-Groundwater Wells Project (Z14009600) in Fund 6001; and (c) Budget appropriations in the amount of \$605,073 in the Wholesale Connection Fee Project (Z14006700) in Fund 6001; and 3) approving the contract plans and specifications for the Folsom Boulevard Water Transmission Main Project, Florin-Perkins Road to South Watt Avenue (Z14004200), and awarding the contract to Mark III Construction, Inc. for an amount not to exceed \$1,087,655.

Contact: Bill Busath, Interim Engineering Manager, (916) 808-1434; Dan Sherry, Supervising Engineer, (916) 808-1419 - Department of Utilities

Presenter: None

Department: Department Of Utilities

Division: Cip Engineering

Dept ID: 14001321

Attachments:

- 1-Description/Analysis
- 2-Background
- 3-Location Map
- 4-Resolution
- 5-Unexecuted Agreement Cover
- 6-Construction Contract

City Attorney Review

Approved as to Form
Joe Robinson
5/4/2011 10:37:48 AM

City Treasurer Review

Prior Council Financial Policy Approval or
Outside City Treasurer Scope
Russell Fehr
4/18/2011 4:10:28 PM

Approvals/Acknowledgements

Department Director or Designee: Marty Hanneman - 5/3/2011 10:54:56 AM

Assistant City Manager: John Dangberg - 5/3/2011 8:13:01 PM



Description/Analysis

Issue: On December 10, 2010, the City Council approved Resolution 2010-723 authorizing the execution of a Wholesale Water Supply Agreement (Agreement) with California American Water Company (Cal Am), whereby the City will provide surface water to Cal Am and will generate additional revenue for the City's water fund. In order for the City to wholesale water to Cal Am's Rosemont service area, a transmission main is required to be constructed to connect the City's existing water system to Cal Am pipelines. The completion of this project will also allow surface water deliveries in the City's American River Place of Use to be extended and optimized, reducing the groundwater extraction from the over-drafted Central Groundwater Basin.

The Agreement requires Cal Am to pay Connection Fees for Capital Costs related to surface water diversion, treatment and transmission facilities, and groundwater capacity. The Connection Fees are estimated to total \$4,405,073; \$2,000,000 has already been received from Cal Am, \$300,000 will be received as reimbursement of the service connection meter cost, and the balance will be received not later than thirty days after Cal Am receives California Public Utilities Commission approval per the Agreement. These funds are to be used in three projects: 1) Project Z14004200 to construct the needed transmission main and water meter (24-inch water transmission main along Folsom Boulevard from Florin-Perkins Road to approximately 700 feet west of South Watt Avenue), 2) Project Z14009600 to enhance groundwater capacity, and 3) Project Z14006700 for wholesale water connection improvements.

Project Z14004200 to construct the transmission main is also being funded by a CALFED Proposition 50 Grant in the amount of \$750,000.

This report recommends award of the construction contract to Mark III Construction, Inc. for the bid amount not to exceed \$1,087,655, and to appropriate budget for revenues and expenses related to the Agreement. The details of the budget approvals requested are in the Financial Considerations section.

Policy Considerations: The requested action is in conformance with City Code Section 3.60, Articles I and III, which provide for the award of competitively bid contracts to the lowest responsible bidder. This report's recommendation is consistent with the City's Strategic Plan Goals of supporting the economic vitality of the City.

Environmental Considerations:

California Environmental Quality Act (CEQA): This project was included in the scope of the Mitigated Negative Declaration (MND) prepared for the Cal Am Agreement. The MND was prepared and circulated for public review for a 30-day period, followed by the City Council's adoption of the MND and associated Mitigation Reporting Program prior to approval of the Cal Am Agreement, on December 14, 2010 (Resolution 2010-723). There has been no change in circumstances, and no new information, that would affect the analysis in the MND adopted for the Cal Am Agreement. The Mitigation Reporting

Program adopted for the Cal Am Agreement contains mitigation measures that will be implemented for this project. In addition, CEQA does not apply to the installation of new pipelines of less than one mile in length installed within a public street or right-of-way (Public Resources Code § 21080.21). Upon approval of this project, City staff will file a Notice of Determination with the Sacramento County Clerk.

Sustainability: This project is consistent with the City's Sustainability Master Plan by installing facilities for the provision of a safe and reliable water supply.

Commission/Committee Action: Not applicable

Rationale for Recommendation: After the plans and specifications were completed by the Department of Utilities the project was formally advertised to solicit bids on February 14, 2011. On March 9, 2011, the City Clerk opened 18 bids. The lowest responsive and responsible bidder was Mark III Construction, Inc.

Financial Considerations: Cal Am's payments under the Agreement will cover all costs related to the delivery of potable water to Cal Am, including payment of the 11% general tax that is transferred to the General Fund. Cal Am also will pay Connection Fees in the estimated amount of \$4,405,073 for Capital Projects, of which \$300,000 is for reimbursement of the service connection meter. \$2,000,000 has already been received from Cal Am, the service connection meter cost will be reimbursed upon construction, and the remaining Connection Fees will be received not later than thirty days after Cal Am receives California Public Utilities Commission approval per the Agreement. In addition, DOU received a grant award in the amount of \$750,000 from CALFED Proposition 50 funds for construction of the transmission main. Budget appropriations for projects for reimbursable revenue and revenue already received, and future budget appropriations needed when future revenue is received are detailed below.

Current budget appropriations will total \$3,050,000 and include the following:

- 1) Revenue in the amount of \$2,000,000 will be budgeted in Fund 6001(Water Development Fees) for Connection Fee payments already received from Cal Am under the Wholesale Agreement. An expenditure budget in the amount of \$750,000 will be budgeted in the T-Main CA-America Rosemont Project (Z14004200) and an expenditure budget in the amount of \$1,250,000 will be budgeted in the Wholesale Connection Fee Improvements Project (Z14006700) in Fund 6001.
- 2) Revenue and expenditure budgets in the amount of \$750,000 will be established in Fund 3704 (CIP Grant Fund) for the T-Main CA-America Rosemont Project (Z14004200), for the CALFED Proposition 50 grant from the California Department of Water Resources (\$750,000).
- 3) Revenue and expenditure budgets in the amount of \$300,000 will be established in Fund 3702 (CIP Reimbursable Fund) for the T-Main CA-America

Rosemont Project (Z14004200) for the Service Connection construction reimbursement (\$300,000) received from Cal Am.

The balance of Connection Fee payments from Cal Am under the Agreement, estimated to be \$2,105,073 (\$4,405,073 less the \$2,000,000 received and the \$300,000 reimbursement for the water meter connection), will be received not later than thirty days after Cal Am receives California Public Utilities Commission approval per the Agreement. Upon receipt, the revenue and expenditure budgets will be established as follows:

- 1) Revenue in the amount of \$2,105,073 (estimated) will be budgeted in Fund 6001 for the remaining money to be received from Cal Am.
- 2) Expenses in the amount of \$1,500,000 will be budgeted in the Conjunctive Use-Groundwater Wells Project (Z14009600) in Fund 6001.
- 3) Expenses in the amount of \$605,073 (estimated) will be budgeted in the Wholesale Connection Fee Improvements Project (Z14006700) in Fund 6001.

Emerging Small Business Development (ESBD): This project included a minimum participation requirement of 20% for emerging and small business enterprises (ESBEs) as required by Ordinance 99-007 and Resolution 99-055, relating to ESBD participation goals and policies, adopted by the City Council on February 9, 1999. The prime contractor Mark III Construction, Inc. has met the ESBD requirement, with an ESBE participation level of 20.23%.



BACKGROUND

On December 10, 2010, the City Council approved Resolution 2010-723 authorizing the execution of a Wholesale Water Supply Agreement with California American Water Company (Cal Am), whereby the City will provide surface water to Cal Am and generate additional revenue for the City's water fund. In order for the City to wholesale water to Cal Am's Rosemont service area, a transmission main is required to be constructed in order to connect the City's existing water system to Cal Am pipelines. A magnetic meter will also be placed to track the amount of delivered water.

This project will place approximately 4,050 feet of 24-inch diameter water transmission main and associated appurtenances including the metering vault. This project also installs smaller distribution mains that will connect to the City's existing system and increase pressures to adjacent neighborhoods.

Public outreach includes disseminating information to properties adjacent to the project through mailers.

The project was formally advertised to solicit bids on February 11, 2011. On March 9, 2011, the City Clerk opened 18 bids. The lowest responsive and responsible bidder is Mark III Construction, Inc.

The bids are summarized below:

	Name of Bidder	Amount of Bid
1	Mark III Construction, Inc.	\$1,087,655.00
2	Mountain Cascade, Inc.	\$1,139,700.00
3	Preston Pipelines Milpitas	\$1,142,890.00
4	McGuire Hester	\$1,157,550.00
5	T & S Construction Co., Inc.	\$1,172,700.00
6	Civil Engineering Construction, Inc.	\$1,195,990.00
7	Marques Pipeline, Inc.	\$1,206,825.00
8	Sierra National Construction, Inc.	\$1,244,345.00
9	Vinciguerra Construction	\$1,266,925.00
10	Tidelands Construction Company	\$1,273,700.00
11	Navajo Pipelines, Inc.	\$1,309,710.00
12	Newland Entities, Inc.	\$1,348,497.50
13	Lamon Construction Co., Inc.	\$1,395,900.00
14	Martin General Engineering, Inc.	\$1,421,400.00
15	Teichert Construction	\$1,486,550.00
16	Pacific Underground Construction, Inc.	\$1,523,977.00
17	Bay Pacific Pipelines, Inc.	\$1,557,450.00
18	Martin Brothers	\$1,654,859.00

The Engineer's estimate for the construction cost was \$1,764,000.

Prop 50 Grant Funding

The California Department of Water Resources has developed grant programs for constructing projects described in the Regional Water Authority's ("RWA") Integrated Regional Water Management Plan to facilitate and coordinate the development, design, construction, rehabilitation, acquisition or financing of water-related facilities. Funding for these grant programs is authorized under the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, California Water Code sections 79500-79590 (Proposition 50).

California Proposition 50 grants are available for a variety of water supply and delivery projects. The RWA, on behalf of membership agencies, bundled a group of projects for the Proposition 50 grant applications that benefit the northern Sacramento regional groundwater and surface water conjunctive use efforts.

On May 23, 2005, the City Manager executed a Project Agreement with the Regional Water Authority authorizing the RWA to apply for grant funding for projects described in the RWA's Integrated Regional Water Management Plan on the City's behalf. RWA was successful in securing a \$750,000 CALFED Proposition 50 Grant for the City's Folsom Boulevard Water Transmission Main Project. The grant application was accepted by DWR in April 2007 and the City was awarded the full requested amount of \$750,000. The RWA will act as project manager to manage and perform grant activities under the Project Agreement.

Wholesale Agreement

Cal Am's Rosemont service area near Watt Avenue has areas being served by groundwater that are currently being impacted, and, in some cases, lost, due to industrial contamination. The completion of this project will allow for surface water deliveries to the Rosemont service area, and also will allow surface water deliveries in the City's American River Place of Use to be extended and optimized, reducing the groundwater extraction from the over-drafted Central Groundwater Basin. Construction of the Folsom Boulevard Water Transmission Main Project would construct a water transmission main on Folsom Boulevard to provide treated water to the point of service for the Rosemont area.

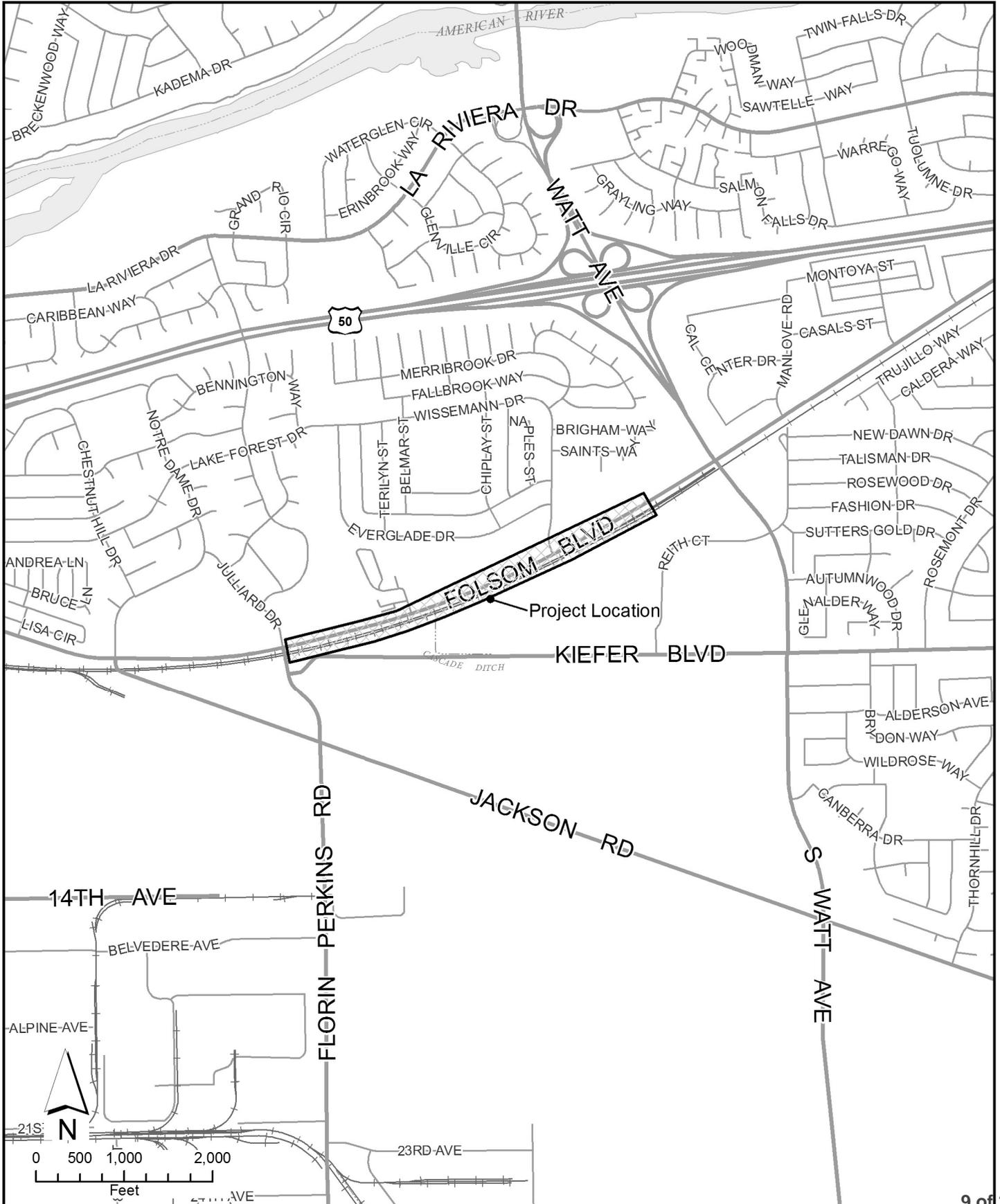
Under the Cal Am Wholesale Water Supply Agreement Cal Am will pay the City and estimated \$4,405,073 in connection fees. These funds are to be used in three projects: 1) Project Z14004200 to construct the needed transmission main and water meter (24-inch water transmission main along Folsom Boulevard from Florin-Perkins Road to approximately 700 feet west of South Watt Avenue), 2) Project Z14009600 to enhance groundwater capacity, and 3) Project Z14006700 for wholesale water connection improvements. Cal Am has paid the City

\$2,000,000 and will reimburse the City for the water connection meter in the amount of \$300,000. The balance of the Connection Fee payments, in the approximate amount of \$2,105,073 will be received prior to Cal Am receiving full allotment of water and will be received not later than thirty days after Cal Am receives California Public Utility Commission approval for such payment per the Agreement. The revenue and expenditure budget will be amended upon receipt of the funds.



LOCATION MAP

Folsom Blvd. Water Transmission Main Project
Florin Perkins Rd to S. Watt Ave.
(Z14004200)





RESOLUTION NO. 2011-

Adopted by the Sacramento City Council

AUTHORIZING BUDGET APPROPRIATIONS AND AWARDED CONTRACT FOR FOLSOM BOULEVARD WATER TRANSMISSION MAIN PROJECT (Z14004200) TO MARK III CONSTRUCTION, INC.

BACKGROUND

- A. On December 10, 2010, the City Council approved Resolution 2010-723 authorizing the execution of a Wholesale Water Supply Agreement (Agreement) with California American Water Company (Cal Am), whereby the City will provide surface water to Cal Am and will generate additional revenue for the City's water fund.
- B. In order for the City to wholesale water to Cal Am's Rosemont service area, a transmission main is required to be constructed to connect the City's existing water system to Cal Am pipelines. The completion of this project will also allow surface water deliveries in the City's American River Place of Use to be extended and optimized, reducing the groundwater extraction from the over-drafted Central Groundwater Basin.
- C. The Agreement requires Cal Am to pay Connection Fees for Capital Costs related to surface water diversion, treatment and transmission facilities, and groundwater capacity. The Connection Fees are estimated to total \$4,405,073; \$2,000,000 has already been received, \$300,000 will be received as reimbursement of the service connection meter cost, and the balance will be paid not later than thirty days after Cal Am receives California Public Utility Commission approval per the Agreement.
- D. Cal Am's Connection Fee payments will be used in three projects: 1) The Folsom Boulevard Water Transmission Main Project, Florin-Perkins Road to South Watt Avenue (Project Z14004200); 2) Project Z14009600 to enhance groundwater capacity; and 3) Project Z14006700 for wholesale water connection improvements. Project Z14004200 also is being funded by a CALFED Proposition 50 Grant in the amount of \$750,000.
- E. The Folsom Boulevard Water Transmission Main Project, Florin-Perkins Road to South Watt Avenue (Z14004200) will place approximately 4050 feet of 24-inch water transmission main with associated appurtenances, including a metering vault, along Folsom Boulevard from Florin-Perkins Road to approximately 700 feet west of South Watt Avenue.
- F. City staff prepared a set of plans and specifications for the project and the project was advertised for bidding, with bids received on March 9, 2011.

G. Mark III Construction, Inc. was the lowest responsible bidder.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The City Council finds as follows:

- A. The Folsom Boulevard Water Transmission Main Project, Florin-Perkins Road to South Watt Avenue (Folsom Boulevard Water Main Project) was included in the scope of the Mitigated Negative Declaration (MND) prepared for the Cal Am Agreement. In accordance with the California Environmental Quality Act (CEQA), the MND was prepared and circulated for public review for a 30-day period, followed by the City Council's adoption of the MND and associated Mitigation Reporting Program prior to approval of the Cal Am Agreement, on December 14, 2010 (City Council Resolution No. 2010-723).
- B. The City Council has reviewed and considered the previously adopted MND and Mitigation Reporting Program and determined that no additional or subsequent environmental review or documentation is required for the Folsom Boulevard Water Main Project, based on the reasons set forth below:
 - 1. No substantial changes are proposed by the Folsom Boulevard Water Main Project that will require major revisions of the previously adopted MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
 - 2. No substantial changes have occurred with respect to the circumstances under which the Folsom Boulevard Water Main Project will be undertaken that will require major revisions to the previously adopted MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; and
 - 3. No new information of substantial importance has been found that shows any of the following:
 - a. The Project will have one or more significant

effects not discussed in the previously adopted MND;

- b. Significant effects previously examined will be substantially more severe than shown in the previously adopted MND;
- c. Mitigation measures previously found to be infeasible would in fact be feasible and would substantially reduce one or more significant effects of the Project; or
- d. Mitigation measures which are considerably different from those analyzed in the previously adopted MND would substantially reduce one or more significant effects on the environment.

C. The Mitigation Reporting Program adopted for the Cal Am Agreement contains mitigation measures that will be implemented for the Folsom Boulevard Water Main Project.

D. In addition, CEQA does not apply to the installation of new pipelines of less than one mile in length installed within a public street or right-of-way (Public Resources Code § 21080.21).

Section 2: The City Manager is authorized to make the following budget appropriations for revenues and expenditures in the total amount of \$3,050,000:

1) Establish revenue budget in the amount of \$2,000,000 in Fund 6001(Water Development Fees). Establish expenditure budgets in the amount of \$1,250,000 in the Wholesale Connection Fee Improvement Project (Z14006700) and in the amount of \$750,000 in the T-Main CA-America Rosemont Project (Z14004200).

2) Accept and establish revenue and expenditure budgets in the amount of \$750,000 for the CALFED Proposition 50 grant received from the Department of Water Resources in the T-Main CA-America Rosemont Project (Z14004200)

3) Establish revenue and expenditure budgets in the amount of \$300,000 for the reimbursement of the service connection cost from Cal Am in Z14004200.

Section 3: The City Manager is authorized to make the following budget appropriations for revenues and expenditures for the balance of the

Connection Fees payable under the Cal Am Agreement in the estimated amount of \$2,105,073, upon receipt as follows:

- 1) Establish revenue budget in the amount of \$2,105,073 in Fund 6001.
- 2) Budget appropriations in the amount of \$1,500,000 in the Conjunctive Use-Groundwater Wells Project (Z14009600) in Fund 6001.
- 3) Budget appropriations in the amount of \$605,073 in the Wholesale Connection Fee Project (Z14006700) in Fund 6001.

Section 4. The contract plans and specifications for the Folsom Boulevard Water Transmission Main Project, Florin-Perkins Road to South Watt Avenue (Z14004200), are approved, and the contract is awarded to Mark III Construction, Inc., for an amount not to exceed \$1,087,655.



Unexecuted Contract/Agreements

- The Unexecuted Contract/Agreement is signed by the other party, is attached as an exhibit to the resolution, and is approved as to form by the City Attorney.
- The Unexecuted Contract/Agreement (Public Project) is NOT signed by the other party, is attached as an exhibit to the resolution, and is approved as to form by the City Attorney.
- The Unexecuted Contract is NOT included as an exhibit to the Resolution because the Agreement(s) is with other another governmental agency and it is not feasible to obtain the other agency's signature prior to Council action (be they denominated Agreements, MOUs, MOAs, etc.); however, the City Attorney approves the forwarding of the report to Council even though the signed agreement is not in hand yet.
- The Unexecuted Contract is NOT included as an exhibit to the resolution because, due to special circumstances, and the City Attorney confirms in writing that it is okay to proceed with Council action even though the signed agreement is not in hand yet.

All unexecuted contracts/agreements which are signed by the other parties are in the Office of the City Clerk before agenda publication.



CITY OF SACRAMENTO

DEPARTMENT OF UTILITIES

ENGINEERING SERVICES DIVISION



CONTRACT SPECIFICATIONS FOR

FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.

PN: Z14004200

B113331014

Engineer's Estimate: \$1,764,000.00

Non-Refundable Fee

\$25.00

For Pre-Bid Information Call:

Separate Plans

Michelle Carrey
Senior Engineer
(916) 808-1438

Bid to be received before 2:00 PM
Bid date: March 9, 2011
Historic City Hall, City Clerk's Office
915 I Street, 1st Floor
Sacramento, CA 95814

ESBE Program Goals

For information on meeting the City of Sacramento's Small Business Enterprise (SBE) and Emerging Business Enterprise (EBE) project goals, please contact Noreen James at (916) 808-5470, or visit the City of Sacramento's small business web site at: http://dev.cityofsacramento.org/econdev/business-open/Sub_small-business-certificaiton.cfm

**FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.
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SPECIAL PROVISIONS

ESBD PRE-BID CONFERENCE

The City of Sacramento Code Section 3.60.270 requires all bidding contractors to meet or exceed the City's Emerging and Small Business Development (ESBD) participation goals established for this project in order to qualify as a responsible bidder. Attendance is recommended at the ESBD program meeting within 180 calendar days of the bid opening date.

Effective July 2010, the meetings are scheduled as requested:

For information on meeting the City of Sacramento's Small Business Enterprise (SBE) and Emerging Business Enterprise (EBE) project goals, please contact Noreen James at (916) 808-5470, or visit the City of Sacramento's small business web site at: http://dev.cityofsacramento.org/econdev/business-open/Sub_small-business-certificaiton.cfm

NOTICE TO CONTRACTORS

CITY OF SACRAMENTO

Sealed Proposals will be received by the City Clerk of the City of Sacramento at the Office of the City Clerk, Historic City Hall, located at 915 I Street, 1st Floor, up to the hour of 2:00 p.m. on March 9, 2011 and opened at 2:00 p.m., or as soon thereafter as business allows, in the Hearing Room, Historic City Hall, 2nd Floor, for construction of:

FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT, FLORIN-PERKINS RD TO S. WATT AVE.
(PN: Z14004200) (B113331014)

as set forth in the Construction Documents.

Proposals received and work performed thereunder shall comply with the requirement of Chapter 3 of the Sacramento City Code. Each Bid Proposal shall be accompanied by bid security of at least 10% of the sum the Bid Proposal. The right to reject proposals or to waive any error or omission in any Bid Proposal received is reserved by the City. Signed proposals shall be submitted on the printed forms contained herein and enclosed in an envelope marked:

**SEALED PROPOSAL FOR
FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.**
(PN: Z14004200) (B113331014)

Copies of the contract documents are available at:

Signature Reprographics
620 Sunbeam Avenue
Sacramento, CA 95814
(916) 454-0800

A non-refundable fee of \$25.00 will be charged.

Subcontractors shall comply with the rates of wages currently established by the Director of Industrial Relations under provisions of Sections 1773 of the Labor Code of the State of California, a copy of which is on file in the office of the City Clerk. In accordance with the Sacramento City Code Section 3.60.180 and Section 1771.5 of the California Labor Code, the payment of the general prevailing rate of per diem wages or the general prevailing rate of per diem wages for holiday and overtime is not required for any Public Construction project of \$25,000 or less, or Public Maintenance project of \$15,000 or less. The City of Sacramento has an approved Labor Compliance Program. **Electronic Web submittal of Labor Compliance Reports is effective May 1, 2008.** Each contractor and every lower-tier subcontractor is required to submit certified payrolls and labor compliance documentation electronically at the discretion of and in the manner specified by the City of Sacramento.

Electronic submittal will be web-based system, accessed on the World Wide Web by a web browser. Each contractor and subcontractor will be given a Log On identification and password to access the City of Sacramento reporting system.

Use of the system may entail additional data entry of weekly payroll information including; employee identification labor classification, total hours worked and hours worked on this project, wage and benefit rates paid, etc. The contractor's payroll and accounting software might be capable of generating a 'comma delimited file' that will interface with the software.

This requirement will be "flowed down" to every lower-tier subcontractor and vendor required to provide labor compliance documentation.

All questions regarding the Labor Compliance Program should be directed to the Labor Compliance Section at (916) 808-5524.

Pursuant to Sacramento City Code Section 3.60.250, any agreement awarded pursuant to this Invitation to Bid shall contain a provision permitting the substitution of securities for any monies withheld to ensure performance under the Agreement. The terms of such provisions shall be according to the requirements and the form required by the City.

Bid protests must be filed and maintained in accordance with the provisions of Chapter 3.60.460 through 3.60.560 of the Sacramento City Code. Bid protests that do not comply with Chapter 3.60.040 through 3.60.560 of the Sacramento City Code shall be invalid and shall not be considered. A bid protest fee of \$750.00 is required at the time of filing to be considered valid in accordance with City of Sacramento Resolution No. 2003-231 dated April 29, 2003. As used herein, the term "bid protests" includes any bid protest that (1) claims that one or more bidders on this contract should be disqualified or rejected for any reason, or (2) contests a City staff recommendation to award this contract to a particular bidder, or (3) contests a City staff recommendation to disqualify or reject one or more bidders on this contract. A copy of Chapter 3.60.010 of the Sacramento City Code may be obtained from the Project Manager or from the Office of the City Clerk, located at 915 I Street, 1st Floor, Sacramento, CA 95814.

The right to reject any and all bids or to waive any informality in any bid received is reserved by the City Council.

THE FOLLOWING DOCUMENTS
ARE TO BE COMPLETED AND
SUBMITTED WITH THE BID PACKAGE

Contractor's Name: _____
(Please print)

CITY OF SACRAMENTO
SEALED PROPOSAL
(MUST BE SIGNED BY BIDDER)

The Sealed Proposal will be received not later than Wednesday, March 9, 2011, at the Office of the City Clerk, Historic City Hall, at 915 I Street, 1st Floor, Sacramento, California and opened at March 9, 2011 at 2:00 PM, or as soon thereafter as business allows, on March 9, 2011, by the Office of the City Clerk, 915 I Street, Historic City Hall, Hearing Room 2nd Floor, Sacramento, California.

TO THE HONORABLE CITY COUNCIL:

The undersigned hereby proposes and agrees to furnish any and all required labor, material, transportation, and services for

**FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.
(PN: Z14004200) (B113331014)**

in the City and County of Sacramento, California.

TOTAL BID: _____ (\$_____).

The work herein described is to be performed in strict conformity with the Plans, City of Sacramento Standard Specifications (Resolution No. 89-216) and these Special Provisions, all as on file in the Office of the City Clerk, at the following unit prices.

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization	1	LS	\$_____	\$_____
2	Construction Photographs to Provide Meter Retrofit of 1-Inch Water Services	1	LS	\$_____	\$_____
3	14-Inch Diameter Water T-Main to Furnish and Install	150	LF	\$_____	\$_____
4	24-Inch Diameter Water T-Main to Furnish and Install	3890	LF	\$_____	\$_____
5	12-Inch Diameter Water Main to Furnish and Install	20	LF	\$_____	\$_____
6	14-Inch Diameter Motorized Operated Butterfly Valve to Furnish and Install	1	EA	\$_____	\$_____
7	24-Inch Diameter Butterfly Valve to Furnish and Install	3	EA	\$_____	\$_____
8	6 -Inch Blow-Off to Furnish and Install	3	EA	\$_____	\$_____
9	2-Inch Air Vacuum and Release Valve to Furnish and Install	3	EA	\$_____	\$_____
10	Access to Manhole to Furnish and Install	2	EA	\$_____	\$_____
11	Standard Fire Hydrant to Furnish and Install	2	EA	\$_____	\$_____

12	Connection to Existing Water System	1	LS	\$ _____	\$ _____
13	Corrosion Monitoring System to Furnish and Install	1	LS	\$ _____	\$ _____
14	Trench Sheeting, Shoring and Bracing to Furnish and Install	1	LS	\$ _____	\$ _____
15	Unsuitable Material to Remove and Replace	1000	TON	\$ _____	\$ _____
16	Miscellaneous Asphaltic Concrete to Place	2000	SF	\$ _____	\$ _____
17	Miscellaneous Concrete to Remove and Replace	500	SF	\$ _____	\$ _____
18	Water Quality to Provide	1	LS	\$ _____	\$ _____
19	Furnish and Install 14-Inch Magnetic Flow Meter	1	LS	\$ _____	\$ _____
20	Furnish and Install Concrete Vault	1	LS	\$ _____	\$ _____
21	Electrical Improvements	1	LS	\$ _____	\$ _____
22	Potholes	15	EA	\$ _____	\$ _____
23	Traffic Loop Modifications	1	LS	\$ _____	\$ _____
24	Traffic Control	1	LS	\$ _____	\$ _____

TOTAL BID: \$ _____
Write this total amount on previous page

If awarded the contract, the undersigned shall execute said contract and furnish the necessary bonds within ten (10) days after the notice of award of said contract and begin work within fifteen (15) days after the signing of the contract by the Contractor and the City or the Notice to Proceed has been prepared, whichever is applicable.

In determining the amount bid by each bidder, City shall disregard mathematical errors in addition, subtraction, multiplication and division that appear obvious on the face of the Proposal. When such a mathematical error appears on the Proposal, the City shall have the right to correct such error and to compute the total amount bid by said bidder on the basis of the corrected figure or figures.

When the unit price of an item is required to be set forth in the Proposal, and the total for the item set forth separately does not agree with a figure derived by multiplying the item unit price times the Engineer's estimate of the quantity of work to be performed for said item, the item unit price shall prevail over the sum set forth as the total for the item unless, in the sole discretion of the City, such a procedure would be inconsistent with the policy of the City's bidding procedures. The total paid for each such item of work shall be based upon the item unit price and not the total price.

Should the Proposal contain only a total price for an item and the item unit price is omitted, the City shall determine the item unit price by dividing the total price of the item by the Engineer's estimate of the quantity of work to be performed for the item of work.

If the Proposal contains neither the item price nor the total price for the item, then it shall be deemed incomplete and the Proposal shall be disregarded.

It is understood that this bid is based upon completion of the work within a period of **One Hundred Seventy (170) working days** commencing on the date specified in the Notice to Proceed.

The amount of liquidated damages to be paid by the Contractor for failure to complete the work by the completion date (as extended, if applicable) shall be **five hundred dollars (\$500.00) for each calendar day**, continuing to the time at which the work is completed. Such amount is the actual cash value agreed upon as the loss to the City resulting from the default of the Contractor.

The undersigned represents and warrants that he/she has examined the location of the proposed work and is familiar with the conditions at the place where the work is to be done. The undersigned further represents that he/she has reviewed and understands the Plans, Special Provisions, and other contract documents, and the undersigned is satisfied with all conditions for the performance of the work. **Additionally, the undersigned shall include written documentation with the Sealed Proposal of previous satisfactory experience in installation of water main pipeline, in accordance with the following:**

- **The undersigned shall provide documentation for a minimum of three (3) projects of similar size and scope for the placement of water main pipeline performed by the undersigned for a municipality or other public agency within the last five years. The documentation for each project shall describe the work performed, including the size and length of pipeline installed, the type of water main material installed, the contract amount and duration, and the time period of performance, and shall include the name, address and telephone number of the owner agency or municipality. The documentation also shall include the name of a contact person for each owner who is familiar with the work performed. The above documentation shall be included with the Sealed Proposal.**
- **A Sealed Proposal that does not include the above required documentation may be rejected as non-responsive.**

Please note that information included in the above documentation and/or obtained from such other owner agency or municipality or from another source regarding the bidder's performance on another public project also may be used by the City in determining whether the bidder is a responsible bidder.

The undersigned has carefully checked all of the above figures and understands that the City of Sacramento will not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

This proposal shall not be withdrawn for the time periods specified in Section 3-2 of the City of Sacramento Standard Specifications for award of contract to respective low bidders. This proposal is submitted in accordance with Chapter 3.60 of the Sacramento City Code and Sections 1, 2, and 3 of the City of Sacramento Standard Specifications.

In accordance with Standard Specification Section 3-2, the City shall award this contract to the lowest responsible bidder, if such award is made, within forty-five (45) working days after opening of the Proposals. The City reserves the right to reject any and all bids.

BID DEPOSIT ENCLOSED IN THE FOLLOWING FORM:

\$ _____ not less than ten (10) percent of amount bid.

- ____ CERTIFIED CHECK
- ____ MONEY ORDER
- ____ CASHIERS'S CHECK
- ____ BID BOND

<u>FOR CITY USE ONLY</u>	
TYPE OF DEPOSIT	
<input type="checkbox"/>	Bid Bond
<input type="checkbox"/>	Cashier/Certified Check
<input type="checkbox"/>	Other _____
Reviewer's Initials: _____	

CONTRACTOR

Addendum No. 1 _____

Addendum No. 2 _____ By: _____
(Signature)

Addendum No. 3 _____ Title: _____

Addendum No. 4 _____ Address: _____
Physical Location No PO Box address

_____ City State Zip Code

Telephone No. _____

Fax No. _____

Email _____

(Federal Tax ID # or Social Security #)
Under penalty of perjury, I certify that the Taxpayer Identification Number and all other information provided here are correct.

Valid Contractor's License No. _____, Classification _____ is held by the bidder.

Expiration date _____. Representation made herein are true and correct under penalty or perjury

PN: Z14004200 (B113331014)

KNOW ALL MEN BY THESE PRESENTS,

That we, _____

as Principal, and _____

a corporation duly organized under the laws of the State of _____ and duly licensed to become sole surety on bonds required or authorized by the State of California, as Surety, are held and firmly bound unto the City of Sacramento, hereinafter called the City, in the penal sum of ten percent (10%) of the (BASE OR LUMP SUM) Proposal of the Principal above named, or other amount as set forth in the Invitation to Bidders, submitted by said Principal to the City for the Work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH

That whereas the Principal has submitted the above mentioned proposal to the City, for which Proposals are to be opened in the Office of the City Clerk, Historic City Hall, Hearing Room 2nd Floor, 915 I Street, Sacramento, California, on March 9, 2011, for the Work specifically described as follows:

FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT, FLORIN-PERKINS RD TO S. WATT AVE.
(PN: Z14004200) (B113331014)

NOW, THEREFORE, if the aforesaid Principal is award the Agreement and within the time and manner required under the Contract Documents, enters into a written Agreement, in the prescribed form, in accordance with the Proposal, and files two (2) bonds with the City, one to guarantee faithful performance and the other to guarantee payment for labor and materials, and files the required insurance policies with the City, all as required by the Contract Documents or by law, then the obligation shall be null and void; otherwise it shall be and remain in full force and effect.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court, which sums shall be additional to the principal amount of this bond.

IN WITNESS THEREOF, We have hereunto set our hands and seal this _____ day of _____, 2011.

PRINCIPAL Seal
By: _____

Title

SURETY Seal
By _____

Title
Agent Name and Address

Agent Phone #

Surety Phone #

California License #

DRUG-FREE WORKPLACE POLICY AND AFFIDAVIT

BID MAY BE DECLARED NONRESPONSIVE IF THIS FORM (COMPLETED) IS NOT ATTACHED.
Pursuant to City Council Resolution CC90-498 dated 6/26/90 the following is required.

The undersigned contractor certifies that it and all subcontractors performing under this contract will provide a drug-free workplace by:

1. Publishing a "Drug-Free Workplace" statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Establishing a Drug-Free Awareness Program to inform employees about:
 - a. The dangers of drug abuse in the workplace.
 - b. The contractor's policy of maintaining a drug-free workplace.
 - c. Any available drug counseling, rehabilitation, and employee assistance program.
 - d. The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
3. Notify employees that as a condition of employment under this contract, employees will be expected to:
 - a. Abide by the terms of the statement.
 - b. Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace.
4. Making it a requirement that each employee to be engaged in the performance of the contract be given a copy on the "Drug-Free Workplace" statement.
5. Taking one of the following appropriate actions, within thirty (30) days of receiving notice from an employee or otherwise receiving such notice, that said employee has received a drug conviction for a violation occurring in the workplace:
 - a. Taking appropriate disciplinary action against such an employee, up to and including termination; or
 - b. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement or other appropriate agency.

* I certify that no person employed by this company, corporation, or business has been convicted of any criminal drug statute violation on any job site or project where this company, corporation, or business was performing work within three years of the date of my signature below.

EXCEPTION:

Date	Violation Type	Place of Occurrence
If additional space is required use back of this form.		

*The above statement will also be incorporated as a part of each subcontract agreement for any and all subcontractors selected for performance on this project.

IN THE EVENT THIS COMPANY, CORPORATION, OR BUSINESS IS AWARDED THIS CONSTRUCTION CONTRACT, AS A RESULT OF THIS BID; THE CONTRACTOR WITH HIS/HER SIGNATURE REPRESENTS TO THE CITY THAT THE INFORMATION DISCLOSED IN THIS DOCUMENT IS COMPLETE AND ACCURATE. IT IS UNDERSTOOD AND AGREED THAT FALSE CERTIFICATION IS SUBJECT TO IMMEDIATE TERMINATION BY THE CITY.

The Representations Made Herein On This Document Are Made Under Penalty Of Perjury.

CONTRACTOR'S NAME: _____

BY: _____ Date: _____
Signature Title

Effects of violations: a. Suspension of payments under this contract. b. Suspension or termination of the contract. c. Suspension or debarment of the contractor from receiving any contract from the City of Sacramento for a period not to exceed five years.

MINIMUM QUALIFICATIONS QUESTIONNAIRE

Sacramento City Code Section 3.60.020 authorizes the Sacramento City Council to adopt standard minimum qualifications for bidders on competitively bid public works construction projects, and requires, among other provisions, that a bidder meet such minimum qualifications at the time of bid opening in order to bid. On July 31, 2007, the City Council adopted Resolution No. 2007-574 establishing these standard minimum qualifications. Pursuant to City Code section 3.60.020, a bidder failing to meet these minimum qualifications at the time of bid opening shall not be considered a responsible bidder for purposes of bidding on the subject project.

All bidders must demonstrate compliance with the minimum qualifications established by Resolution No. 2007-574 by completing all of the questions contained in this questionnaire. Bidder responses shall be limited to those operating business units, offices, branches and/or subsidiary divisions of the bidder that will be involved with the performance of any project work if awarded the contract. If a bidder answers "yes" to any single question, fails to submit a fully completed questionnaire, or submits false information, this will result in a determination that the minimum qualifications are not met, and the bidder shall not be considered a qualified bidder for purposes of bidding on this contract. If two or more entities submit a bid on a contract as a Joint Venture, each entity within the Joint Venture must separately meet these minimum qualifications for the Joint Venture to be considered a qualified bidder.

The City of Sacramento ("City") shall make its determination on the basis of the submitted questionnaire, as well as any relevant information that is obtained from others or as a result of investigation by the City. While it is the intent of this questionnaire to assist the City in determining whether bidders possess the minimum qualifications necessary to submit bids on the City's competitively bid public works construction contracts, the fact that a bidder submits a questionnaire demonstrating that it meets these minimum qualifications shall not in any way limit or affect the City's ability to: (1) review other information contained in the bid submitted by the bidder, and additional relevant information, and determine whether the contractor is a responsive and/or responsible bidder; or (2) establish pre-qualification requirements for a specific contract or contracts.

By submitting this questionnaire, the bidder consents to the disclosure of its questionnaire answers: (i) to third parties for purposes of verification and investigation; (ii) in connection with any protest, challenge or appeal of any action taken by the City; and (iii) as required by any law or regulation, including without limitation the California Public Records Act (Calif. Gov't Code sections 6250 et seq.). Each questionnaire must be signed under penalty of perjury in the manner designated at the end of the form, by an individual who has the legal authority to bind the bidder submitting the questionnaire. If any information provided by a bidder becomes inaccurate, the bidder shall immediately notify the City and provide updated accurate information in writing, under penalty of perjury.

QUESTIONNAIRE

NOTICE: For firms that maintain other operating business units, offices, branches and/or subsidiary divisions that will not be involved with the performance of any project work if the firm is awarded the contract, references hereafter to "your firm" shall mean only those operating business units, offices, branches and/or subsidiary divisions that will be involved with the performance of any project work.

All of the following questions regarding "your firm" refer to the firm (corporation, partnership or sole proprietor) submitting this questionnaire, as well as any firm(s) with which any of your firm's owners, officers, or partners are or have been associated as an owner, officer, partner or similar position within the last five years

The firm submitting this questionnaire shall not be considered a responsible bidder if the answer to any of these questions is "yes", or if the firm submits a questionnaire that is not fully completed or contains false information.

1. **Classification & Expiration Date(s) of California Contractor's License Number(s) held by firm:**

2. Has a contractor's license held by your firm and/or any owner, officer or partner of your firm been revoked at anytime in the last five years?
 Yes No
3. Within the last five years, has a surety firm completed a contract on your firm's behalf, or paid for completion of a contract to which your firm was a party, because your firm was considered to be in default or was terminated for cause by the project owner?
 Yes No
4. At the time of submitting this minimum qualifications questionnaire, is your firm ineligible to bid on or be awarded a public works contract, or perform as a subcontractor on a public works contract, pursuant to either California Labor Code section 1777.1 (prevailing wage violations) or Labor Code section 1777.7 (apprenticeship violations)?
 Yes No
5. At any time during the last five years, has your firm, or any of its owners, officers or partners been convicted of a crime involving the awarding of a contract for a government construction project, or the bidding or performance of a government contract?
 Yes No

6. Answer either subsection A or B, as applicable:

A. Your firm has completed three or more government construction contracts in Sacramento County within the last five years: Within those five years, has your firm been assessed liquidated damages on three or more government construction contracts in Sacramento County for failure to complete contract work on time?

NOTE: If there is a pending administrative or court action challenging the assessment of liquidated damages on a government contract within the last five years, you need not include that contract in responding to this question.

Yes No Not applicable

OR

B. Your firm has not completed at least three government construction contracts in Sacramento County within the last five years: Within the last three years, has your firm been assessed liquidated damages on three or more government construction contracts for failure to complete contract work on time?

NOTE: If there is a pending administrative or court action challenging an assessment of liquidated damages on a government contract within the last three years, you need not include that contract in responding to this question.

Yes No Not applicable

7. In the last three years has your firm been debarred from bidding on, or completing, any government agency or public works construction contract for any reason?

NOTE: If there is a pending administrative or court action challenging a debarment, you need not include that debarment in responding to this question.

Yes No

8. Has CAL OSHA assessed a total of three or more penalties against your firm for any "serious" or "willful" violation occurring on construction projects performed in Sacramento County at any time within the last three years?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

Yes No

9. Answer either subsection A or B, as preferred:

A. In the last three years has your firm had a three year average Workers' Compensation experience modification rate exceeding 1.1?

Yes No

OR

B. In the last three years has your firm had a three-year average incident rate for total lost workday cases exceeding 10?

NOTE: Incident rates represent the number of lost workday cases per 100 full-time workers and is to be calculated as: $(N/EH) \times 200,000$, where

N = number of lost workday cases (as defined by the U.S. Dept. of Labor, Bureau of Labor Statistics)
EH = total hours worked by all employees during the calendar year
200,000 = base for 100 equivalent full-time working (working 40 hours per week, 50 weeks per year)

Yes No

10. In the past three years, has the federal EPA, Region IX or a California Air Quality Management District or Regional Water Quality Control Board assessed penalties three or more times, either against your firm, or against the project owner for a violation resulting in whole or in part from any action or omission by your firm on a project on which your firm was a contractor in Sacramento County?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

Yes No

11. In the past three years, has the federal EPA, Region IX or a California Air Quality Management District or Regional Water Quality Control Board assessed a single penalty of \$100,000 or more, either against your firm, or against the project owner for a violation resulting in whole or in part from any action or omission by your firm on a project on which your firm was the contractor in Sacramento County?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

Yes No

12. In the past three years, have civil penalties been assessed against your firm pursuant to California Labor Code 1777.7 for violation of California public works apprenticeship requirements, three or more times?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

Yes No

13. In the past three years, has a public agency in California withheld contract payments or assessed penalties against your firm for violation of public works prevailing wage requirements, three or more times?

NOTE: If there is a pending administrative or court action appealing a withholding or penalty assessment, you need not include that withholding or penalty assessment in responding to this question.

Yes No

14. Has your firm been assessed penalties for violation of public works prevailing wage requirements in California, in an aggregate amount for the past three years of \$50,000 or more?

NOTE: If there is a pending administrative or court action appealing a penalty assessment, you need not include that penalty assessment in responding to this question.

Yes No

REQUIREMENTS OF THE NON-DISCRIMINATION IN EMPLOYEE BENEFITS CODE

INTRODUCTION

The Sacramento Non-Discrimination In Employee Benefits Code (the "Ordinance"), codified as Sacramento City Code Chapter 3.54, prohibits City contractors from discriminating in the provision of employee benefits between employees with spouses and employees with domestic partners, and between the spouses and domestic partners of employees.

APPLICATION

The provisions of the Ordinance apply to any contract or agreement (as defined below), between a Contractor and the City of Sacramento, in an amount exceeding \$25,000.00. The Ordinance applies to that portion of a contractor's operations that occur: (i) within the City of Sacramento; (ii) on real property outside the City of Sacramento if the property is owned by the City or if the City has a right to occupy the property; or (iii) at any location where a significant amount of work related to a City contract is being performed.

The Ordinance does not apply: to subcontractors or subcontracts of any Contractor or contractors; to transactions entered into pursuant to cooperative purchasing agreements approved by the Sacramento City Council; to legal contracts of other governmental jurisdictions or public agencies without separate competitive bidding by the City; where the requirements of the ordinance will violate or are inconsistent with the terms or conditions of a grant, subvention or agreement with a public agency or the instructions of an authorized representative of any such agency with respect to any such grant, subvention or agreement; to permits for excavation or street construction; or to agreements for the use of City right-of-way where a contracting utility has the power of eminent domain.

DEFINITIONS

As set forth in the Ordinance, the following definitions apply:

"Contract" means an agreement for public works or improvements to be performed, or for goods or services to be purchased or grants to be provided, at the expense of the City or to be paid out of moneys deposited in the treasury or out of the trust money under the control or collected by the City. "Contract" also means a written agreement for the exclusive use ("exclusive use" means the right to use or occupy real property to the exclusion of others, other than the right reserved by the fee owner) or occupancy of real property for a term exceeding 29 days in any calendar year, whether by singular or cumulative instrument, (i) for the operation or use by others of real property owned or controlled by the City for the operation of a business, social, or other establishment or organization, including leases, concessions, franchises and easements, or (ii) for the City's use or occupancy of real property owned by others, including leases, concessions, franchises and easements.

"Contract" shall not include: a revocable at-will use or encroachment permit for the use of or encroachment on City property regardless of the ultimate duration of such permit; excavation, street construction or street use permits; agreements for the use of City right-of-way where a contracting utility has the power of eminent domain; or agreements governing the use of City property that constitute a public forum for activities that are primarily for the purpose of espousing or advocating causes or ideas and that are generally protected by the First Amendment to the United States Constitution or that are primarily recreational in nature.

"Contractor" means any person or persons, firm partnership or corporation, company, or combination thereof, that enters into a Contract with the City. "Contractor" does not include a public entity.

"Domestic Partner" means any person who has a currently registered domestic partnership with a governmental entity pursuant to state or local law authorizing the registration.

"Employee Benefits" means bereavement leave; disability, life, and other types of insurance; family medical leave; health benefits; membership or membership discounts; moving expenses; pension and retirement benefits; vacation; travel benefits; and any other benefit given to employees. "Employee benefits" shall not include benefits to the extent that the application of the requirements of this chapter to such benefits may be preempted by federal or state.

CONTRACTOR'S OBLIGATION TO PROVIDE THE CITY WITH DOCUMENTATION AND INFORMATION

Contractor shall provide the City with documentation and information verifying its compliance with the requirements of the Ordinance within ten (10) days of receipt of a request from the City. Contractors shall keep accurate payroll records, showing, for each City Contract, the employee's name, address, Social Security number, work classification, straight time pay rate, overtime pay rate, overtime hours worked, status and exemptions, and benefits for each day and pay period that the employee works on the City Contract. Each request for payroll records shall be accompanied by an affidavit to be completed and returned by the Contractor, as stated, attesting that the information contained in the payroll records is true and correct, and that the Contractor has complied with the requirements of the Ordinance. A violation of the Ordinance or noncompliance with the requirements of the Ordinance shall constitute a breach of contract.

EMPLOYER COMPLIANCE CERTIFICATE AND NOTICE REQUIREMENTS

- (a) All contractors seeking a Contract subject to the Ordinance shall submit a completed Declaration of Compliance Form (attachment "A"), signed by an authorized representative, with each proposal, bid or application. The Declaration of Compliance shall be made a part of the executed contract, and will be made available for public inspection and copying during regular business hours.
- (b) The Contractor shall give each existing employee working directing on a City contract, and (at the time of hire), each new employee, a copy of the notification provided as attachment "B."
- (c) Contractor shall post, in a place visible to all employees, a copy of the notice provided as attachment "C."

**DECLARATION OF COMPLIANCE
Equal Benefits Ordinance**

Name of Contractor

Address

The above named contractor ("Contractor") hereby declares and agrees as follows:

1. I have read and understand the Requirements of the Non-Discrimination In Employee Benefits Code (the "Requirements") provided to me by the City of Sacramento ("City") in connection with the City's request for proposals or other solicitations for the performance of services, or for the provision of commodities, under a City contract or agreement ("Contract").
2. As a condition of receiving the City Contract, I agree to fully comply with the Requirements, as well as any additional requirements that may be specified in the City's Non-Discrimination in Employee Benefits Code codified at Chapter 3.54 of the Sacramento City Code (the "Ordinance").
3. I understand, to the extent that such benefits are not preempted or prohibited by federal or state law, employee benefits covered by the Ordinance, are any of the following:
 - a. Bereavement Leave
 - b. Disability, life, and other types of insurance
 - c. Family medical leave
 - d. Health benefits
 - e. Membership or membership discounts
 - f. Moving expenses
 - g. Pension and retirement benefits
 - h. Vacation
 - i. Travel benefits
 - j. Any other benefit offered to employees

I agree that should I offer any of the above listed employee benefits, that I will offer those benefits, without discrimination between employees with spouses and employees with domestic partners, and without discrimination between the spouses and domestic partners of such employees.

4. I understand that I will not be considered to be discriminating in the provision or application of employee benefits under the following conditions or circumstances:
 - a. In the event that the actual cost of providing a benefit to a domestic partner or spouse, exceeds the cost of providing the same benefit to a spouse or domestic partner of an employee, I will not be required to provide the benefit, nor shall it be deemed discriminatory, if I require the employee to pay the monetary difference in order to provide the benefit to the domestic partner or to the spouse.
 - b. In the event I am unable to provide a certain benefit, despite taking reasonable measures to do so, if I provide the employee with a cash equivalent, I will not be deemed to be discriminating in the application of that benefit.
 - c. If I provide employee benefits neither to employee's spouses nor to employee's domestic partners.
 - d. If I provide employee benefits to employees on a basis unrelated to marital or domestic partner status.
 - e. If I submit, to the Program Coordinator, written evidence of making reasonable efforts to end discrimination in employee benefits by implementing policies which are to be enacted before the

first effective date after the first open enrollment process following the date the Contract is executed with the City.

I understand that any delay in the implementation of such policies may not exceed one (1) year from the date the Contract is executed with the City, and applies only to those employee benefits for which an open enrollment process is applicable.

- f. Until administrative steps can be taken to incorporate, in the infrastructure, nondiscrimination in employee benefits

The time allotted for these administrative steps will apply only to those employee benefits for which administrative steps are necessary and may not exceed three (3) months from the date the Contract is executed with the City.

- g. Until the expiration of a current collective bargaining agreement(s) where, in fact, employee benefits are governed by a collective bargaining agreement(s).
- h. I take all reasonable measures to end discrimination in employee benefits by either requesting the union(s) involved agree to reopen the agreement(s) in order for me to take whatever steps are necessary to end discrimination in employee benefits or by my ending discrimination in employee benefits without reopening the collective bargaining agreement(s).
- i. In the event I cannot end discrimination in employee benefits despite taking all reasonable measures to do so, I provide a cash equivalent to eligible employees for whom employee benefits (as listed previously), are not available.

Unless otherwise authorized in writing by the City Manager, I understand this cash equivalent must begin at the time the union(s) refuse to allow the collective bargaining agreement(s) to be reopened or no longer than three (3) months from the date the Contract is executed with the City.

- 5. I understand that failure to comply with the provisions of Section 4. (a) through 4. (i), above, will subject me to possible suspension and/or termination of this Contract for cause; repayment of any or all of the Contract amount disbursed by the City; debarment for future contracts until all penalties and restitution have been paid in full; deemed ineligible for future contracts for up to two (2) years; the imposition of a penalty, payable to the City, in the sum of \$50.00 for each employee, for each calendar day during which the employee was discriminated against in violation of the provisions of the Ordinance.
- 6. I understand and do hereby agree to provide each current employee and, within ten (10) days of hire, each new employee, of their rights under the Ordinance. I further agree to maintain a copy of each such letter provided, in an appropriate file for possible inspection by an authorized representative of the City. I also agree to prominently display a poster informing each employee of these rights.
- 7. I understand that I have the right to request an exemption to the benefit provisions of the Ordinance when such a request is submitted to the Procurement Services Division, in writing with sufficient justification for resolution, prior to contract award.

I further understand that the City may request a waiver or exemption to the provisions or requirements of the Ordinance, when only one contractor is available to enter into a contract or agreement to occupy and use City property on terms and conditions established by the City; when sole source conditions exist for goods, services, public project or improvements and related construction services; when there are no responsive bidders to the Ordinance requirements and the contract is for essential goods or services; when emergency conditions with public health and safety implications exist; or when the contract is for specialized legal services if in the best interest of the City.

8. In consideration of the foregoing, I shall defend, indemnify and hold harmless, the City, its officers and employees, against any claims, actions, damages, costs (including reasonable attorney fees), or other liabilities of any kind arising from any violation of the Requirements or of the Ordinance by me.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am authorized to bind the Contractor to the provisions of this Declaration.

Signature of Authorized Representative

Date

Print Name

Title



YOUR RIGHTS UNDER THE CITY OF SACRAMENTO'S
NON-DISCRIMINATION IN EMPLOYEE BENEFITS BY CITY CONTRACTORS ORDINANCE

On (date), your employer (the "Employer") entered into a contract with the City of Sacramento (the "City") for (contract details), and as a condition of that contract, agreed to abide by the requirements of the City's Non-Discrimination In Employee Benefits By City Contractors Ordinance (Sacramento City Code Section 3.54).

The Ordinance does not require the Employer to provide employee benefits. The Ordinance does require that if certain employee benefits are provided by the Employer, that those benefits be provided without discrimination between employees with spouses and employees with domestic partners, and without discrimination between the spouse or domestic partner of employees.

The Ordinance covers any employee working on the specific contract referenced above, but only for the period of time while those employees are actually working on this specific contract.

The included employee benefits are:

- Bereavement leave
- Disability, life and other types of insurance
- Family medical leave
- Health benefits
- Membership or membership discounts
- Moving expenses
- Pension and retirement benefits
- Vacation
- Travel benefits
- Any other benefits given to employees

(Employee Benefits does not include benefits that may be preempted by federal or state law.)

If you feel you have been discriminated or retaliated against by your employer in the terms and conditions of your application for employment, or in your employment, or in the application of these employee benefits, because of your status as an applicant or as an employee protected by the Ordinance, or because you reported a violation of the Ordinance, and after having exhausted all remedies with your employer,

You May . . .

- Submit a written complaint to the City of Sacramento, Contract Services Unit, containing the details of the alleged violation. The address is:

City of Sacramento
Contract Services Unit
915 I St., 2nd Floor
Sacramento, CA 95814

- Bring an action in the appropriate division of the Superior Court of the State of California against the Employer and obtain the following remedies:
 - Reinstatement, injunctive relief, compensatory damages and punitive damages
 - Reasonable attorney's fees and costs



YOUR RIGHTS UNDER THE CITY OF SACRAMENTO'S
NON-DISCRIMINATION IN EMPLOYEE BENEFITS BY CITY CONTRACTORS ORDINANCE

If your employer provides employee benefits, they must be provided to those employees working on a City of Sacramento contract without discriminating between employees with spouses and employees with domestic partners.

The included employee benefits are:

- Bereavement leave
- Disability, life and other types of insurance
- Family medical leave
- Health benefits
- Membership or membership discounts
- Moving expenses
- Pension and retirement benefits
- Vacation
- Travel benefits
- Any other benefits given to employees

If you feel you have been discriminated against by your employer . . .

You May . . .

- o Submit a written complaint to the City of Sacramento, Contract Services Unit, containing the details of the alleged violation. The address is:

City of Sacramento
Contract Services Unit
915 I St., 2nd Floor
Sacramento, CA 95814
- o Bring an action in the appropriate division of the Superior Court of the State of California against the employer and obtain reinstatement, injunctive relief, compensatory damages, punitive damages and reasonable attorney's fees and costs.

Discrimination and Retaliation Prohibited.

If you feel you have been discriminated or retaliated against by your employer in the terms and conditions of your application for employment, or in your employment, because of your status as an applicant or as an employee protected by the Ordinance, or because you reported a violation of this Ordinance . . .

You May Also . . .

Submit a written complaint to the City of Sacramento, Contract Services Unit, at the same address, containing the details of the alleged violation.

Construction and Demolition (C&D) Debris Recycling Requirements

As a condition of receiving this Contract, Contractor agrees to fully comply with the requirements specified herein for all demolition projects, as well as projects with a valuation of \$250,000 or more:

1. **Definitions.** For purposes of this section, the following terms, words and phrases shall have the following meanings:

“Certified C&D sorting facility” means a facility that receives C&D debris and/or processes C&D debris into its component material types for reuse, recycling, and disposal of residuals and possesses a valid certificate as a C&D sorting facility from the Sacramento Regional County Solid Waste Authority.

“Construction and demolition debris” or “C&D debris” means used or commonly discarded materials resulting from construction, repair, remodel or demolition operations on any pavement, house, building, or other structure, or from landscaping that are not hazardous as defined in California Health and Safety Code section 25100 et seq. Such materials include, but are not limited to, concrete, asphalt, wood, metal, brick, dirt, sand, rock, gravel, plaster, glass, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, masonry, plastic pipe, trees, and other vegetative matter resulting from land clearing and landscaping.

“Divert” or “diversion” means to use materials for any purpose other than disposal in a landfill or transformation facility. Methods to divert materials include on-site reuse of the materials, delivery of materials from the project site to a certified C&D sorting facility or a recycling facility, or other methods as approved in regulations promulgated by the City Department of Utilities.

“Franchised waste hauler” means a person who possesses a valid commercial solid waste collection franchise issued by the Sacramento Regional County Solid Waste Authority.

“Mixed C&D debris” means loads that include commingled recyclable and non-recyclable C&D debris generated at a project site.

“Recyclable C&D debris” means C&D debris required to be diverted from landfills as specified in the Waste Management Plan and returned to the economic mainstream in the form of raw material for new, reused or reconstituted products that meet the quality standards necessary to be used in the marketplace.

“Recycling facility” means a facility or operation that receives, processes, and transfers source-separated recyclable materials.

“Source-separated C&D debris” means recyclable C&D debris that is separately sorted and containerized at the site of generation by individual material type and segregated from mixed C&D debris prior to collection and transporting.

“Waste log” means a record detailing the management of C&D debris generated by the covered project, including the date and weight/volume of material by type that was salvaged, reused, recycled or disposed.

2. **Waste Management Plan.** A completed WMP (see **Attachment 1**) must be submitted to and approved by the City prior to commencing any work on the project. The WMP must specify the types of C&D debris that will be generated from the project; the manner in which C&D debris will be managed and/or stored on the project site; the manner in which recyclable C&D debris generated from the project will be recycled or reuse; the person who will haul, collect or transport the recyclable C&D debris from the project site; and the certified C&D sorting facility or recycling facility where recyclable C&D debris will be delivered. The WMP must be approved by the City prior to commencing any work on the project.

3. Contractor shall be solely responsible for diverting the recyclable C&D materials specified on the WMP. Mixed C&D debris shall be delivered to a SWA-certified C&D sorting facility only. Only the permit holder, the person who generates the waste, a franchised waste hauler, or the City of Sacramento can transport or haul mixed C&D debris. Source-separated C&D debris may be delivered by any person to any recycling facility that accepts such materials. (See **Attachment 2** for list of C&D Debris Haulers and Facilities).

4. During the course of the project, Contractor shall maintain a waste log (see **Attachment 3**), and keep all weight tickets or weight receipts, for all C&D debris hauled away from the project. At a minimum, the waste log shall specify the C&D debris generated by the project; the manner in which C&D debris was recycled or re-used; and the facility where the C&D debris was delivered.

5. Within 30 days after submitting the project completion report, Contractor shall submit to the City a completed waste log, along with copies of supporting weight tickets. Contractor shall maintain and keep accurate and complete records of all bills, weight receipts or weight tickets that were issued for the collection, transport or disposal of C&D debris for a period of one-year after submittal of the waste log. The records shall be made available for inspection, examination and audit by the City during the one-year retention period to validate the information provided in the WMP and in the waste log. If the City determines noncompliance by the Contractor after an audit has been conducted, Contractor shall reimburse the City for all costs incurred in performing the audit.

6. Failure by Contractor to comply with any provisions specified herein will subject Contractor to possible suspension and/or termination of this Contract for cause; repayment of any or all of the Contract amount disbursed by the City; imposition of a penalty, payable to the City (\$50-\$250 for first offense, \$251-\$500 for second offense, and \$501-\$1500 for subsequent offenses); and/or submission of a performance security deposit fee when submitting a permit application to the City for a project within one year of imposition of the penalty.

For questions or to obtain more information about the Recycling Requirements for C&D debris, contact the City of Sacramento, Solid Waste Services Division, 2812 Meadowview Road, Building 1, Sacramento, CA 95832, or telephone (916) 808-4833, or email C&D@cityofsacramento.org

C&D Debris Waste Management Plan

C&D Debris Waste Management Plan
 City of Sacramento Solid Waste Services
 2812 Meadowview Road, Building 1
 Sacramento, CA 95832
 Phone: (916) 808-4839 / Fax: (916) 808-4999
 C&D@cityofsacramento.org

Form
submitted by:

Please attach a business card, or put your name with a phone number and/or an email address.

This Waste Management Plan (WMP) must be submitted and approved before work can begin. Only one WMP is required for each public construction project. The administration fee and, if applicable, a security deposit must be submitted with this form to be approved. Administration fee is 0.04% of project bid amount (min \$40, max \$800); security deposit, if applicable, is 1% of bid amount (max \$10,000). The accompanying Waste Log must be submitted within 30 days of the project completion report, or a penalty may be imposed.

A. Building Project Information:

Job Address: _____
 Contractor: _____
 Address: _____

Engineering
 Estimate: _____
 Phone: _____
 Email: _____

B. Briefly describe the project:

C. Materials Required to be Recycled

50% of all debris must be recycled if generated during the course of your project. You can either **source-separate** them, which may be hauled by anyone, or mix them in one container and send the **mixed C&D debris** load to a **Certified Mixed C&D Sorting Facility**. Mixed C&D loads can only be hauled by a franchised hauler or self-hauled. Please see the Definitions section, on the next page, for more information.



D. Material Management.

1. How will C&D debris will be stored on the project site: _____ Mixed C&D _____ Source-Separated
2. Company to haul away debris: _____
3. Facilities to receive debris: _____

C&D Debris Waste Management Plan

C&D Debris Waste Management Plan
City of Sacramento Solid Waste Services
2812 Meadowview Road, Building 1
Sacramento, CA 95832
Phone: (916) 808-4839 / Fax: (916) 808-4999
C&D@cityofsacramento.org

E. Definitions.

Please read and understand these terms. Call Solid Waste at (916) 808-4833 if these terms are not clear to you. More information is also available online at <http://www.cityofsacramento.org/utilities/>.

1. **Self-haul or self-hauling:** This is when the general contractor or a subcontractor *who is doing work on the project* hauls their own waste materials for recycling or disposal. Note that a *jobsite cleanup crew is not doing other work on the project and is not self-hauling*. Jobsite cleanup crews need to be franchised in order to haul mixed C&D debris away.
2. **Franchised hauler:** Check the Department of Utilities (DOU) website for a list of these haulers. Only these companies and the City of Sacramento can collect and haul mixed C&D debris generated within the City for a fee.
3. **Source separation:** This means keeping wood, metal, cardboard, or other recyclables in separate containers, and sending the materials to an authorized recycler. A list of authorized recyclers can be found on the DOU web site. Source-separated materials may be hauled by anyone.
4. **Mixed C&D debris:** This means putting all recyclable debris into one container. Mixed materials must be sent to a certified mixed C&D sorting facility. Mixed materials may be either self-hauled or hauled by a franchised hauler. If your job site is crowded, this option saves the most space.
5. **Certified Mixed C&D Sorting Facility:** See the DOU web site for a list. These facilities have been certified by the Sacramento Regional Solid Waste Authority (SWA) to extract recyclable materials from mixed C&D debris.

F. Terms and Conditions

- Your approved Waste Management Plan and Waste Log must be kept on the job site for the duration of the project.
- City of Sacramento Solid Waste Services staff may enter the jobsite to inspect waste collection areas.
- **ALL Clean Wood Waste** (unpainted, untreated lumber, plywood and OSB), **Inert Materials** (concrete, asphalt paving, brick, block, and dirt), **Wooden Pallets**, **Scrap Metal**, and **Corrugated Cardboard** must be recycled.
- Only SWA-Certified Mixed C&D Sorting Facilities may be used to recycle these materials if mixed with other materials.
- Only the City of Sacramento, SWA-Franchised Haulers, or self-haulers (as defined above) may collect and transport mixed C&D material from the jobsite.
- C&D Debris may not be burned or dumped illegally.
- Your Waste Log must be completed and submitted, with supporting weight tickets, within 30 days of submitting your project completion report. All waste hauling and disposal or recycling activity must be entered on the Waste Log, including information from any subcontractors who self-hauled their own debris off-site.
- You must keep all receipts or weight-tickets from your project for a period of one year from the submittal of your waste log.
- Failure to comply with these terms and conditions may result in a fine and payment of a security deposit on future projects

C&D Debris Haulers & Facilities

C&D Debris Waste Management Plan
City of Sacramento Solid Waste Services
2812 Meadowview Road, Building 1
Sacramento, CA 95832
Phone: (916) 808-4833 / Fax: (916) 808-4999
C&D@cityofsacramento.org

Certified Mixed C&D Facilities

Allied Waste / Elder Creek Transfer and Recovery	(916) 387-8425
Florin-Perkins Public Disposal	(916) 443-5120
L&D Landfill	(916) 737-8640
Waste Management / K&M Recycle America	(916) 452-0142

Franchised Haulers

ACES Waste Services, Inc.	(866) 488-8837	Elk Grove Waste Management, LLC	(916) 689-4052
Allied Waste Services	(916) 631-0600	Mini Drops, Inc.	(916) 686-8785
All Waste Systems, Inc.	(916) 456-1555	Norcal Waste Services of Sacramento	(916) 381-5300
Atlas Disposal Industries, LLC	(916) 455-2800	North West Recyclers	(916) 686-8575
California Waste Recovery Systems	(916) 441-1985	Waste Management of Sacramento	(916) 387-1400
Central Valley Waste Services, Inc.	(209) 369-8274	Waste Removal & Recycling	(916) 453-1400
City of Sacramento Solid Waste	(916) 808-4839	Western Strategic Materials, Inc.	(916) 388-1076

Recyclers*

Bell Marine	(916) 442-9089
C & C Paper Recycling	(916) 920-2673
EBI Aggregates	(916) 372-7580
International Paper	(916) 371-4634
Modern Waste Solutions	(916) 447-6800
PRIDE Industries, Inc.	(916) 640-1300
Recycling Industries, Inc.	(916) 452-3961
Sacramento Local Conservation Corps	(916) 386-8394
Smurfit-Stone Container Corporation	(916) 381-3340
Southside Art Center	(916) 387-8080
Spencer Building Maintenance, Inc.	(916) 922-1900

Recovery Stations & Landfills

Elder Creek Recovery & Transfer Station	(916) 387-8425
Kiefer Landfill	(916) 875-5555
L & D Landfill	(916) 383-9420
North Area Recovery Station	(916) 875-5555
Sacramento Recycling & Transfer Station	(916) 379-0500
Waste Management Recycle America	(916) 452-0142

More updated information can be found online at:
<http://www.cityofsacramento.org/utilities/>

* Please note that any facility may receive source-separated recyclable materials as long as it is authorized to do so by the State of California. This is not meant to be a complete list.

Voluntary Green Contracting Fleet Inventory List (On-Road Equipment)

In partnership with the City of Sacramento and the Sacramento Metropolitan Air Quality Management District

Green Contracting Survey (Voluntary)

The City of Sacramento and the Sacramento Metropolitan Air Quality District (SMAQMD) are conducting a joint pilot project to help meet Federal Clean Air Standards for the Sacramento region.

Attached is a Green Contracting Fleet Inventory Form. Please complete the form, remove it from the bid package and return it to SMAQMD in the postage paid envelope provided with the bid package. Please do not return the Green Contracting Fleet Inventory Form to the City of Sacramento with the bid documents or otherwise.

A limited amount of funds and other financial incentives may be available to qualified contractors participating in this joint project to assist qualified contractors with upgrading and/or replacing equipment and/or trucks.

Completing and returning the Green Contracting Fleet Inventory Form is strictly voluntary

Voluntary Green Contracting Fleet Inventory List (On-Road Equipment)
 In partnership with the City of Sacramento and the Sacramento Metropolitan Air Quality Management District

Company Name: _____
 Contact Name: _____
 Company Address: _____
 City, State, ZIP: _____
 Company Phone: _____

City Bid Information	
Department	_____
Project #	_____
ESBE/SBE?	_____

Please Submit To: _____

- Instructions:
- a) Please enter the vehicle / equipment information for each unit used in conjunction with your City of Sacramento Bid.
 - b) All fields are required for both on-road heavy-duty vehicles and off-road construction equipment over 50 HP.
 - c) Electronic version available at <http://www.airquality.org/ceqa/index.shtml>
 For additional questions, please call (916) 874-4892
 - d)

Kristian Damkier, P.E.
 Sacramento Metropolitan AQMD
 777 12th St, 3rd Floor
 Sacramento, CA 95814-1908

#	VIN	License Plate	Vehicle Information			Engine Information			Annual Usage (miles)	Received Funding	
			Make	Model	Year	Make	Model	Year			HP
(ex)	1XP5AAC35RG339402	1T45678	Kenworth	T-300	2002	Cummins	ISB	2002	250	35,000	No

Voluntary Green Contracting Fleet Inventory List (On-Road Equipment)
 In partnership with the City of Sacramento and the Sacramento Metropolitan Air Quality Management District

Company Name: _____
 Contact Name: _____
 Company Address: _____
 City, State, ZIP: _____
 Company Phone: _____

City Bid Information	
Department	_____
Project #	_____
ESBE/SBE?	_____

Please Submit To:

Kristian Damkier, P.E.
 Sacramento Metropolitan AQMD
 777 12th St, 3rd Floor
 Sacramento, CA 95814-1908

- Instructions:
- a) Please enter the vehicle / equipment information for each unit used in conjunction with your City of Sacramento Bid.
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 Electronic version is available at <http://www.airquality.org/ceqa/index.shtml>
 - c) For additional questions, please call (916) 874-4892
 - d)

Equipment Serial Number	Equipment Information			Engine Information			Annual Usage (hours)		
	Make	Model	Type	Year	Make	Model		Year	HP
48W34456	Caterpillar	631G	Scraper	2003	Caterpillar	3408E	2003	485	1,600

Guidelines for City of Sacramento Boycott of Arizona and Arizona-Headquartered Businesses

Sacramento City Council Resolution No. 2010-346 calls for a boycott of the State of Arizona and businesses headquartered in Arizona. The boycott provisions prohibit employee travel to Arizona at City expense, and restrict the purchase of goods and services with Arizona headquartered businesses.

Resolution No. 2010-346 provides that “where ***practicable*** and where there is no ***significant*** additional cost to the City, the City of Sacramento shall not enter into any new, amended, extended or supplemental contracts to purchase or procure goods or services from any business or entity that is ***headquartered*** in Arizona ...”

The guidelines below are provided to city staff for implementing the Resolution.

• Definitions

- **Headquartered**: State in which a company is headquartered. This may be different than the state of incorporation, where subsidiaries are located. You may determine a company headquarters from the declaration provided in a solicitation response or by calling the company directly.
- **Practicable**: The proposed or existing vendor can be replaced without interruption to services and/or supplies, and the replacement of the vendor does not adversely affect the Sacramento economy. For example, excluding a company headquartered in Arizona, but with a Sacramento-area office would not be practicable, as it would adversely affect the local economy. The cost of transition should not be significant.
- **Significant**: Costs that exceed the following percentages or dollar thresholds:
 - o For contracts valued \$250k and less – the lesser of 10% or \$25k
 - o For contracts valued between \$250k and \$1m – the lesser of 10% or \$100k
 - o For contracts valued between \$1m and 10m – the lesser of 8% or \$100k
 - o For contracts valued at \$10m and more – the lesser of 6% or 100k
- **Related companies, subcontractors**: The policy applies only to the company with which the City enters into a contract.

• Exceptions Checklist

If the lowest bidder is headquartered in Arizona, in order to have a valid exception to the boycott Resolution, you must be able to answer yes to **at least** one of the following questions:

- Is the difference between the low bid and the second low bid “significant”? (see definitions) OR if the vendor has a current contract and we evaluating a renewal, is there a significant cost to switch vendors?
- Does the lowest bidder have a local office in Sacramento, providing benefit to the local economy, if awarded the contract?
- Is the vendor the sole-source for this particular service/commodity?
- Is the contract award or extension in the “best interest of the City” for reasons not listed above?

City of Sacramento Boycott of Arizona-Headquartered Businesses

On June 15, 2010, the Sacramento City Council adopted Resolution No. 2010-346 opposing two Arizona laws (SB 1070 and HB 2162) that will allow Arizona police to arrest individuals suspected of being unlawfully present in the United States and to charge immigrants with a state crime for not carrying immigration documents. Sacramento City Council Resolution No. 2010-346 also called for a boycott of the State of Arizona and businesses headquartered in Arizona until Arizona repeals or a court nullifies SB 1070 and HB 1262. Resolution No. 2010-346 provides, in pertinent part, that "where practicable and where there is no significant additional cost to the City, the City of Sacramento shall not enter into any new, amended, extended or supplemental contracts to purchase or procure goods or services from any business or entity that is headquartered in Arizona ..."

Pursuant to the provisions of Resolution No. 2010-346, the City may determine that a bid from a business or entity that is headquartered in Arizona is nonresponsive and the City may reject the bid on that basis.

Bidders that are headquartered in the United States shall certify in the space below the state where the bidder is headquartered:

State Where Firm is Headquartered

Signature of Authorized Representative

Date

Print Name

Title

This Page to be completed and submitted with bid proposal

ESBE REQUIREMENTS

(City Contracts no Federal Funds Used)

I. ESBE PARTICIPATION REQUIREMENT

On February 9, 1999, the Sacramento City Council adopted an Emerging and Small Business Development (ESBD) program to provide enhanced opportunities for the participation of small business enterprises (SBEs) and emerging business enterprises (EBEs) in the City's contracting and procurement activities. The ESBD program establishes an annual emerging and small business enterprise (ESBE) participation goal for the City's contracts, and authorizes City departments to require minimum ESBE participation levels in individual contracts so that the annual ESBE participation goal can be met. Under City Code section 3.60.270, when the bid specifications for a City contract establishes a minimum participation level for ESBEs, no bidder on the contract shall be considered a responsive bidder unless its bid meets the minimum ESBE participation level required by the bid specifications.

The City has established a **minimum 20% participation level for ESBEs on this contract**. Pursuant to City code Section 3.60.270, no bidder on this contract shall be considered a responsive bidder unless its bid meets or exceeds this minimum participation level.

Bidders shall include copies of their Certification as a SBE or EBE and the SBE or EBE Certifications for each subcontractor, trucker, material supplier, or other business entity listed on the forms submitted within two (2) working days of submitting the sealed proposal. Failure to submit the required ESBE information will be grounds for finding the bid non-responsive.

II. ESBE CERTIFICATION

- A. A SBE designated in the bid must be certified as such by the State of California, Department of General Services, or by the City, as defined herein, prior to the time bids are received.
- B. An EBE designated in the bid must be certified as such by the City, as defined herein, prior to the time bids are received.

III. DETERMINATION OF ESBE PARTICIPATION LEVEL

- A. The percent of ESBE participation shall be determined based on the dollar value of the work to be performed or supplies to be furnished by certified ESBEs designated in the bidder's Subcontractor and ESBE Participation Verification Form, relative to the total dollar amount of the bid.
- B. To receive credit for participation, an ESBE must perform a commercially useful function; i.e., must be responsible for the execution of a distinct element of the work and must carry its responsibility by actually performing, managing, or supervising the work.

- C. ESBE Bidders: The dollar value listed for an ESBE bidder on the bidder's Subcontractor and ESBE Participation Verification Form shall include only the amount of work to be performed by the ESBE bidder, and shall not include any amount to be paid by the ESBE bidder for the cost of materials or supplies.
- D. Suppliers: Credit for an ESBE vendor of materials or supplies is counted as one hundred (100) percent of the amount paid to the vendor for the material or supplies. To receive this credit, ESBE vendors of supplies and materials must be listed on the bidder's Subcontractor and ESBE Participation Verification Form.
- E. Truckers: Credit for an ESBE trucker is counted as one hundred (100) percent of the amount paid to the trucker for trucking services, not including any amount paid to the trucker for the cost of any materials or supplies being transported by the trucker.
- F. Subcontractors (including truckers): To receive credit for an ESBE subcontractor, the subcontractor must be listed on the bidder's Subcontractor and ESBE Participation Verification Form. The dollar value listed for a subcontractor on the bidder's Subcontractor and ESBE Participation Verification Form shall not include any amount to be paid to the subcontractor for the cost of materials or supplies.

IV. ESBE REQUIREMENTS FOR CONTRACTOR

- A. ESBE Records: The Contractor shall maintain records of all subcontracts with certified ESBE subcontractors and records of materials purchased from certified ESBE vendors/suppliers for one (1) year after receiving final payment from the City. Such records shall show the name and business address of each ESBE subcontractor or vendor/supplier and the total dollar amount actually paid each ESBE subcontractor or vendor/supplier.

Upon completion of the contract, a summary of these records shall be prepared, certified correct by the Contractor's authorized representative and furnished to the City. The Contractor shall provide such other information, records, reports, certifications or other documents as may be required by City, to determine compliance with any provision of the ESD program or these specifications.

- B. Reporting Requirements and Sanctions: Failure to provide specific information, records, reports, certifications, or any other documents required for compliance with these specifications shall be considered noncompliance with the contract. If the Contractor fails to correct a deficiency within fifteen (15) days after notification, a deduction may be made from the contract amount. The deduction shall be ten (10) percent of the estimated value of the work performed during the month, not to be less than \$1,000 nor exceed \$10,000 and shall be deducted from the next progress payment.
- C. Performance of ESBE Subcontractors and Suppliers: The ESBEs listed by the Contractor shall perform the work and supply the materials for which they are listed unless the Contractor has received prior written authorization from the City to perform the work with other forces or to obtain the material from other sources. Reasons for requesting such authorization would include:

1. The listed ESBE fails to execute a written contract based upon the general terms, conditions, plans, and specifications for the project.
2. The listed ESBE becomes bankrupt or insolvent.
3. The listed ESBE subcontractor fails to meet the bond requirements of the Contractor.
4. The work performed by the listed ESBE subcontractor is unsatisfactory and/or is not in accordance with the plans and specifications, or the subcontractor fails to perform his/her obligations under the subcontractor contract.
5. It would be in the best interest of the City.

The Contractor shall not be entitled to any payment for such work or materials unless it is performed or supplied by the listed SBE or EBE or other forces (including those of the Contractor) authorized by the City in writing.

- D. Subcontractor Substitution: No substitution of an ESBE subcontractor shall be made at any time without compliance with the Subcontracting Listing Law and the written consent of the City. If an ESBE subcontractor is unable to perform successfully and is to be replaced, the Contractor will be required to make good faith efforts to replace the original ESBE subcontractor with another certified ESBE subcontractor. The new ESBE subcontractor must be certified at the time of substitution.

V. DEFINITIONS

- A. **Emerging Business Enterprise (EBE)**: The City shall certify EBEs utilizing the small business certification criteria and standards of the State of California, General Services Department, Office of Small Business Certification and Resources, that were in effect on December 1, 1998, provided that the size standard, industry by industry, shall be set at 50% of the State small business certification criteria and standards that were in effect on December 1, 1998.
- B. **Small Business Enterprise (SBE)**: The City shall certify SBEs utilizing the small business certification criteria and standards of the State of California, General Services Department, Office of Small Business Certification and Resources. The City will also accept State certified SBEs.
- C. **Contractor**: The individual, partnership, corporation, joint venture or other legal entity entering into a contract with the City of Sacramento.
- D. **Subcontractor**: The individual, partnership, corporation, or other legal entity entering into a contract with the prime contractor to perform a portion of the work.

FOLLOWING FORMS TO BE FILLED OUT AND SIGNED

ONLY

IF AWARDED CONTRACT

WORKER'S COMPENSATION INSURANCE CERTIFICATION

TO THE CITY OF SACRAMENTO:

The undersigned does hereby certify that he is aware of the provisions of Section 3700 et seq. of the Labor Code which require every employer to be insured against liability for worker's compensation claims or to undertake self-insurance in accordance with the provisions of said Code, and that he/she will comply with such provisions before commencing the performance of the work on this contract.

Bidder

BY: _____

Title: _____

Address: _____

Date: _____

PLEASE READ CAREFULLY BEFORE SIGNING

To be signed by authorized corporate officer or partner or individual submitting the bid. If bidder is: (example)

1. An individual using a firm name, sign: "John Doe, and individual doing business as Blank Company".
2. An individual doing business under his own name, sign: Your name only.
3. A co-partnership, sign: "John Doe and Richard Doe, co-partners doing business as Blank Company, by, John Doe, Co-Partner".
4. A corporation, sign: "Blank Company, by John Doe, Secretary". (Or other title)

AGREEMENT
(Construction Contract Over \$25,000)

THIS AGREEMENT, dated for identification _____, 20___, is made and entered into between the CITY OF SACRAMENTO, a municipal corporation ("City"), and _____
("Contractor").

The City and Contractor hereby mutually agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents, sometimes also referred to as the "Contract," consist of the following items, which are hereby incorporated by reference as if set forth in full in this Agreement:

- The Notice to Contractors
- The Proposal Form submitted by the Contractor
- The Instructions to Bidders
- The Emerging and Small Business Enterprise (ESBE) Requirements
- The Requirements for the Non-Discrimination in Employee Benefits by City Contractors Ordinance and the Declaration of Compliance
- The City's Reference Guide for Construction Contracts
- The Addenda, if any
- This Agreement
- The Standard Specifications
- The Special Provisions
- The Plans and Technical Specifications
- The drawings and other data and all developments thereof prepared by City pursuant to the Contract
- Any modifications of any of the foregoing made or approved by City, including but not limited to duly authorized change orders.

Unless specifically noted otherwise, references to the "Standard Specifications" shall mean and refer to the Standard Specifications for Public Construction of the City of Sacramento approved by the Sacramento City Council on June 4, 2007 (Resolution No. 2007-350), and any subsequent amendments thereto approved by the Sacramento City Council or the Sacramento City Manager. Work called for in any one Contract Document and not mentioned in another is to be performed and executed as if mentioned in all Contract Documents. The table of contents, titles and headings contained in the Contract Documents are provided solely to facilitate reference to various provisions of the Contract Documents and in no way affect or limit the interpretation of the provisions to which they refer.

2. DEFINITIONS

Unless otherwise specifically provided herein, all words and phrases defined in the Standard Specifications shall have the same meaning and intent in this Agreement.

3. AGREEMENT CONTROLS

In the event of a conflict between any of the terms and conditions set forth in this Agreement and the terms and conditions set forth in other Contract Documents, the terms

and conditions set forth in this Agreement shall prevail, except that the provisions of any duly authorized change order shall prevail over any conflicting provisions of this Agreement.

4. SCOPE OF CONTRACT

Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, material and transportation necessary to perform and complete in a good and workmanlike manner to the satisfaction of City, all the Work called for in the Contract Documents entitled:

FOLSOM BLVD. WATER TRANSMISSION MAI PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE., (PN: Z14004200)

including the Work called for in the following alternative bid items described in the Proposal Form:

Contractor agrees to perform such Work in the manner designated in and in strict conformity with the Contract Documents.

5. CONTRACT AMOUNT AND PAYMENTS

City agrees to pay and Contractor agrees to accept, as complete payment for the above Work, in accordance with the schedule and procedures set forth in the Contract Documents and subject to deductions, withholdings and additions as specified in the Contract Documents, a total sum that shall not exceed the total bid amount set forth in Contractor's Proposal Form. In addition, subject to deductions, withholdings and additions as specified in the Contract Documents, payment for individual items of the Work shall be computed as follows:

(A) For items of the Work for which a lump sum price is specified in Contractor's Proposal Form, Contractor shall be paid the lump sum price(s) specified in Contractor's Proposal Form; and

(B) For items of the Work for which a unit price is specified in Contractor's Proposal Form, Contractor shall be paid the sum computed at such unit price, or computed at a different price if such different price is determined by City in accordance with the Standard Specifications, based on the actual amount of each such item performed and/or furnished and incorporated in the Work; provided that in no event shall the total sum for a unit price item exceed the total bid amount set forth for such item in the Contractor's Proposal Form, unless authorized by Change Order.

6. PROGRESS PAYMENTS

Subject to the terms and conditions of the Contract, City shall cause payments to be made upon demand of Contractor as follows:

(A) On or about the first of the month, the Engineer shall present to the Contractor a statement showing the amount of labor and materials incorporated in the Work through the twentieth (20) calendar day of the preceding month. After both Contractor and Engineer approve the statement in writing, and the City's labor compliance officer provides written approval, the City shall issue a certificate for ninety (90) percent of the

amount it shall find to be due, subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations.

(B) No inaccuracy or error in said monthly estimates shall operate to release Contractor from damages arising from such Work or from enforcement of each and every provision of the Contract Documents, and City shall have the right subsequently to correct any error made in any estimate for payment.

(C) Contractor shall not be paid for any defective or improper Work.

(D) The remaining ten (10) percent of the value of the Work performed under the Contract, if unencumbered and subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations, shall be due and payable beginning thirty-five (35) days after completion and final acceptance of the Work by City; provided that the City may determine, in its sole discretion, to release up to fifty (50) % of such retention, in whole or in part, at any time. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the City arising under the Contract Documents, except for disputed claims in stated amounts that the Contractor specifically reserves in writing, but only to the extent that the Contractor has complied with all procedures and requirements applicable to the presentation and processing of such claim(s) under the Contract Documents. Contractor shall be entitled to substitute securities for retention or to direct that payments of retention be made into escrow, as provided in Public Contract Code Section 22300, upon execution of the City's Escrow Agreement for Security Deposits in Lieu of Retention.

(E) The parties agree that, for purposes of the timely progress payment requirements specified in Public Contract Code Section 20104.50, the date that the City receives a statement jointly approved by the Contractor and the Engineer as provided above shall be deemed to constitute the date that City receives an undisputed and properly submitted payment request from the Contractor. Progress payments not made within 30 days after this date may be subject to payment of interest as provided in Section 20104.50.

7. RETENTION OF SUMS CHARGED AGAINST CONTRACTOR

When, under the provisions of this Contract or any applicable Laws or Regulations, City is authorized or required to withhold, deduct or charge any sum of money against Contractor, City may deduct and retain the amount of such charge from the amount of the next succeeding progress estimate(s), or from any other moneys due or that may become due Contractor from City. If, on completion or termination of the Contract, sums due Contractor are insufficient to pay City's charges, City shall have the right to recover the balance from Contractor or its Sureties.

8. COMMENCEMENT AND PROSECUTION OF WORK

Contractor shall commence the Work not later than fifteen (15) working days after the date of the written Notice to Proceed from City to Contractor and shall diligently prosecute the Work to final completion. The phrase "commence the Work" means to engage in a continuous program on-site including, but not limited to, site clearance, grading, dredging, land filling and the fabrications, erection, or installation of the Work. The Notice to Proceed shall be issued within fifteen (15) calendar days following execution of the Agreement by the City and the filing by Contractor of the required Bonds and proof of insurance, provided that the Engineer may delay issuance of the Notice to Proceed if the Engineer determines in the Engineer's sole discretion that conditions on the site of the

Work are unsuitable for commencement of the Work. After the Notice to Proceed is issued, the continuous prosecution of Work by Contractor shall be subject only to Excusable Delays as defined in this Agreement.

9. TIME OF COMPLETION

The entire Work shall be brought to completion in the manner provided for in the Contract Documents on or before **One Hundred Seventy (170) working** days from the date of the Notice to Proceed (hereinafter called the "Completion Date") unless extensions of time are granted in accordance with the Contract Documents.

Failure to complete the entire Work by the Completion Date and in the manner provided for in the Contract Documents shall subject Contractor to liquidated damages as provided in this Agreement. Time is and shall be of the essence in the performance of the Contract and the Work.

10. PAYMENTS DO NOT IMPLY ACCEPTANCE OF WORK

The payment of any progress payment, or the acceptance thereof by Contractor, shall not constitute acceptance of the Work or any portion thereof and shall in no way reduce the liability of Contractor to replace unsatisfactory work or material, whether or not the unsatisfactory character of such work or material was apparent or detected at the time such payment was made.

11. ACCEPTANCE NOT RELEASE

Contractor shall correct immediately any defective or imperfect work or materials that may be discovered before final acceptance of the entire Work, whether or not such defect or imperfection was previously noticed or identified by the City. The inspection of the Work, or any part thereof, shall not relieve Contractor of any of its obligations to perform satisfactory work as herein specified.

Failure or neglect on the part of City or any of its officers, employees or authorized agents to discover, identify, condemn or reject defective or imperfect work or materials shall not be construed to imply an acceptance of such work or materials, if such defect or imperfection becomes evident at any time prior to final acceptance of the entire Work, nor shall such failure or neglect be construed as barring City from enforcing Contractor's warranty(ies) or otherwise recovering damages or such a sum of money as may be required to repair or rebuild the defective or imperfect work or materials whenever City may discover the same, subject only to any statutes of limitation that may apply to any such claim.

12. CITY'S RIGHT TO TAKE POSSESSION OF THE WORK IN WHOLE OR IN PART

The City shall have the right at any time to enter upon the Work and perform work not covered by this Contract, or to occupy and use a portion of the Work, prior to the date of the final acceptance of the Work as a whole, without in any way relieving Contractor of any obligations under this Contract.

13. NO WAIVER OF REMEDIES

Neither the inspection by City, its officers, employees or agents, nor any certificate or other approval for the payment of money, nor any payment for, nor acceptance of the

whole or any part of the Work by City, nor any extensions of time, nor any position taken by City, its officers, employees or its agents shall operate as a waiver of any provision of the Contract Documents nor of any power herein reserved to City or any right to damages herein provided, nor shall any waiver of any breach of this Agreement be held to be a waiver of any other or subsequent breach. All remedies provided in the Contract Documents shall be taken and construed as cumulative; in addition to each and every other remedy herein provided, the City shall have any and all equitable and legal remedies that it would in any case have.

14. WARRANTY

Except as otherwise expressly provided in the Contract Documents, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect by City, Contractor warrants and guarantees all Work executed and all supplies, materials and devices of whatsoever nature incorporated in or attached to the Work, or otherwise provided as a part of the Work pursuant to the Contract, to be absolutely free of all defects of workmanship and materials for a period of one year after final acceptance of the entire Work by the City. Contractor shall repair or replace all work or material, together with any other work or material that may be displaced or damaged in so doing, that may prove defective in workmanship or material within this one year warranty period without expense or charge of any nature whatsoever to City.

In the event that Contractor shall fail to comply with the conditions of the foregoing warranty within ten (10) days after being notified of the defect in writing, City shall have the right, but shall not be obligated, to repair, or obtain the repair of, the defect and Contractor shall pay to City on demand all costs and expense of such repair. Notwithstanding anything herein to the contrary, in the event that any defect in workmanship or material covered by the foregoing warranty results in a condition that constitutes an immediate hazard to public health or safety, or any property interest, or any person, City shall have the right to immediately repair, or cause to be repaired, such defect, and Contractor shall pay to City on demand all costs and expense of such repair. The foregoing statement relating to hazards to health, safety or property shall be deemed to include both temporary and permanent repairs that may be required as determined in the sole discretion and judgment of City.

In addition to the above, the Contractor shall make a written assignment of all manufacturer's and other product warranties to the City, prior to completion and final acceptance of the Work by City.

The Contractor's Performance Bond shall secure the performance of the Contractor's obligations under this Section 14, and the Contractor and its Surety shall be jointly and severally liable for these obligations.

15. LIQUIDATED DAMAGES IF WORK NOT COMPLETED ON TIME

(A) The actual fact of the occurrence of damages and the actual amount of the damages that City would suffer if the entire Work, and/or any specified portion thereof, were not completed within the time(s) specified herein are dependent upon many circumstances and conditions that could prevail in various combinations, and for this reason, it is impracticable and extremely difficult to fix the actual damages. Damages that City would suffer in the event of such delay include: loss of the use of the project;

expenses of prolonged assignment to the project of an architectural and/or engineering staff; prolonged costs of administration, inspection, and supervision; increased operational expenses and/or impaired operation of other facilities dependent upon completion of the project; and the loss and inconvenience suffered by the public within the City of Sacramento by reason of the delay in the completion of the project or portion thereof. Accordingly, the parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the amount(s) set forth herein as liquidated damages reflect the parties' best efforts at the time of entering into the Contract to estimate the damages that may be incurred by City and the public due to the Contractor's delay in completion of the Work and/or any specified portion thereof, and shall be presumed to be the amount of damages sustained by the failure of Contractor to complete the entire Work and/or any specified portion thereof within the time(s) specified herein.

(B) Contractor shall pay liquidated damages to City for failure to complete the entire Work by the Completion Date (as extended in accordance with the Contract Documents, if applicable) in the amount of **seven hundred fifty dollars (\$750.00)** for each calendar day after the Completion Date (as extended in accordance with the Contract Documents, if applicable), continuing to the time at which the entire Work is completed. Such amount is the actual cash value agreed upon by the City and Contractor as the loss to City and the public resulting from Contractor's default.

The parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the foregoing provisions provide for the imposition of liquidated damages from the Completion Date (as extended in accordance with the Contract Documents, if applicable) until the date of completion of the entire Work as determined by the Engineer in accordance with Section 8-4 of the Standard Specifications, whether or not the Work or any portion thereof is claimed or determined to be substantially complete prior to such date of completion.

(C) In the event Contractor shall become liable for liquidated damages, City, in addition to all other remedies provided by law, shall have the right to withhold any and all payments that otherwise would be or become due Contractor until the liability of Contractor under this section is finally determined. City shall have the right to use and apply such payments, in whole or in part, to reimburse City for all liquidated damages due or to become due to City. Any remaining balance of such payments shall be paid to Contractor only after discharge in full of all liability incurred by Contractor under this section or otherwise under any provision of the Contract Documents or any applicable Law or Regulation. If the sum so retained by City is not sufficient to discharge all such liabilities of Contractor, Contractor shall continue to remain liable to City until all such liabilities are satisfied in full. No failure by City to withhold any payment as specified above shall in any manner be construed to constitute a release of any such liabilities nor a waiver of the City's right to withhold payment for such liabilities.

16. INDEMNITY AND HOLD HARMLESS

(A) Contractor shall defend, hold harmless and indemnify the City, its officers, employees, and agents, and each and every one of them, from and against any and all actions, damages, costs, liabilities, claims, demands, losses, judgments, penalties, costs and expenses of every type and description, whether arising on or off the site of the Work, including, but not limited to, any fees and/or costs reasonably incurred by City's staff attorneys or outside attorneys and any fees and expenses incurred in enforcing this provision (hereafter collectively referred to as "Liabilities"), including but not limited to

Liabilities arising from personal injury or death, damage to personal, real or intellectual property or the environment, contractual or other economic damages, or regulatory penalties, arising out of or in any way connected with performance of or failure to perform the Work by the Contractor, any subcontractor or agent, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, whether or not (i) such Liabilities are caused in part by a party indemnified hereunder, or (ii) such Liabilities are litigated, settled or reduced to judgment; provided that the foregoing indemnity does not apply to liability for damages for death or bodily injury to persons, injury to property, or other loss, damage or expense to the extent arising from (i) the sole negligence or willful misconduct of, or defects in design furnished by, City, its agents, servants, or independent contractors who are directly responsible to City, or (ii) the active negligence of City.

(B) The existence or acceptance by City of any of the insurance policies or coverages described in this Agreement shall not affect or limit any of City's rights under this Section 16, nor shall the limits of such insurance limit the liability of Contractor hereunder. The provisions of this Section 16 shall survive any expiration or termination of the Contract.

17. CONTRACTOR SHALL ASSUME RISKS

Until the completion and final acceptance by City of all Work under this Contract, the Work shall be under Contractor's responsible care and charge, and Contractor, at no cost to City, shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by accidental causes of any nature, to all or any portions of the Work.

18. GENERAL LIABILITY OF CONTRACTOR

Except as otherwise herein expressly stipulated, Contractor shall perform all the Work and furnish all the labor, materials, tools, equipment, apparatus, facilities, transportation, power and light, and appliances, necessary or proper for performing and completing the Work herein required in the manner and within the time herein specified. The mention of any specific duty or liability of Contractor shall not be construed as a limitation or restriction of any general liability or duty of Contractor, and any reference to any specific duty or liability shall be construed to be solely for the purpose of explanation.

19. INSURANCE

During the entire term of this Contract and until completion and final acceptance of the Work as provided in the Contract Documents, Contractor shall maintain in full force and effect the insurance coverage described in this section.

Full compensation for all premiums that Contractor is required to pay for the insurance coverage described herein shall be included in the compensation specified for performance of the Work under the Contract. No additional compensation will be provided for Contractor's insurance premiums.

It is understood and agreed by the Contractor that its liability to the City shall not in any way be limited to or affected by the amount of insurance coverage required of or carried by the Contractor.

(A) Minimum Scope and Limits of Insurance Coverage

(1) Commercial General Liability Insurance, providing coverage at least as broad as ISO CGL Form 00 01 on an occurrence basis for bodily injury, including death, of one or more persons, property damage and personal injury, with limits of not less than one million dollars (\$1,000,000) per occurrence. The policy shall provide contractual liability and products and completed operations coverage for the term of the policy.

(2) Automobile Liability Insurance providing coverage at least as broad as ISO Form CA 00 01 on an occurrence basis for bodily injury, including death, of one or more persons, property damage and personal injury, with limits of not less than one million dollars (\$1,000,000) per occurrence. The policy shall provide coverage for owned, non-owned and/or hired autos as appropriate to the operations of the Contractor.

(3) Workers' Compensation Insurance with statutory limits, and Employers' Liability Insurance with limits of not less than one million dollars (\$1,000,000). The Worker's Compensation policy shall include a waiver of subrogation.

(B) Additional Insured Coverage

(1) Commercial General Liability Insurance: The City, its officials, employees and volunteers shall be covered by policy terms or endorsement as additional insureds as respects general liability arising out of activities performed by or on behalf of Contractor, products and completed operations of Contractor, and premises owned, leased or used by Contractor. The general liability additional insured endorsement must be signed by an authorized representative of the insurance carrier.

If the policy includes a blanket additional insured endorsement or contractual additional insured coverage, the above signature requirement may be fulfilled by submitting that document with a signed declaration page referencing the blanket endorsement or policy form.

(2) Automobile Liability Insurance: The City, its officials, employees and volunteers shall be covered by policy terms or endorsement as additional insureds as respects auto liability.

(C) Other Insurance Provisions

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

(1) Contractor's insurance coverage shall be primary insurance as respects City, its officials, employees and volunteers. Any insurance or self-insurance maintained by City, its officials, employees or volunteers shall be in excess of Contractor's insurance and shall not contribute with it.

(2) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to City, its officials, employees or volunteers.

(3) Coverage shall state that Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

(4) City will be provided with thirty (30) days written notice of cancellation or material change in the policy language or terms.

(D) Acceptability of Insurance

Insurance shall be placed with insurers with a Bests' rating of not less than A:V. Self-insured retentions, policy terms or other variations that do not comply with the requirements of this Section 19 must be declared to and approved by the City Risk Management Division in writing prior to execution of this Agreement.

(E) Verification of Coverage

(1) Contractor shall furnish City with certificates and required endorsements evidencing the insurance required. The certificates and endorsements shall be forwarded to the City representative designated by City. Copies of policies shall be delivered to the City on demand. Certificates of insurance shall be signed by an authorized representative of the insurance carrier.

(2) The City may withdraw its offer of contract or cancel the Contract if the certificates of insurance and endorsements required have not been provided prior to execution of this Agreement. The City may withhold payments to Contractor and/or cancel the Contract if the insurance is canceled or Contractor otherwise ceases to be insured as required herein.

(F) Subcontractors

Contractor shall require and verify that all subcontractors maintain insurance coverage that meets the minimum scope and limits of insurance coverage specified in subsection A, above.

20. FAILURE TO MAINTAIN BONDS OR INSURANCE

If, at any time during the performance of this Contract, Contractor fails to maintain any item of the bonds and/or insurance required under the Contract in full force and effect, Contractor shall immediately suspend all work under the Contract and notify City in writing of such failure. After such notice is provided, or if City discovers such failure and notifies Contractor, the City thereafter may withhold all Contract payments due or that become due until notice is received by City that such bonds and/or insurance have been restored in full force and effect and that the premiums therefor have been paid for a period satisfactory to the Division of Risk Management. Contractor shall not resume work until notified by City to do so, and the City shall have no responsibility or liability for any costs incurred by Contractor as a result of such suspension of Work.

In addition to the foregoing, any failure to maintain any item of the required bonds and/or insurance at any time during the performance of this Contract will be sufficient cause for termination of the Contract by City.

The Contractor shall be solely responsible for, and shall defend, indemnify and hold harmless the City, its officers, employees and agents against and from, any and all damages, claims, losses, actions, costs or other expenses of any kind incurred by any party as a direct or indirect result of any suspension of Work or termination of the Contract under the provisions of this Section.

21. EXCUSABLE DELAYS

For the purpose of these Contract Documents, the term "Excusable Delay" shall mean, and is limited to, delay caused directly by: acts of God; acts of a public enemy; fires; inclement weather as determined by the Engineer; riots; insurrections; epidemics; quarantine restrictions; strikes; lockouts; sitdowns; acts of a governmental agency; priorities or privileges established for the manufacture, assemble, or allotment of materials necessary in the Work by order, decree or otherwise of the United States or by any department, bureau, commission, committee, agent, or administrator of any legally constituted public authority; changes in the Work ordered by City insofar as they necessarily require additional time in which to complete the Work; the prevention of Contractor from commencing or prosecuting the Work because of the acts of others, excepting Contractor's subcontractors or suppliers; or the prevention of Contractor from commencing or prosecuting the Work because of a Citywide failure of public utility service.

The term "Excusable Delay" shall specifically not include: (i) any delay that could have been avoided by the exercise of care, prudence, foresight and diligence on the part of Contractor; (ii) any delay in the prosecution of any part of the Work that does not constitute a Controlling Operation, whether or not such delay is unavoidable; (iii) any reasonable delay resulting from time required by City for review of any Contractor submittals and for the making of surveys, measurements and inspection; and, (iv) any delay arising from an interruption in the prosecution of the Work on account of reasonable interference by other Contractors employed by City that does not necessarily prevent the completion of the entire Work within the time specified. Excusable Delays, if any, shall operate only to extend the Completion Date (not in excess of the period of such delay as determined by City) and shall not under any circumstances increase the amount City is required to pay Contractor except as otherwise provided in these Contract Documents.

22. CONTRACTOR TO SERVE NOTICE OF DELAYS

Whenever Contractor foresees any delay in the prosecution of the Work, and in any event as soon as possible (not to exceed a period of ten (10) calendar days) after the initial occurrence of any delay that Contractor regards as or may later claim to be an Excusable Delay, the Contractor shall notify the Engineer in writing of such delay and its cause, in order that the Engineer: (i) may take immediate steps to prevent if possible the occurrence or continuance of the delay; or (ii) if this cannot be done, may determine whether the delay is to be considered excusable, how long it continues, and to what extent the prosecution and completion of the Work are delayed thereby. Said written notice shall constitute an application for an extension of time only if the notice requests such an extension and sets forth the Contractor's estimate of the additional time required together with a full description of the cause of the delay relied upon.

After the completion of any part or whole of the Work, the Engineer, in estimating the amount due Contractor, will assume that any and all delays that may have occurred in its prosecution and completion were not Excusable Delays, except for such delays for which the Contractor has provided timely written notice as required herein, and that the

Engineer has found to be excusable. Contractor shall not be entitled to claim Excusable Delay for any delay for which the Contractor failed to provide such timely written notice.

23. EXTENSION OF TIME

If the Contractor complies with Section 22, above, and the Engineer finds a delay claimed by the Contractor to be an Excusable Delay, the Contractor shall be allowed an extension of time to complete the Work that is proportional to the period of Excusable Delay determined by the Engineer, subject to the approval by City of a change order granting such time extension. During a duly authorized extension for an Excusable Delay, City shall not charge liquidated damages against the Contractor for such delay.

If the City extends the time to complete the Work as provided herein, such extension shall in no way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such extension of time relieve or release the sureties of the Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such extension of time. The granting of any extension of time as provided herein shall in no way operate as a waiver on the part of City of its rights under this Contract, excepting only extension of the Completion Date for such period of Excusable Delay as may be determined by the Engineer and approved by a duly authorized change order.

24. NO PAYMENT FOR DELAYS

No damages or compensation of any kind shall be paid to Contractor or any subcontractor because of delays in the progress of the Work whether or not such delays qualify for extension of time under this Agreement; except that this provision shall not preclude the recovery of damages for a delay caused by the City that is unreasonable under the circumstances and that is not within the contemplation of the parties, provided that the Contractor timely submits all such written notice(s) and fully complies with such other procedures as may be specified in the Contract Documents or any Laws or Regulations for Contractor to claim damages for such delay.

25. CHANGES IN THE WORK

Changes in the Work authorized or directed in accordance with the Contract Documents and extensions of time of completion made necessary by reason thereof shall not in any way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such changes in the Work relieve or release the Sureties on Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such change in Work and to any extension of time made by reason thereof.

26. TERMINATION AFTER COMPLETION DATE

In addition to any other rights City may have, if any services or work required under the Contract (including but not limited to punch list items) are not completed as of the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), City may terminate the Contract at any time after the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), by providing a written notice to Contractor specifying the date of termination. Such notice also may specify conditions or requirements that Contractor must meet to avoid termination of the Contract on such

date. If Contractor fails to fulfill all such conditions and requirements by such termination date, or, if no such conditions or requirements are specified, Contractor shall cease rendering services and performing work on such termination date, and shall not be entitled to receive any compensation for services rendered or work performed after such termination date. In the event of such termination, Contractor shall remain liable to City for liquidated damages incurred for any period of time prior to the termination date.

In addition to any other charges, withholdings or deductions authorized under the Contract or any Laws or Regulations, if City terminates the Contract pursuant to this section, City may withhold and deduct from any payment and/or retention funds otherwise due Contractor any sum necessary to pay the City's cost of completing or correcting, or contracting for the completion or correction of, any services or work under the Contract that are not completed to the satisfaction of the City or that otherwise are deficient or require correction as of such termination date, including but not limited to incomplete punch list items. Such costs shall include all of the City's direct and indirect costs incurred to complete or correct such services or work, including the City's administrative and overhead costs. If the amount of payment(s) and/or retention funds otherwise due the Contractor are insufficient to pay such costs, City shall have the right to recover the balance of such costs from the Contractor and/or its Surety(ies).

27. TERMINATION FOR CONVENIENCE

Upon written notice to the Contractor, the City may at any time, without cause and without prejudice to any other right or remedy of the City, elect to terminate the Contract for the convenience of City. In such case, the Contractor shall be paid (without duplication of any items, and after deduction and/or withholding of any amounts authorized to be deducted or withheld by the Contract Documents or any Laws or Regulations):

- (A) For Work executed in accordance with the Contract Documents prior to the effective date of termination and determined to be acceptable by the Engineer, including fair and reasonable sums for overhead and profit on such Work;
- (B) For reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with subcontractors, suppliers, and others; and
- (C) For reasonable expenses directly attributable to termination.

Contractor shall not be paid for any loss of anticipated profits or revenue for any Work not performed prior to termination, nor for any economic loss arising out of or resulting from such termination, except for the payments listed in this section. Contractor's warranty under Section 14 of this Agreement shall apply, and Contractor shall remain responsible for all obligations related to such warranty, with respect to all portions of the Work performed prior to the effective date of the termination for convenience pursuant to this section. The City shall be entitled to have any or all remaining Work performed by other contractors or by any other means at any time after the effective date of a termination for convenience pursuant to this section.

28. TERMINATION FOR BREACH OF CONTRACT

If Contractor abandons the Work under this Contract, or if the Contract or any portion of the Contract is sublet or assigned without the consent of the City, or if the Engineer determines in the Engineer's sole discretion that the conditions of the Contract in respect

to the rate of progress of the Work are not being fulfilled or any part thereof is unnecessarily delayed, or if Contractor violates or breaches, or fails to execute in good faith, any of the terms or conditions of the Contract, or if Contractor refuses or fails to supply enough properly skilled labor or materials or refuses or fails to make prompt payment to subcontractors for material or labor, or if Contractor disregards any Laws or Regulations or proper instruction or orders of the Engineer, then, notwithstanding any provision to the contrary herein, the City may give Contractor and its Sureties written notification to immediately correct the situation or the Contract shall be terminated.

In the event that such notice is given, and, in the event such situation is not corrected, or arrangements for correction satisfactory to the City are not made, within ten (10) calendar days from the date of such notice or within such other period of time as may be specified by the City in the notice, the Contract shall upon the expiration of said period cease and terminate. In the event of any such termination, City may take over the Work and prosecute the Work to completion, or otherwise, and the Contractor and its Sureties shall be liable to City for any cost occasioned City thereby, as hereinafter set forth.

In the event City completes the Work, or causes the Work to be completed, no payment of any kind shall be made to Contractor until the Work is complete. The cost of completing the Work, including but not limited to, extra costs of project administration and management incurred by City, both direct or indirect, shall be deducted from any sum then due, or that becomes due, to Contractor from City. If sums due to Contractor from City are less than the cost of completing the Work, Contractor and its Sureties shall pay City a sum equal to this difference on demand. In the event City completes the Work, and there is a sum remaining due to Contractor after City deducts the costs of completing the Work, then City shall pay such sum to Contractor. The Contractor and Contractor's Sureties shall be jointly and severally liable for all obligations imposed on Contractor hereunder.

No act by City before the Work is finally accepted, including, but not limited to, exercise of other rights under the Contract, actions at law or in equity, extensions of time, payments, assessments of liquidated damages, occupation or acceptance of any part of the Work, waiver of any prior breach of the Contract or failure to take action pursuant to this section upon the happening of any prior default or breach of Contractor, shall be construed to be a waiver or estoppel of the City's right to act pursuant to this Section upon any subsequent event, occurrence or failure by Contractor to fulfill the terms and conditions of the Contract. The rights of City to terminate the Contract pursuant to this Section and pursuant to Sections 26 and 27 are cumulative and are in addition to all other rights of City pursuant to the Contract and at law or in equity.

29. CONTRACTOR BANKRUPT

If Contractor should commence any bankruptcy proceeding, or if Contractor is adjudged a bankrupt, or if Contractor makes any assignment for the benefit of creditors, or if a receiver is appointed on account of Contractor's insolvency, then the City may, without prejudice to any other right or remedy, terminate the Contract and complete the work by giving notice as provided in Section 28 above.

30. SURETIES' OBLIGATIONS UPON TERMINATION

If the City terminates the Contract pursuant to Section 28 or Section 29 above:

(A) The Surety under Contractor's performance bond shall be fully responsible for all of the Contractor's remaining obligations of performance under the Contract as if the Surety were a party to the Contract, including without limitation Contractor's obligations, as provided in the Contract Documents, to complete and provide a one-year warranty of the entire Work, pay liquidated damages and indemnify, defend and hold harmless City, up to the full amount of the performance bond.

(B) The Surety under Contractor's payment bond shall be fully responsible for the performance of all of the Contractor's remaining payment obligations for work, services, equipment or materials performed or provided in connection with the Work or any portion thereof, up to the full amount of the payment bond.

31. ACCOUNTING RECORDS OF CONTRACTOR

During performance of the Contract and for a period of three (3) years after completing the entire Work, Contractor shall maintain all accounting and financial records related to the Contract and performance of the Work in accordance with generally accepted accounting practices, and shall keep and make such records available for inspection and audit by representatives of the City upon reasonable written notice.

32. USE TAX REQUIREMENTS

(A) Use Tax Direct Payment Permit For all leases and purchases of materials, equipment, supplies, or other tangible personal property used to perform the Contract and shipped from outside California, the Contractor and any subcontractors leasing or purchasing such materials, equipment, supplies or other tangible personal property shall obtain a Use Tax Direct Payment Permit from the California State Board of Equalization ("SBE") in accordance with the applicable SBE criteria and requirements.

(B) Sellers Permit For any construction contract and any construction subcontract in the amount of \$5,000,000 or more, Contractor and the subcontractor(s) shall obtain sellers permits from the SBE and shall register the jobsite as the place of business for the purpose of allocating local sales and use tax to the City. Contractor and its subcontractors shall remit the self-accrued use tax to the SBE, and shall provide a copy of each remittance to the City.

(C) The above provisions shall apply in all instances unless prohibited by the funding source for the Contract.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement on the date set for opposite their names.

CONTRACTOR

Under penalty of perjury, I certify that the taxpayer identification number and all other information provided here are correct.

DATE _____

BY _____

Print Name _____

Title _____

BY _____

Print Name _____

Title _____

Federal ID# _____

State ID# _____

City of Sacramento Business Operation Tax Certificate No. (City will not award contract until Certificate Number is obtained)

Type of Business Entity (*check one*):

- _____ Individual/Sole Proprietor
- _____ Partnership
- _____ Corporation
- _____ Limited Liability Company
- _____ Other

(please

specify: _____)

CITY OF SACRAMENTO
a municipal corporation

DATE _____

BY _____

For: Gus Vina, Interim City Manager

Original Approved As To Form:

Attest:

City Attorney

CITY OF SACRAMENTO
PERFORMANCE BOND
Department of Utilities

Bond #: _____
Premium: _____
Page 1 of 1

WHEREAS, the City of Sacramento, in the State of California, hereinafter called City has conditionally awarded to *(here insert full name and address of Contractor)*:

as principal, hereinafter called Contractor, an agreement for construction of:

FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.
(PN: Z14004200) (B113331014)

in accordance with the plans, specifications, drawings, conditions, and project manual prepared therefore, which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract, Contractor is required to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, we the Contractor and *(here insert full name and address of Surety)*:

_____, a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter called Surety, are held and firmly bound unto the City, as obligee, in the sum of _____ DOLLARS \$ _____), for the payment of which sum well and truly to be made, we the Contractor and Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally. The condition of this obligation is such that, if the Contractor, Contractor's heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and fully perform all covenants, conditions and agreements required to be kept and performed by Contractor in the Contract and any changes, additions or alterations made thereto, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meanings, and shall indemnify and save harmless the City, its officers, employees and agents, as therein provided, then this obligation shall be null and void; otherwise shall be and remain in full force and effect. This obligation shall remain in full force and effect until (1) the date that the Contractor no longer has any remaining obligation of performance under the Contract, or (2) the date that is one year after the date that the work to be performed under the Contract is accepted as complete by the City, whichever occurs later.

As part of the obligation secured hereby and in addition to the sum specified above, there shall be included all costs, expenses and fees, including attorney's fees, reasonably incurred by City in successfully enforcing such obligation, all to be taxed as costs and included in any judgement rendered.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or to the specifications accompanying the same, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety.
SIGNED AND SEALED on _____, 2011.

(Contractor) (Seal)

By _____

Title _____

ORIGINAL APPROVED AS TO FORM:

City Attorney

(Surety) (Seal)

By _____

Title _____

Agent Name and Address _____

Agent Phone # _____

Surety Phone # _____

California License # _____

Surety Email: _____

CITY OF SACRAMENTO
PAYMENT BOND
Department of Utilities

Bond No: _____
Premium: _____
Page 1 of 1

WHEREAS, the City of Sacramento, in the State of California, hereinafter called City, has conditionally awarded to:

hereinafter called Contractor, an agreement for construction of:

FOLSOM BLVD. WATER TRANSMISSION MAIN PROJECT,
FLORIN-PERKINS RD TO S. WATT AVE.
(PN: Z14004200) (B113331014)

in accordance with the plans, specifications, drawings, conditions, and project manual prepared therefor, which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract, Contractor is required to furnish a good and sufficient payment bond to secure the claims to which reference is made in Title 15(commencing with Section 3082) of Part 4 of Division 3 of the California Civil Code.

NOW, THEREFORE, we the Contractor and (*here insert full name and address of Surety*):

_____, a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter called Surety, are held and firmly bound unto the City, and unto all subcontractors, laborers, materialmen and other persons employed in the performance of the Contract and referred to in the aforesaid Civil Code in the sum of _____ DOLLARS (\$_____), on the condition that if Contractor shall fail to pay for any materials or equipment furnished or used in performance of the Contract, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Contractor and all subcontractors with respect to such work or labor, then the Surety shall pay the same in an amount not exceeding the sum specified above. If suit is brought upon this bond, Surety shall pay, in addition to the above sum, all costs, expenses and fees, including attorney's fees, reasonably incurred by any party in successfully enforcing the obligation secured hereby, all to be taxed as costs and included in any judgment rendered. Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect, and shall bind Contractor, Surety, their heirs, executors, administrators, successors and assigns, jointly and severally.

It is hereby stipulated and agreed that this bond shall inure to the benefit of all persons, companies, corporations, political subdivisions and State agencies entitled to file claim under Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond. The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety. SIGNED AND SEALED on _____, 2011.

(Contractor) (Seal)
By _____
Title _____

(Surety) (Seal)
By _____
Title _____
Agent Name and Address _____

ORIGINAL APPROVED AS TO FORM:

City Attorney

Agent Phone # _____
Surety Phone # _____
California License # _____
Surety Email: _____

**EXCERPTS FROM THE CALIFORNIA LABOR CODE RELATING TO
APPRENTICES ON PUBLIC WORKS
Chapter 1 of Division 2
APPRENTICES ON PUBLIC WORKS**

1773.3. An awarding agency whose public works contract falls within the jurisdiction of Section 1777.5 shall, within five days of the award, send a copy of the award to the Division of Apprenticeship Standards. When specifically requested by a local joint apprenticeship committee, the division shall notify the local joint apprenticeship committee regarding all such awards applicable to the joint apprenticeship committee making the request. Within five days of a finding of any discrepancy regarding the ratio of apprentices to journeymen, pursuant to the certificated fixed number of apprentices to journeymen, the awarding agency shall notify the Division of Apprenticeship Standards.

1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following: (1) The information contained in the payroll record is true and correct. (2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis: (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request. (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations. (3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (Section 175a of Title 29 of the United States Code) shall be marked or obliterated only to prevent disclosure of an individual's name and social security number. A joint labor management committee may maintain an action in a court of competent jurisdiction against an employer who fails to comply with Section 1774. The court may award restitution to an employee for unpaid wages and may award the joint labor management committee reasonable attorney's fee and costs incurred in maintaining the action. An action under this subdivision may not be based on the employer's misclassification of the craft of a worker on its certified payroll records. Nothing in this subdivision limits any other available remedies for a violation of this chapter.

(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

(h) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section.

(i) The director shall adopt rules consistent with the California Public Records Act, (Chapter 3.5 (commencing with Section 6250), Division 7, Title 1, Government Code) and the Information Practices Act of 1977, (Title 1.8 (commencing with Section 1798), Part 4, Division 3, Civil Code) governing the release of these records, including the establishment of reasonable fees to be charged for reproducing copies of records required by this section.

(j) This section shall remain in effect only until January 1, 2003, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2003, deletes or extends that date.

1776. (a) Each contractor and subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis: (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request. (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations. (3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested

payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

(d) Each contractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or performing the contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (Section 175a of Title 29 of the United States Code) shall be marked or obliterated only to prevent disclosure of an individual's social security number.

(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(g) The contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the contractor must comply with this section. In the event that the contractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

(h) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section. These stipulations shall fix the responsibility for compliance with this section on the prime contractor.

(i) The director shall adopt rules consistent with the California Public Records Act, (Chapter 3.5 (commencing with Section 6250), Division 7, Title 1, Government Code) and the Information Practices Act of 1977, (Title 1.8 (commencing with Section 1798), Part 4, Division 3, Civil Code) governing the release of these records, including the establishment of reasonable fees to be charged for reproducing copies of records required by this section.

(j) This section shall become operative January 1, 2003.

1777.5. (a) Nothing in this chapter shall prevent the employment of properly registered apprentices upon public works.

(b) Every apprentice employed upon public works shall be paid the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered and shall be employed only at the work of the craft or trade to which he or she is registered.

(c) Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprentice agreements under Chapter 4 (commencing with Section 3070) of Division 3 are eligible to be employed at the apprentice wage rate on public works. The employment and training of each apprentice shall be in accordance with either (1) the apprenticeship standards and apprentice agreements under which he or she is training or (2) the rules and regulations of the California Apprenticeship Council.

(d) When the contractor to whom the contract is awarded by the state or any political subdivision, in performing any of the work under the contract, employs workers in any apprenticeable craft or trade, the contractor shall employ apprentices in at least the ratio set forth in this section and may apply to any apprenticeship program in the craft or trade that can provide apprentices to the site of the public work for a certificate approving the contractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the contractor, shall arrange for the dispatch of apprentices to the contractor. A contractor covered by an apprenticeship program's standards shall not be required to submit any additional application in order to include additional public works contracts under that program. "Apprenticeable craft or trade," as used in this section, means a craft or trade determined as an apprenticeable occupation in accordance with rules and regulations prescribed by the California Apprenticeship Council. As used in this section, "contractor" includes any subcontractor under a contractor who performs any public works not excluded by subdivision (o).

(e) Prior to commencing work on a contract for public works, every contractor shall submit contract award information to an applicable apprenticeship program that can supply apprentices to the site of the public work. The information submitted shall include an estimate of journeyman hours to be performed under the contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the awarding body if requested by the awarding body. Within 60 days after concluding work on the contract, each contractor and subcontractor shall submit to the awarding body, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the contract. The information under this subdivision shall be public. The apprenticeship programs shall retain this information for 12 months.

(f) The apprenticeship program that can supply apprentices to the area of the site of the public work shall ensure equal employment and affirmative action in apprenticeship for women and minorities.

(g) The ratio of work performed by apprentices to journeymen employed in a particular craft or trade on the public work may be no higher than the ratio stipulated in the apprenticeship standards under which the apprenticeship program operates where the contractor agrees to be bound by those standards, but, except as otherwise provided in this section, in no case shall the ratio be less than one hour of apprentice work for every five hours of journeyman work.

(h) This ratio of apprentice work to journeyman work shall apply during any day or portion of a day when any journeyman is employed at the jobsite and shall be computed on the basis of the hours worked during the day by journeymen so employed. Any work performed by a journeyman in excess of eight hours per day or 40 hours per week shall not be used to calculate the ratio. The contractor shall employ apprentices for the number of hours computed as above before the end of the contract or, in the case of a subcontractor, before the end of the subcontract. However, the contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the jobsite. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Chief of the Division of Apprenticeship Standards, upon application of an apprenticeship program, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification.

(i) A contractor covered by this section that has agreed to be covered by an apprenticeship program's standards upon the issuance of the approval certificate, or that has been previously approved for an apprenticeship program in the craft or trade, shall

employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the applicable apprenticeship standards, but in no event less than the 1-to-5 ratio required by subdivision (g).

(j) Upon proper showing by a contractor that he or she employs apprentices in a particular craft or trade in the state on all of his or her contracts on an annual average of not less than one hour of apprentice work for every five hours of labor performed by journeymen, the Chief of the Division of Apprenticeship Standards may grant a certificate exempting the contractor from the 1-to-5 hourly ratio, as set forth in this section for that craft or trade.

(k) An apprenticeship program has the discretion to grant to a participating contractor or contractor association a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting the contractor from the 1-to-5 ratio set forth in this section when it finds that any one of the following conditions is met: (1)

Unemployment for the previous three-month period in the area exceeds an average of 15 percent. (2) The number of apprentices in training in the area exceeds a ratio of 1 to 5. (3) There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth of its journeymen annually through apprenticeship training, either on a statewide basis or on a local basis. (4) Assignment of an apprentice to any work performed under a public works contract would create a condition that would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large, or the specific task to which the apprentice is to be assigned is of a nature that training cannot be provided by a journeyman.

(l) When an exemption is granted pursuant to subdivision (k) to an organization that represents contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

(m) (1) A contractor to whom a contract is awarded, who, in performing any of the work under the contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the director determines is the prevailing amount of apprenticeship training contributions in the area of the public works site. A contractor may take as a credit for payments to the council any amounts paid by the contractor to an approved apprenticeship program that can supply apprentices to the site of the public works project. The contractor may add the amount of the contributions in computing his or her bid for the contract.

(2) At the conclusion of each fiscal year, the California Apprenticeship Council shall distribute training contributions received by the council under this subdivision, less the expenses of the Division of Apprenticeship Standards for administering this subdivision, by making grants to approved apprenticeship programs for the purpose of training apprentices. The funds shall be distributed as follows: (A) If there is an approved multiemployer apprenticeship program serving the same craft or trade and geographic area for which the training contributions were made to the council, a grant to that program shall be made. (B) If there are two or more approved multiemployer apprenticeship programs serving the same craft or trade and geographic area for which the training contributions were made to the council, the grant shall be divided among those programs based on the number of apprentices registered in each program. (C) All training contributions not distributed under subparagraphs (A) and (B) shall be used to defray the future expenses of administering this subdivision. (3) All training contributions received pursuant to this subdivision shall be deposited in the Apprenticeship Training Contribution Fund, which fund is hereby created in the State Treasury. Notwithstanding Section 13340 of the Government Code, all money in the Apprenticeship Training Contribution Fund is hereby continuously appropriated for the purpose of carrying out this subdivision and to pay the expenses of the division in administering this subdivision.

(n) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section. The stipulations shall fix the responsibility of compliance with this section for all apprenticeable occupations with the prime contractor.

(o) This section does not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor when the contracts of general contractors or those specialty contractors involve less than thirty thousand dollars (\$30,000).

(p) All decisions of an apprenticeship program under this section are subject to Section 3081.

1777.6. It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works, on the ground of the race, religious creed, color, national origin, ancestry, sex, or age, except as provided in Section 3077, of such employee.

1777.7. (a) (1) A contractor or subcontractor that is determined by the Chief of the Division of Apprenticeship Standards to have knowingly violated Section 1777.5 shall forfeit as a civil penalty an amount not exceeding one hundred dollars (\$100) for each full calendar day of noncompliance. The amount of this penalty may be reduced by the Chief if the amount of the penalty would be disproportionate to the severity of the violation. A contractor or subcontractor that knowingly commits a second or subsequent violation of Section 1777.5 within a three-year period, where the noncompliance results in apprenticeship training not being provided as required by this chapter, shall forfeit as a civil penalty the sum of not more than three hundred dollars (\$300) for each full calendar day of noncompliance.

Notwithstanding Section 1727, upon receipt of a determination that a civil penalty has been imposed by the Chief, the awarding body shall withhold the amount of the civil penalty from contract progress payments then due or to become due. (2) In lieu of the penalty provided for in this subdivision, the Chief may, for a first-time violation and with the concurrence of an apprenticeship program described in subdivision (d), order the contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.

(b) In the event a contractor or subcontractor is determined by the Chief to have knowingly committed a serious violation of any provision of Section 1777.5, the Chief may also deny to the contractor or subcontractor, and to its responsible officers, the right to bid on or be awarded or perform work as a subcontractor on any public works Contract for a period of up to one year for the first violation and for a period of up to three years for a second or subsequent violation. Each period of debarment shall run from the date the determination of noncompliance by the Chief becomes a final order of the Administrator of Apprenticeship.

(c) (1) An affected contractor, subcontractor, or responsible officer may obtain a review of the determination of the Chief imposing the debarment or civil penalty by transmitting a written request to the office of the Administrator within 30 days after service of the determination of debarment or civil penalty. A copy of this report shall also be served on the Chief. If the Administrator does not receive a timely request for review of the determination of debarment or civil penalty made by the Chief, the order shall become the final order of the Administrator. (2) Within 20 days of the timely receipt of a request for review, the Chief shall provide the contractor, subcontractor, or responsible officer the opportunity to review any evidence the Chief may offer at the hearing. The Chief shall also promptly disclose any nonprivileged documents obtained after the 20-day time limit at a time set forth for exchange of evidence by the Administrator. (3) Within 90 days of the timely receipt of a request for review, a hearing shall be commenced before the

Administrator or an impartial hearing officer designated by the Administrator and possessing the qualifications of an administrative law judge pursuant to subdivision (b) of Section 11502 of the Government Code. The affected contractor, subcontractor, or responsible officer shall have the burden of providing evidence of compliance with Section

1777.5. (4) Within 45 days of the conclusion of the hearing, the Administrator shall issue a written decision affirming, modifying, or dismissing the determination of debarment or civil penalty. The decision shall contain a statement of the factual and legal basis for the decision and an order. This decision shall be served on all parties and the awarding body pursuant to Section 1013 of the Code of Civil Procedure by first-class mail at the last known address of the party that the party has filed with the Administrator. Within 15 days of issuance of the decision, the Administrator may reconsider or modify the decision to correct an error, except that a clerical error may be corrected at any time. (5) An affected contractor, subcontractor, or responsible officer who has timely requested review and obtained a decision under paragraph (4) may obtain review of the decision of the Administrator by filing a petition for a writ of mandate to the appropriate superior court pursuant to Section 1094.5 of the Code of Civil Procedure within 45 days after service of the final decision. If no timely petition for a writ of mandate is filed, the decision shall become the final order of the Administrator. The decision of the Administrator shall be affirmed unless the petitioner shows that the Administrator abused his or her discretion. If the petitioner claims that the findings are not supported by the evidence, abuse of discretion is established if the court determines that the findings are not supported by substantial evidence in light of the entire record. (6) The Chief may certify a copy of the final order of the Administrator and file it with the clerk of the superior court in any county in which the affected contractor or subcontractor has property or has or had a place of business. The clerk, immediately upon the filing, shall enter judgment for the state against the person assessed in the amount shown on the certified order. A judgment entered pursuant to this section shall bear the same rate of interest and shall have the same effect as other judgments and be given the same preference allowed by the law on other judgments rendered for claims for taxes. The clerk shall not charge for the service performed by him or her pursuant to this section. An awarding body that has withheld funds in response to a determination by the Chief imposing a penalty under this section shall, upon receipt of a certified copy of a final order of the Administrator, promptly transmit the withheld funds, up to the amount of the certified order, to the Administrator.

(d) If a subcontractor is found to have violated Section 1777.5, the prime contractor of the project is not liable for any penalties under subdivision (a), unless the prime contractor had knowledge of the subcontractor's failure to comply with the provisions of Section 1777.5 or unless the prime contractor fails to comply with any of the following requirements: (1) The contract executed between the contractor and the subcontractor or the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815.

(2) The contractor shall continually monitor a subcontractor's use of apprentices required to be employed on the public works project pursuant to subdivision (d) of Section 1777.5, including, but not limited to, periodic review of the certified payroll of the subcontractor.

(3) Upon becoming aware of a failure of the subcontractor to employ the required number of apprentices, the contractor shall take corrective action, including, but not limited to, retaining funds due the subcontractor for work performed on the public works project until the failure is corrected. (4) Prior to making the final payment to the subcontractor for work performed on the public works project, the contractor shall obtain a declaration signed under penalty of perjury from the subcontractor that the subcontractor has employed the required number of apprentices on the public works project.

(e) Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund if the awarding body is a state entity, or in the equivalent fund of an awarding body if the awarding body is an entity other than the state.

(f) The Chief shall consider, in setting the amount of a monetary penalty, in determining whether a violation is serious, and in determining whether and for how long a party should be debarred for violating this section, all of the following circumstances: (1) Whether the violation was intentional. (2) Whether the party has committed other violations of Section 1777.5. (3) Whether, upon notice of the violation, the party took steps to voluntarily remedy the violation. (4) Whether, and to what extent, the violation resulted in lost training opportunities for apprentices. (5)

Whether, and to what extent, the violation otherwise harmed apprentices or apprenticeship programs. If a party seeks review of a decision by the Chief to impose a monetary penalty or period of debarment, the Administrator shall decide de novo the appropriate penalty, by considering the same factors set forth above.

(g) The interpretation of Section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council. The Administrator may adopt regulations to establish guidelines for the imposition of monetary penalties and periods of debarment and may designate precedential decisions under Section 11425.60 of the Government Code.

NOTE: THE ABOVE CALIFORNIA LABOR CODE SECTIONS ARE AVAILABLE FROM THE INTERNET @ www.dir.ca.gov/.

DAS 10 (Rev. 04-02)

**Request for Taxpayer
Identification Number and Certification**

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: Individual/Sole proprietor Corporation Partnership
 Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ Exempt payee
 Other (see instructions) ▶

Address (number, street, and apt. or suite no.) Requestor's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3. Note: If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

OR

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued).
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

REQUIRED UPON AWARD

YEAR

Withholding Exemption Certificate

CALIFORNIA FORM

2011

(This form can only be used to certify exemption from nonresident withholding under California Revenue and Taxation Code (R&TC) Section 18662. Do not use this form for exemption from wage withholding.)

590

File this form with your withholding agent. (Please type or print)

Withholding agent's name _____

Payee's name _____

Payee's SOS file no. SSN or ITIN CA corp. no. FEIN

Address (number and street, PO Box, or PMB no.) _____

Apt. no./Sta. no. _____

City _____

State _____

ZIP Code _____

Read the following carefully and check the box that applies to the payee.

I certify that for the reasons checked below, the payee named on this form is exempt from the California income tax withholding requirement on payment(s) made to the entity or individual.

Individuals — Certification of Residency:

I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly notify the withholding agent. See instructions for General Information D, Who is a Resident, for the definition of a resident.

Corporations:

The above-named corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State (SOS) to do business in California. The corporation will file a California tax return and withhold on payments of California source income to nonresidents when required. If this corporation ceases to have a permanent place of business in California or ceases to do any of the above, I will promptly notify the withholding agent. See instructions for General Information F, What is a Permanent Place of Business, for the definition of permanent place of business.

Partnerships or limited liability companies (LLC):

The above-named partnership or LLC has a permanent place of business in California at the address shown above or is registered with the California SOS, and is subject to the laws of California. The partnership or LLC will file a California tax return and will withhold on foreign and domestic nonresident partners or members when required. If the partnership or LLC ceases to do any of the above, I will promptly inform the withholding agent. For withholding purposes, a limited liability partnership (LLP) is treated like any other partnership.

Tax-Exempt Entities:

The above-named entity is exempt from tax under California Revenue and Taxation Code (R&TC) Section 23701 _____ (insert letter) or Internal Revenue Code Section 501(c) _____ (insert number). The tax-exempt entity will withhold on payments of California source income to nonresidents when required. If this entity ceases to be exempt from tax, I will promptly notify the withholding agent. Individuals cannot be tax-exempt entities.

Insurance Companies, Individual Retirement Arrangements (IRAs), or Qualified Pension/Profit Sharing Plans:

The above-named entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

California Trusts:

At least one trustee and one noncontingent beneficiary of the above-named trust is a California resident. The trust will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required. If the trustee becomes a nonresident at any time, I will promptly notify the withholding agent.

Estates — Certification of Residency of Deceased Person:

I am the executor of the above-named person's estate. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required.

Nonmilitary Spouse of a Military Servicemember:

I am a nonmilitary spouse of a military servicemember and I meet the Military Spouse Residency Relief Act (MSRRA) requirements. See instructions for General Information E, MSRRA.

CERTIFICATE: Please complete and sign below.

Under penalties of perjury, I hereby certify that the information provided in this document is, to the best of my knowledge, true and correct. If conditions change, I will promptly notify the withholding agent.

Payee's name and title (type or print) _____ Daytime telephone no. _____

Payee's signature ► _____ Date _____

For Privacy Notice, get form FTB 1131.

7061113

Form 590 c2 2010

REQUIRED UPON AWARD

SPECIAL PROVISIONS

CITY OF SACRAMENTO

**FOLSOM BOULEVARD WATER TRANSMISSION MAIN PROJECT
FLORIN-PERKINS RD. TO S. WATT AVE
(Z14004200)**

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DIVISION 8 - DOORS AND WINDOWS

08600 ALUMINUM ACCESS HATCH

DIVISION 15 – MECHANICAL

15121 PIPE COUPLINGS

15135 SUBMERISBLE PUMPS

15201 VALVE ACTUATORS

DIVISION 16 – ELECTRICAL

16010 ELECTRICAL WORK

16110 RACEWAY SYSTEMS

16120 LOW VOLTAGE WIRE AND CABLE

16921 RTU/PLC SYSTEM

16922 MISCELLANEOUS EQUIPMENT

16950 OPERATIONAL TESTING

17101 INSTRUMENTATION

17102 FLOW MEASURING SYSTEM

17520 RTU/PLC SYSTEM

**SPECIAL PROVISIONS
FOR
FOLSOM BOULEVARD TRANSMISSION MAIN PROJECT
FLORIN-PERKINS ROAD TO WATT AVENUE
(Z14004200)**

SECTION 1 - GENERAL CONSTRUCTION REQUIREMENTS

1.01. Scope of Work

The work to be performed under these Special Provisions consists of furnishing and placing new 24-inch and 14-inch diameter water transmission main pipe together with all required fittings, butterfly valves, blow-offs, air vacuum and release valves, access manholes, corrosion test stations and associated materials, fire hydrants, distribution main, and system ties. Also, included in this project is constructing a vault structure with a magnetic flow meter, valves and associated appurtenances, along with electrical facilities which include, but is not limited to the following: service pedestal, antenna pole and foundation, instrumentation, PLC circuit breakers, conduits, and conductors.

The Contractor shall provide all labor, materials, tools and equipment, and shall perform all work necessary to furnish, install, pressure test and disinfect water main pipe and appurtenances. The Contractor shall make all required connections to the existing water system. All work shall be performed as indicated in the Plans and as specified in these Special Provisions such that upon contract completion the project will be ready for use.

1.02. Specifications

The work to be performed under this contract shall be done in accordance with the Special Provisions contained herein. In these Special Provisions, reference is made to the Standard Specifications of the City of Sacramento, adopted June 2007, referred to herein as "City Standard Specifications". Reference may also be made to the State of California, Department of Transportation, Standard Specifications referred to herein as "State Standard Specifications".

The general requirements of this contract shall be governed by these Special Provisions first, followed by Sections 1 through 8 of the City Standard Specifications. Other Standards or Specifications specified in these Special Provisions govern only the applicable technical specifications.

1.03. Governing Documents

1. All work performed under this contract shall be in accordance with the following general requirements:

- a. Sealed Proposal
 - b. Agreement
 - c. City Standard Specifications - Sections 1 through 8
2. All work performed under this contract shall be in accordance with the following provisions:
- a. Special Provisions
 - b. Contract Plans
 - c. City Standard Specifications - Sections 10 through 38
 - d. California Labor Code - Chapter 4 of Division 3
3. In the event of a conflict in the Contract Documents, the governing priorities, when appropriate, shall be in accordance with section 5-3 of the City Standard Specifications.

1.04. Interpretation of Contract Documents

Questions from bidder's concerning the interpretation of any portion of the contract documents may be directed to Michelle Carrey of the City of Sacramento, Department of Utilities, 1395 35th Avenue, Sacramento, California, 95822, phone (916) 808-1438. Interpretation, where necessary, will be made by the City in the form of an addendum to the contract documents and, when issued, will be sent as promptly as is practicable to all parties to whom the bid documents have been issued. All such addenda shall become part of the contract.

It shall also be the bidder's responsibility to call to the attention of the Engineer any missing pages or drawings in the contract documents, including the addenda. These items shall be brought to the attention of the Engineer at least one (1) week prior to the bid opening date.

1.05. Proof of Compliance with Contract

In order that the Engineer may determine whether the Contractor has complied with the requirements of the contract documents not readily determinable through inspection and tests of plant, equipment, work, or materials, the Contractor shall at any time when requested, at the Contractor's expense, submit to the Engineer properly authenticated documents or other satisfactory proofs as to his compliance with such requirements.

1.06. Shop Drawings and Submittals

The Contractor's shop drawings and submittals shall include, but not be limited to, the following:

- A. Water Main Pipe – Material & Lay Sheets, Fittings, and Joints
- B. Calculations for Length of Restrained Pipe
- C. Butterfly Valves and Flexible Couplings

- D. Appurtenances such as Blow-offs, Air Vacuum and Release Valves, Fire Hydrants and Gate Valves
- E. Pipe and Fittings Used for System Connections
- F. Corrosion Monitoring System
- G. Construction Activity Time Schedule
- H. Traffic Control Plan
- I. Erosion, Sediment and Pollution Control Plan
- J. Material data for all grout, concrete, asphalt, bedding, backfill, and aggregate base
- K. Public Notification Information
- L. Signed manufacturer warranty certifications

Note: Submittals for material and equipment referenced in the Appendix, which includes but is not limited to materials and equipment for construction of the Magnetic Meter, Vault, and Electrical System, shall be submitted in accordance with this section.

When materials or equipment must conform to the standards of organizations such as, but not limited to, the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL) documents showing, or proving, conformance shall be submitted.

If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual Sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable tests, and is approved by the City. The certificate shall state that the item has been tested in accordance with the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product, and the referenced standard and shall state that the manufacturer certifies that the product conforms to all requirements of the project Specification and of the referenced standards listed.

Submittals for each manufactured item shall be comprised of manufacturer's descriptive literature, drawings, diagrams, performance and characteristic curves, and catalog cuts. Manufacturer's name, trade name, model or catalog number, nameplate data, size, layout dimensions, capacity, project specification references, and any other additional information necessary to establish contract compliance shall be clearly indicated for each item submitted.

Shop Drawings shall show types, sizes, accessories, elevations, floor plans, sectional views, installation details, elementary control diagrams, and wiring diagrams. Wiring diagrams shall identify circuit terminals and shall indicate the internal wiring for each item of equipment. Drawings shall also indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. If any equipment is disapproved, the drawings shall be revised to show acceptable equipment and be resubmitted. **Contractor shall provide a hard copy and electronic copy of all shop drawings. The electronic copies shall be in Adobe format**

(Portable Document Format) and shall be provided on a CD. Contractor shall use latest version of Adobe.

Contractor shall submit operation and maintenance manuals covering the stipulated systems and equipment. Four (4) approved copies of the manual, bound in Avery D - Ring binder model number AVY79-799 or approved equal, shall be furnished to the City. **One (1) of the four copies of the operation and maintenance manual shall contain original documentation/manuals and not photocopies.** Each binder shall be no more than 75% full. Prior to system and equipment tests, one (1) complete, bound copy of the manual shall be submitted for approval. Three (3) approved copies of the manual each for this project, with all applicable test forms completed, shall be furnished to the City before completion of the Contract. The following identification shall be inscribed on the cover and spine of the binders:

Operation and Maintenance Manual — Electrical Controls
Folsom Blvd Water T Main Flow Meter Project
Contractor: _____
Contract No.: _____
Date: _____

The contractor shall also provide the City with an electronic copy of each O&M manual. The electronic copies shall be in Adobe format (Portable Document Format) and shall be provided on a CD. Contractor shall use the latest version of Adobe.

Provide a table of contents and tab sheets to identify discrete subjects. Instruction sheets shall be legible and easily understood with large sheets and drawings folded in. Use manufacturer's original pre-printed instructions when available; do not xerox these pre-printed instructions. Cross out all material which does not apply to the equipment furnished on this job.

The operating and maintenance instruction shall include, as a minimum, the following data for each item of mechanical and electrical equipment:

1. Name and location of the manufacturer, the manufacturer's local representative, the nearest supplier and spare parts warehouse.
2. Approved submittals applicable to operation and maintenance.
3. Recommended installation, adjustment, start-up, calibration, and troubleshooting procedures.
4. A control sequence describing start-up, operation, and shutdown.
5. Detailed description of the function of each principal component of the systems.
6. Recommended lubrication and an estimate of yearly quantity needed.
7. Recommended step-by-step procedures for all modes of operation.
8. Complete internal and connection wiring diagrams.
9. Complete printed circuit board schematic and assembly drawings.
10. Recommended preventive maintenance procedures and schedule.
11. Complete parts lists, by generic title and identification number, with exploded views of each assembly.

12. Recommended spare parts.
13. Disassembly, overhaul, and reassembly instructions.
14. All completed test forms.
15. Provide ISA (International Society for Measurement and Control) S-20 forms for all instrumentation devices.

1.07. Project Signs

Prior to beginning any onsite work the contractor shall install a total of two project signs. The signs shall be supplied by the City. One of the signs is 4 feet by 8 feet and the other is 30 inches by 54 inches. Height of sign installation shall be as directed by the Engineer. In general, signs shall be installed a minimum of 7 feet and maximum of 10 feet above surrounding grade.

Signs will be installed in the following locations or as directed by the Engineer:

- 4' x 8' – Locate sign in the vicinity of proposed vault location. Sign should face east, supported by two 4" x 4" temporary posts.
- 30" x 54" – Sign should face west on the south side of the street. The location of the sign shall be proposed by the Contractor and approved by the Engineer prior to sign placement.

Unless otherwise noted and if acceptable to the Engineer an existing sign post may be used, otherwise, the Contractor shall be required to install a new post. The sign and post installed by the Contractor shall be removed at the end of the project and the sign returned to the City.

1.08. Construction Activity Time Schedule

The Contractor shall submit a detailed schedule in accordance with Section 7-2 of the Standard Specifications. No progress payments will be made until a suitable time schedule of construction activities has been submitted to and approved by the Engineer.

The activity time schedule shall indicate the chronological sequence in which the Contractor proposes to carry out each aspect of the work, the calendar dates on which the Contractor will begin the several salient elements of the work (procurement and delivery of materials, posting of "No Parking" signs, notification of property owners, scheduling of equipment, excavation of trenches, placement of pipe, etc), and the contemplated dates for completing said salient elements.

The Contractor shall contact the Engineer at least forty-eight (48) hours in advance of any change in the work schedule. If the Contractor desires to make a major change in his method or operations after commencing construction, or if the activity time schedule fails to reflect the actual progress of the work, the Contractor shall submit a revised schedule to the Engineer in advance of beginning revised operations.

At the very minimum, the Contractor shall update the construction activity time schedule every thirty (30) calendar days throughout the duration of the project.

1.09. Record Drawings

The Contractor shall maintain a neatly and accurately marked set of record drawings in accordance with Section 5-8 of the City Standard Specifications.

The record drawings shall include locations for all valves, fire hydrants, blow-offs, air release valves, and all other appurtenances placed.

The Contractor shall maintain a neatly and accurately marked set of record drawings showing the elementary control diagrams, wiring diagrams, and final locations and layout of all mechanical, electrical, and instrumentation equipment; piping and conduit; structures; and other facilities.

To achieve standardization of appearance, maintenance, and replacement, like items of materials provided under these Special Provisions shall be the end product of one manufacturer.

Prior to acceptance of the work, the Contractor shall deliver two (2) sets of record drawings.

1.10. Storage of Materials and Equipment

Materials and equipment shall be stored in accordance with Section 5-15 of the City Standard Specifications.

1.11. Manufacturer's Direction

Contractor shall comply with manufacturer's directions in accordance with Section 5-16 of the City Standard Specifications.

1.12. Equipment to be Supplied

All equipment, material and supplies called for on the Plans and Specifications shall be new and currently manufactured items, unless otherwise specified.

All equipment shall be complete and in operation to the satisfaction of the Engineer at the time of acceptance of the work.

1.13. Permits

National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Drain Discharge Associated with Construction

Contractor shall obtain a General Permit from the State Water Resources Control Board for storm drain discharge associated with construction. Information and requirements necessary to obtain the permit can be obtained by going to the State Water Resources Control Board internet web page or contacting them by phone. One of the necessary requirements to obtain the permit is completing the Notice of Intent form which is included in the appendix.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall prepare the SWPPP and submit it to the Engineer for review and approval. The SWPPP shall include, but not be limited to, a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, drainage patterns across the project, list of Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs, a visual monitoring program, a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP.

All fees associated with obtaining this permit shall be paid by the Contractor.

1.14. Permanent Survey Monuments

Contractor is responsible for verifying that arrangements have been made for preserving and/or perpetuating all permanent survey monuments that will be affected by the work in accordance with Section 5-6 of the City Standard Specifications.

1.15. City Ordinance Related to Construction Work

The City has adopted an ordinance amending Chapter 12.20 that establishes additional minimum requirements and restrictions relating to construction activities within the City limits and establishes administrative penalties associated with non-compliance of these requirements. The ordinance includes the following general categories:

- A. Working hours for the City's "Primary Streets"
- B. Traffic control plan requirements
- C. Access to private property
- D. Maintenance of construction areas

- E. Repair of traffic control systems
- F. Care of existing known facilities
- G. Public notification
- H. Noise levels

Copies of the ordinance are available from the City Clerk’s Office, 915 I Street, Sacramento, CA. 95814.

1.16. Water Quality Control

Water Quality Control shall be in accordance with Section 16 of the City Standard Specifications.

This project requires the Contractor to obtain a General Permit from the State Water Resources Control Board for storm drain discharge associated with construction as described in Section 1.13. The SWPPP shall incorporate any requirements from Section 16 of the City Standard Specifications that aren’t already required by the SWPPP. The Contractor shall conform with the more stringent requirement if there is a conflict between the two.

1.17. Controlled Density Fill (CDF)

The Contractor shall comply with Section 10 of the City Standard Specifications.

1.18. Surface Cutting and Restoration

Surface cutting and restoration shall conform to the following:

Type of material to cut and restore	City Standard Specification
Asphaltic pavement cutting and restoration	Section 22
Curb, gutter and sidewalk cutting and restoration	Section 24
Concrete pavement (Alleys and Vee gutters) cutting and restoration	Section 19

All materials shall conform to Section 10 of the City Standard Specifications.

Existing pavement to be removed shall be ground or saw cut full depth to provide a neat straight pavement break along both sides of the pipe trench. A “T” trench as shown on Standard Drawing W-701 is required. The minimum pavement section within public street right-of-way shall be five (5”) inches of asphalt concrete over twenty (20”) inches of Class 2 aggregate base.

The Contractor, at his/her option, may perform the pavement saw cutting operation after the pipe installation operation, just prior to pavement repair. No pavement cutting shall precede trenching by more than five calendar days except when saw cutting is used. Where the initial pavement cut is not performed by saw cutting and takes place more than one calendar day before

trench excavation, the Contractor shall fill the pavement cuts with asphalt concrete patching mix and maintain a smooth riding surface until trenching begins.

Upon completion of trench backfill, existing pavement as well as any curbs, gutters, sidewalks, driveways, or other improvements that have been cut or damaged as a result of the construction activities shall be replaced. The replacement of pavement, curb, gutter or other improvements shall match that of the original as close as practical unless otherwise indicated on the Plans or in these Special Provisions. Segments of saw cut pavement which were damaged during construction shall be re-saw cut to a neat straight line.

All fences or shrubbery in the way of construction shall be removed and replaced. The Contractor may re-use the existing fence material provided the Engineer approves the material, prior to installation. If the Engineer does not approve the re-use of the material, the Contractor shall replace with new material. Any private property or any existing improvements damaged by the construction operations shall be replaced with new materials at no additional cost.

Masonry work damaged as a result of the construction shall be repaired by an experienced brick mason to match existing improvements. Existing bricks shall be salvaged and reused to preserve the integrity of the improvement.

Aggregate base for repair and/or replacement of existing pavement shall meet the requirements for Class 2 Aggregate Base as contained in Section 10 of the City Standard Specifications. Aggregate base shall be placed and compacted in accordance with Section 14 of the City Standard Specifications, except that it shall be compacted to a relative compaction of not less than 95 percent as measured by tests specified in Section 14 of the City Standard Specifications.

Where less than one (1) foot of existing pavement is left between the edge of the trench and the lip of concrete gutter or pavement edge, the narrow strip of existing pavement shall be removed and the area repaved along with the area overlying the trench. All existing asphaltic concrete or concrete pavement adjacent to the pipe trench loosened, cracked, or damaged as a result of the Contractor's operations shall be removed and replaced. All pavement debris and other excavated material not destined to be used for backfill shall be removed and disposed of outside the limits of the project at the Contractor's expense.

No separate payment will be made to the Contractor for surface restoration or pavement cutting greater than four (4) inches.

1.19. Project Closeout

The issuance of a punch list, final acceptance of the work, and the final payment shall be in accordance with Section 8-4 of the City Standard Specifications.

1.20 Tree Preservation & Shrub Replacement

Trees within the project area shall be protected by the following means:

1. The Contractor shall hire an International Society of Arboriculture (ISA) certified arborist to prune trees which will be affected by construction equipment. Trees shall be pruned before equipment is mobilized to the construction site. The Contractor shall contact the City Arborist (Dan Pskowski, 768-8604) for a root inspection(s) for any trenching activities within the dripline(s) of the trees.
2. If during excavation for the project, tree roots greater than two inches in diameter are encountered, work shall stop immediately until the project arborist can perform an on-site inspection. All roots shall be cut clean and the tree affected may require supplemental irrigation/fertilization and pruning as a result of the root cutting. The Contractor shall be responsible for any costs incurred.
3. The Contractor shall be held liable for any damage to existing trees, i.e. trunk wounds, broken limbs, pouring of any deleterious materials, or concrete washout under the dripline of the trees. Damages will be assessed using A Guide to Plant Appraisal, Eighth edition, published by the International Society of Arboriculture. An appraisal report shall be submitted for review by the City Arborist.
4. Tree protection methods shall be identified by the Contractor and submitted for approval.
5. The shrub in the vicinity of the proposed vault location may be removed and replaced once the vault construction is complete. The replacement shrub location will be proposed by the Contractor and approved by the Engineer prior to placement.

1.21 Temporary Paving

Unless stated otherwise in the contract documents, at the end of every day and prior to opening to traffic, trenches shall be temporarily paved to provide a smooth riding surface. The paving material may be asphalt concrete or temporary paving, “cut back” or other Engineer approved material.

Contractor shall use non-skid plates to cover trenches. Contractor shall nail down plates at the edges. Contractor shall create and maintain a uniform taper using temporary paving to ensure a smooth traveling surface over the plate.

Temporary paving shall be placed on the proposed aggregate base coarse pavement section. Aggregate base shall be compacted in accordance with the contract requirements. Compacted thickness of temporary paving shall be not less than two inches. Compaction of temporary paving cutback shall be performed using steel wheel rollers or mechanical equipment approved by the Engineer. Compaction by “wheel rolling” with rubber tire construction equipment shall not be allowed.

Temporary paving shall be placed and maintained so that maximum deviation does not exceed ½ inch using a ten foot straight edge placed in any direction.

If, in the opinion of the Engineer, the temporary paving is not properly maintained, Engineer may direct the contractor to install permanent asphalt concrete pavement at no additional cost to the City.

1.22 Order of Work

The Contractor's first order of work shall include the following:

- The proposed location of the vault as shown on the plans shall be potholed to verify that there are not unknown utilities conflicting with the placement of the vault. Extensive potholing may be required. Any irrigation lines damaged as a result of potholing shall be repaired within 24 hours. The Contractor shall record any utilities encountered and their elevations. The potholing information shall be provided to the Engineer. The Engineer may need to make adjustments to the vault location based on the information provided from the potholes. The Engineer reserves the right to require changes in vault location without incurring additional costs.
- Prior to Contractor ordering the water main, the proposed water main upstream and downstream of the vault located outside the street section shall be potholed and all utilities shall be identified. Potholing data shall be submitted to the Engineer for review. The Engineer may need to make adjustments to the pipe design based on the information provided from the potholes. The Engineer reserves the right to require changes in pipe design without incurring additional costs.
- The Contractor shall order the magnetic meter once submittals for this equipment have been approved.
- The 8-inch hot taps on the existing distribution mains shall be scheduled with the City and shall be completed prior to transmission main placement.

1.23 Payment

No separate payment will be made to the Contractor for complying with the requirements of this section. The cost of such work shall be included in whatever bid item the Contractor deems appropriate.

END OF SECTION

SECTION 2 - PUBLIC CONVENIENCE & PROTECTION OF EXISTING CONDITIONS

2.01. Public Right-of-Way and Easements

All water mains constructed as part of this project are to be placed within public street rights-of-way and easements. The Contractor shall confine his or her operations within the limits of existing street rights-of-way or easements as much as practicable.

In the event the Contractor finds it necessary to encroach onto adjoining private property, the Contractor shall make all necessary arrangements with the owner of the property for such encroachment. A copy of any written agreements entered into between the Contractor and the property owner concerning encroachment onto private property shall be submitted to the Engineer prior to beginning any work on the property described in the agreement.

2.02. Existing Utilities

The location, alignment, and depth of existing underground utilities as shown on the Plans is taken from public records unless otherwise noted and no responsibility is assumed for the accuracy thereof.

Attention is directed to the provisions in Section 6-19 of the Standard Specifications.

The Contractor will insure that utility services to customers in the project are maintained.

The Contractor is responsible for the protection of and for damage to existing overhead and underground utility lines and services encountered during the course of construction. The Contractor shall notify the respective utility owner prior to any interruption of service.

The cost of relocating existing overhead or underground utilities not specified on plans to be relocated, but which the Contractor elects to relocate or cut and reconnect for his/her own convenience, shall be borne by the Contractor.

The Contractor shall "pothole" existing underground utilities a minimum of ten (10) working days in advance at any location where an existing utility may be in conflict with the proposed work.

2.03. Protection of Existing Improvements

The Contractor shall be responsible for repairing damage to existing improvements, utilities, and adjacent property in accordance with Section 13-1 of the City Standard Specifications.

2.04. Maintaining Existing Electrical Facilities

Maintaining existing electrical facilities shall be in accordance with Section 34-7 of the City Standard Specifications and these Special Provisions.

The Contractor shall ascertain the exact location and depth of existing electrical facilities before any electrical work begins. Any damage done to existing electrical facilities that is caused by the Contractor shall be repaired immediately and at the Contractor's expense. The Contractor shall trench under all existing traffic signal and street lighting conduits.

Temporary shutdowns of traffic signals shall be in accordance with Section 34-7 of the City Standard Specifications.

2.05. Maintaining Water, Sewer, and Drainage Flows

The Contractor shall be responsible for maintaining water, sewer, and drainage flows including emergency repairs and temporary bypasses in accordance with Section 13-2 of the City Standard Specifications.

Landscaping irrigation water lines cut or broken by the Contractor, but not immediately repaired, shall be capped until repairs can be made. The Contractor shall make repairs within 2 working days of having cut or broken such irrigation lines unless otherwise approved by the Engineer.

2.06. Work Performed by City Crews

The Contractor is advised that the City retains the option of performing with City crews, all or a portion of any work involved in relocation, repairing, or otherwise restoring existing sewer, water, and drainage systems and services to developed properties within the limits of the project that may be in conflict with the proposed project improvements. Any such work performed by City forces will be at the discretion and convenience of the City.

Should the Contractor desire City forces to cut and repair existing water, sewer, or drain services, the Contractor shall contact the Engineer at least three (3) working days in advance to schedule and coordinate the work.

All work performed and materials provided by the City will be paid for by the Contractor or removed from this contract at no additional cost to the City in accordance with Section 4-5 of the City Standard Specifications.

2.07. Emergency and Private Access

The Contractor shall comply with Section 6-10 of the City Standard Specifications.

The Contractor shall conduct his operations so as to offer the least possible obstruction and inconvenience to the general public and abutting property owners. The Contractor shall not have under construction at any one time, a length or quantity of work greater than can be properly and promptly completed with due regard to the rights of the public.

2.08. Temporary Diversion or Bypass of Existing Water, Sewer, or Drainage Flows

The Contractor shall comply with Section 13-2 of the City Standard Specifications.

2.09. Emergency Water, Sewer, and Drainage Service

The Contractor shall comply with Section 13-2 of the City Standard Specifications.

2.10. Handling and Removal of Hazardous or Contaminated Materials.

The Contractor's attention is directed to Section 16 of the City Standard Specifications.

In the event hazardous or contaminated materials are encountered at the site for which separate handling or removal provisions have not been made in these Special Provisions, the Contractor shall stop work on that item, contact the Engineer and schedule his operations to work elsewhere on the site, if possible. The City will be responsible for handling and removal of hazardous material or may request that the Contractor be made available, through contract change order, to provide additional services as needed for the completion of the work. Additional services may consist of retaining a subcontractor who possesses a California license for hazardous substance removal and remedial actions.

Hazardous or contaminated materials may only be removed and disposed of from the project site in accordance with the following provisions:

- A. All work is to be completed in accordance with the following regulations and requirements:
 - 1. Chapter 6.5, Division 20, California Health and Safety Code.
 - 2. California Administration Code, Title 22, relating to Handling, Storage, and Treatment of Hazardous Materials.
 - 3. City of Sacramento Building Code and the Uniform Building Code , 1994 edition.
- B. Coordination shall be made with the County of Sacramento Environmental Management Department, Hazardous Materials Division, and the necessary applications shall be filed.
- C. All hazardous materials shall be disposed of at an approved disposal site and shall only be hauled by a current California registered hazardous waste hauler using correct manifesting procedures and vehicles displaying a current Certificate of Compliance. The Contractor shall identify by name and address the site where toxic substances shall be

disposed of. No payment for removal and disposal services shall be made without a valid certificate from the approved disposal site that the material was delivered.

None of the aforementioned provisions shall be construed to relieve the Contractor from the Contractor's responsibility for the health and safety of all persons (including employees) and from the protection of property during the performance of the work. This requirement shall be applied continuously and not be limited to normal working hours.

2.11. Notification to Property Owners

The Contractor shall be responsible for notifying all property owners adjacent to the work at least seven (7) days prior to commencing any work in front of said property. Notifications shall include the Contractor's name, a contact person and phone number, a brief summary of the project, and the estimated duration of the project. The Engineer shall review and approve public notification flyers/postcards before they are issued to the public.

2.12. Maintenance of Traffic and Public Safety

The Contractor's attention is directed to Sections 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 7-4, and 16-3 of the City Standard Specifications.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at his expense.

Water or dust palliative shall be applied if ordered by the Engineer for the alleviation or prevention of dust nuisance.

Contractor shall not interfere with or impair any railroad operations in accordance with Section 6-6 of the City Standard Specifications.

The Contractor shall be required to establish traffic scheduling and control measures acceptable to the Engineer prior to starting any work. The Contractor shall submit to the Engineer for review and approval a plan in accordance with Section 6-10 of the City Standard Specifications. This plan shall be submitted a minimum of ten (10) working days prior to the scheduled commencement of any work by the Contractor. **The Contractor will not be allowed to begin work until an approved plan is on file with the Engineer.**

The Contractor shall notify Jack Wycarver, via the Engineer, at the Traffic Signal Maintenance Shop, (916) 808-6635, ten (10) working days before any electrical work begins.

The Contractor's traffic control plan shall provide for the following:

1. Folsom Boulevard, within the limits of this project, has five lanes, two in each direction with a turn lane in the center of the street, and bike lanes.

One travel lane in each direction must remain open to traffic on Folsom Boulevard within the construction zone at all times within the Contractor's work hours. The Contractor shall open all lanes when construction concludes at the end of the work shift.

The work hours for the project are from 8:30 am to 4:00 pm or 7:00 pm to 6:00 am. Proposed dates and times must be stated on the traffic control plan.

2. The Contractor shall provide access to all driveways at all times except when excavation is in progress, when forms are in place, or when concrete or asphalt is being placed. The Contractor shall take precautions so as not to entrap vehicles on private property during the progress of the work.

The Contractor shall coordinate with building management two weeks in advance when driveways to parking lots are impacted by construction. Driveways may be closed only during normal working hours and only after giving property owners a minimum of twenty-four (24) hours notice in advance of the closure.

If the contractor works during the day, then at a minimum, the Contractor shall keep half a driveway into businesses and offices open at all times if there is only one driveway to access the property. If businesses or offices have more than one driveway to access the site, one of the driveways may be closed to traffic.

3. Access for emergency vehicles shall be available along all streets within the construction area at all times.
4. Rear access to building and existing parking areas behind buildings shall be maintained. Contractor may close such access for a limited time only if arrangements have been made with property owners. Contractor shall give property owners forty-eight (48) hours notice in advance of the closure.
5. Vehicle and pedestrian access to driveways, houses, and commercial businesses along the streets, alleys, and easements within the limits of the project shall be maintained. Access for emergency vehicles shall be available along all streets within the construction area at all times.
6. The entire roadway width of all streets within the limits of the project shall be kept open for traffic at night, during weekends, on holidays, and during other time periods when work is not in progress. Steel plates or other approved methods shall be used to cover all open excavations in roadways during non-working hours.

The Contractor is hereby alerted that Folsom Boulevard is designated a "primary street" in accordance with Section 6-10 of the City Standard Specifications.

The Contractor is hereby alerted that Folsom Boulevard is designated a "Holiday Season Moratorium Street" in accordance with Section 6-11 of the City Standard Specifications.

Contractor shall perform the following notification procedures prior to closing a street/alley to through traffic:

1. Police Department - Provide the Police Communications Center with the street/alley closure limits and estimated duration of closure, by calling 264-5025 and faxing the information to 264-7770 one (1) working day prior to the closure.
2. Fire Department - Provide the Fire Communications Center with the street/alley closure limits and estimated duration of closure, by calling 228-3035 and faxing the this information to 228-3075 one (1) working day prior to the closure.
3. Solid Waste Division - Provide the street/alley closure limits and estimated duration of closure, by calling 808-4952 and faxing the information to 808-1494 five (5) working days prior to the street closure.
4. On Street Parking Division - Provide the traffic restriction or street closure limits and estimated duration of impact, by calling 808-5874 and faxing the information to 808-7501 five (5) working days prior to the street closure.
5. Regional Transit - Provide the traffic restriction and estimated duration of impact, by calling Lynn Cain at 321-5375 and faxing the information to 557-4541 five (5) working days prior.

The information faxed to the above shall include:

Name of Project
Project Number
Contractor Name and phone number
City Inspector Name and phone number
Department of Utilities Project
Name and Limits of Street being closed
Duration of closure

A copy of the fax receipt shall be given to the project inspector.

2.13. On-Street Parking Removal

The Contractor's operations may require the prohibition of on-street parking of vehicles along all or a portion of the length of the project for a limited period of time. In such instances, the removal of on-street vehicle parking shall be in accordance with Section 6-18 of the City Standard Specifications.

2.14. Dust Control

The Contractor shall be responsible for the control of dust within the limits of the project at all times in accordance with Section 6-2, 6-7, and 16-2 of the City Standard Specifications.

The Contractor shall keep all streets and alleys as well as all grounds adjacent to the project site clean and free of dust, mud, and debris resulting from the Contractor's operations in accordance with Section 16-3 of the City Standard Specifications.

Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor in accordance with Section 16-3 of the City Standard Specifications.

2.15. Payment

No separate payment will be made to the Contractor for complying with the requirements of this section. The cost of such work shall be included in whatever bid item the Contractor deems appropriate.

END OF SECTION

SECTION 3 – GENERAL WATER CONSTRUCTION REQUIREMENTS

3.01. AWWA Standards - Water Distribution and Transmission Systems

These Special Provisions contain reference to certain standards of the American Water Works Association (AWWA). Copies of these AWWA standards are available for reference at the City of Sacramento, Department of Utilities, Engineering Division at 1395 35TH Avenue in Sacramento. AWWA standards referenced are the **latest** revised edition.

IN SUBMITTING A BID, THE CONTRACTOR CERTIFIES THAT HE/SHE IS FAMILIAR WITH FIELD HANDLING, INSTALLATION, INSPECTION, DISINFECTION, PRESSURE TESTING AND ALL OTHER REQUIREMENTS CONTAINED IN THE AWWA STANDARDS.

3.02. Direction of Opening of Valves and Fire Hydrants

All gate valves, butterfly valves, and fire hydrants, installed in the City's water distribution system shall open counter clockwise.

On valves south of the American River, the Contractor shall paint a five inch high two inch wide stenciled letter "L" on the inside of the valve stand pipe using white enamel paint. A letter "L" shall also be placed on the valve box lid per the drawing details.

3.03. Water Main Shutdowns and Connections

After successful completion of hydrostatic pressure testing and disinfection, the Contractor shall connect the new water mains to the existing water system at the locations indicated on the Plans.

To coordinate and schedule a water main shutdown, Contractor shall provide the Engineer with a project schedule that includes date and location for all required project shutdowns as described in "Construction Activity Time Schedule" of these Specifications. The contractor must provide updates of this schedule including the shutdown activities before 3:00 PM on the Monday a minimum of 11 days before the shutdown is required. If these coordination requirements are not performed, the City cannot provide the shutdown.

The Contractor shall expose the existing water main at tie-in locations 24 hours prior to a tie-in and have all materials and equipment necessary for the connection work at the job site prior to beginning the shutdown.

The City will not conduct a shutdown until the Contractor is capable of completing the work within a 4 hour period.

Shut downs will not be scheduled for Mondays or Fridays.

Without exception, all opening and closing of the valves on existing water mains will be performed by City crews only.

Where indicated in the Plans, the Contractor shall cut existing pipe, remove existing plugs or bulkheads, clean pipe ends, prepare connections and make the new connection to existing water mains. The Contractor shall temporarily cap existing mains as necessary and as approved by the Engineer to maintain service to City customers.

Water released from cutting or opening existing mains shall be removed and disposed of by the Contractor. The excavation shall be kept dry until all necessary work within the work area has been performed.

The Contractor shall coordinate with California American Water (Cal Am) to arrange the shut down of non City valves for the purpose of connecting to the existing water system at the City/County property line. The Contractor shall request the Cal Am contact information from the Engineer a minimum of 10 working days prior to a proposed water main shut down.

3.04. Dewatering

A determination of groundwater level has not been made for this project. The Contractor shall be responsible for the control, removal, and disposal of any groundwater in accordance with Section 16 and 27-3 of the City Standard Specifications.

3.05. Geotechnical Information

It is the Contractor's sole responsibility to perform the necessary exploration work, including laboratory testing, to assure himself of the soil and geologic conditions along the entire extent of the project.

All field and laboratory test data resulting from testing for groundwater, soils or geologic conditions performed by the Contractor shall be furnished to the Engineer as soon as available.

3.06. Trench Excavation

The Contractor shall comply with Section 27-3 of the City Standard Specifications.

3.07. Trench Bottom

The Contractor shall comply with Section 27-3 of the City Standard Specifications.

3.08. Unsuitable Materials

The Contractor shall comply with Section 10 and 14-8 of the City Standard Specifications.

The Contractor shall excavate unsuitable material and the resulting space shall be filled with “pit run” base or Class 2, aggregate base at such places and limits as directed by the Engineer.

3.09. Pipe Bedding and Initial Backfill

The Contractor shall comply with Section 10 and 27-8 of the City Standard Specifications.

3.10. Trench Shoring, Sheet piling, and Bracing

The Contractor shall furnish, install, and maintain a trench or shoring system in compliance with the requirements set forth in City’s Standard Specifications.

3.11. Drainage and Control of Water

The Contractor shall provide adequate drainage and control of water for all trenches within the area of and for the duration of the project.

3.12. Temporary Bridges Over Trenches

The Contractor shall comply with Section 27-3 of the City Standard Specifications.

3.13. Limits of Length of Open Trench

The Contractor shall comply with Section 27-3 of the City Standard Specifications.

Within the limits of the temporarily backfilled trench, all spoil from trench excavation activities shall be removed from the paved street surface and the surface swept clean.

3.14. Pipe Stockpiling Limits

The Contractor shall comply with Section 27-4 of the City Standard Specifications.

3.15. Payment

No separate payment will be made to the Contractor for complying with the requirements of this section. The cost of such work shall be included in whatever bid item the Contractor deems appropriate.

END OF SECTION

SECTION 4 - GENERAL WATER TRANSMISSION MAIN CONSTRUCTION REQUIREMENTS

4.01 Basis of Water Transmission Pipe Design

Pipe for the water transmission main to be provided under these Special Provisions shall be the following:

- A. Welded Steel Pipe (WSP)

Thrust Restraint

The Contractor shall comply with Section 27-6 of the City Standard Specifications.

Water Transmission Main Material - General

All materials, design and fabrication of pipe shall conform to the requirements in Section 10-28 and 27 of the City Standard Specifications, except as modified herein.

Welded Steel Pipe (WSP)

In addition to the requirements of Section 10-28 and 27 of the City Standard Specifications, the following will also be included in the basis of design:

- A. All of the required steel cross sectional area of the welded steel pipe shall be provided by the steel cylinder.
- B. The minimum design stress shall be 16,500 psi or 50 percent of the steel minimum yield strength, whichever is greater. Grade of steel supplied shall be ASTM A570, Grade 33 or higher.
- C. When determining the steel cylinder thickness of the pipe, considerations shall be taken for (1) internal pressure, including static and transient pressures; (2) external pressure, including trench loading and earth fill; and (3) practical considerations for handling, shipping, lining and coating, or similar operations. Minimum steel cylinder dimensions shall be as follows:

Nominal Pipe Diameter (inches)	Minimum Inside Diameter of Cylinder (inches)	Minimum Steel Cylinder Thickness (inches)
18	19.0	0.1345, 10 gauge
24	25.5	0.1345, 10 gauge
30	31.5	0.1644, 8 gauge

Nominal Pipe Diameter (inches)	Minimum Inside Diameter of Cylinder (inches)	Minimum Steel Cylinder Thickness (inches)
36	37.5	0.1875, 3/16
42	44.0	0.2500, 1/4
48	50.0	0.2500, 1/4
54	56.0	0.3125, 5/16

- D. Cylinders shall be substantially true right cylinders, formed from one piece of sheet or coil steel.
- E. Field circumferential butt welds are not acceptable.

Pipe End Finish

The exposed inside and outside surfaces of the pipe joints, flanges, reinforcement lugs, and all other exposed steel shall be protected from the formation of rust with an AWWA approved coating applied at the time of manufacture or fabrication of the pipe.

Internal Bracing and End Protection

Prior to delivery of the pipe, end covers and end/internal bracing shall be furnished and installed, as recommended by the manufacturer, for protection during shipping and storage, and installation.

Contractor Submittals

The Contractor shall submit the following items in addition to any other items required by AWWA Standard C200 or items required elsewhere in these Special Provisions to the Engineer or items required by Section 10-28 of the City Standard Specifications.

- A. Affidavit of Compliance

4.02 Corrosion Monitoring

General

The Contractor shall comply with Section 27-17 of the City Standard Specifications.

The Contractor shall furnish and install the corrosion monitoring system components as indicated in the Plans and as specified in these Special Provisions.

Quality Assurance

The Contractor shall comply with Section 27-17 of the City Standard Specifications.

All equipment and materials shall be new and of the highest quality.

All work shall be accomplished by qualified, experienced personnel working under competent supervision.

Where the Plans or these Special Provisions require a higher degree of workmanship or better quality of material than implied by the above codes and standards, these Special Provisions and Plans shall prevail.

Contractor Submittals

An equipment and materials list shall be as specified in these Special Provisions. After approval of the submittals by an authorized representative of the Engineer, the Contractor shall order equipment and materials necessary to complete the facilities so that any long delivery times shall not delay the completion of the work in the specified time.

Brands or trade names are mentioned to set standards of quality: use no substitute materials unless approved in writing by an authorize representative of the Engineer. Approval of substitute materials does not relieve the Contractor of responsibility for providing a workable and functioning system as designed.

Catalog cuts, bulletins, brochures or data sheets shall be submitted for items of material or equipment for which shop drawings are not designated to be submitted. This data shall be submitted marked with a clear indication of the Contractor's intent. A list of items indicated "as specified" will not suffice. A manufacturers name alone will not suffice. The foregoing described catalog data are not required to be submitted for miscellaneous items of hardware which are needed to accomplish this work but which are not covered specifically in these Special Provisions.

Test Stations/Traffic Valve Boxes

The Contractor shall comply with Section 10 and 27-17 of the City Standard Specifications.

Test stations shall be placed at the locations indicated. The Contractor shall field verify final location of the test stations. Wire identifiers shall be placed on all wire prior to backfill and installation of test stations.

Wire

The Contractor shall comply with Section 10 and 27-17 of the City Standard Specifications.

After installation, all wire connections shall be tested at the test station by the Contractor, to ensure that they meet the minimum standard in the Plans and these Special Provisions

Exothermic Welds

The Contractor shall comply with Section 10, 27-17 and Detail W-1011 of the City Standard Specifications.

Connections shall be made at locations shown on Plans.

A coating shall be applied to all exothermic weld locations. The coating shall be a bitumastic coating as listed in these specifications for ductile iron or dielectrically coated steel. The coating shall be covered with a plastic weld cap. All surfaces must be clean and dry and free of oil, dirt, loose particles and all other foreign materials prior to application of the coating. For cement mortar lined and coated pipe or concrete cylinder pipe, the coating shall match the exterior mortar.

Insulating Flange Kits

The Contractor shall comply with Section 10 and 27-17 of the City Standard Specifications.

System Check-out

The Contractor shall comply with Section 27-17 of the City Standard Specifications.

4.03 Butterfly Valves

General

Butterfly valves shall be installed in the locations and to the details shown in the Plans and in accordance to the requirements found in Section 10-29 and 27 of the City Standard Specifications.

Raised identification plates shall be cast on or permanently attached (i.e. riveted) to each butterfly valve body showing the manufacturer's name or trade mark, year of valve casting, valve diameter and AWWA Class rating.

Submittals

The Contractor shall submit an Affidavit of Compliance to AWWA Standard C504 for all butterfly valves or groups of butterfly valves. The Affidavit of Compliance shall provide assurance that all material and manufacturing requirements have been met and required actuator torques are within specified limits.

Testing

It is required that butterfly valves meet leakage tests on both sides of the disc for flow in either direction. The Contractor shall furnish a certificate of compliance that all valves provided, comply with provisions of this specification requirement.

4.04 Flexible Couplings

The Contractor shall comply with Section 10-29 and 27-7 of the City Standard Specifications.

4.05 Air Vacuum and Release Valves

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.06 Blow-offs

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.07 Gate Valves

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.08 Access Manholes

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.09 Fire Hydrants

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.10 Valve Boxes

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.11 Placement and Joining of Pipe

General Requirements

In the course of the Contractor's pipe laying operation, an authorized representative of the Engineer will have the right to direct the work of the Contractor according to the following:

- A. Decide if trench conditions are suitable for pipe laying due to inclement weather.
- B. Direct repairs to pipe outside coating, as needed.
- C. Request cleaning of the inside of the pipe, as needed.
- D. Direct the Contractor to prevent undue pipe deflection and/or unit loading during pipe handling.

The Contractor shall consider the above directives as an integral part of the water transmission main contract.

Rubber Gasketed Joints

The Contractor shall comply with Section 10 and 27-4 of the City Standard Specifications.

Restrained Joints

The Contractor shall comply with Section 10 and 27-6 of the City Standard Specifications.

Insulated Joints

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

Field Welding of Pipe Joints

The Contractor shall comply with Section 10, 27-4, and the Details of the City Standard Specifications.

Welding in the field shall follow the pipe laying operation as closely as possible. All field welds for steel pipe shall be complete before lining and coating of the joints is begun. Double, continuous, watertight, full fillet weld joints shall be the minimum required at all field joints. Triple weld joints shall be required of those sizes of welded steel pipe or concrete cylinder pipe specifically noted on the Plans to be triple welded.

Cement Mortar Joint Finish

The Contractor shall comply with Section 10 and 27-4 of the City Standard Specifications.

Prior to the application of cement mortar to the exterior of the pipe joints, a layer of welded wire mesh shall be tack welded to the pipe at the joint.

The application of cement mortar to the interior and exterior of the pipe shall be made subsequent to welding joints in the field to preclude the formation of gas pockets at the joint.

Pipe End Sealing

The Contractor shall comply with Section 10 and 27-4 of the City Standard Specifications.

Where valves are installed at the pipe end, water tight seals and temporary backfilling shall also be used at the days end.

Installation of Appurtenances

The Contractor shall comply with Section 10 and 27-7 of the City Standard Specifications.

4.12 Trench Backfill, Pavement Repair And Surface Restoration

Trench Backfill

The Contractor shall comply with Section 10, 26-5, 27-8 and 27-9 of the City Standard Specifications.

Placement and compaction of trench backfill material shall meet the applicable requirements of the City of Sacramento's Standard Specifications and Technical Drawing W-701 in the Plans.

Full Depth Select or Imported Backfill

The Contractor shall comply with Section 10 and 27-8 of the City Standard Specifications.

Full Depth Select or Imported Backfill shall also apply in streets where it is desired to reopen the affected construction area to traffic in as short a time as possible.

Utility Crossing Padding

Wherever the water main pipe crosses over or under intersecting sanitary sewer, storm drain, or other utility lines, and the minimum clearance between the two lines is six (6) inches or less, styrofoam pad of full gap thickness or sand shall be placed between the intersecting pipelines. The styrofoam pad shall be approximately 18 inches square and shall be secured so as to remain in place during subsequent backfill operations. Larger pads shall be provided where so indicated on the Plans.

Clean-Up Behind Pipe Laying Operations

The Contractor shall comply with Section 16 and 27-4 of the City Standard Specifications.

4.13 Hydrostatic Pressure And Disinfection Testing

General

The Contractor shall comply with Section 27-13 of the City Standard Specifications.

This section covers disinfection, hydrostatic pressure and leakage testing, and flushing of water transmission mains and related valves and fittings. All hydrostatic pressure and disinfection testing shall be made in the presence of an authorized representative of the Engineer and shall conform with the Standard Specifications except as modified with these Special Provisions.

Testing Procedure

The Contractor shall comply with Section 27-12 and 27-13 of the City Standard Specifications.

In no case shall water be discharged directly to a river, creek, pond or other surface water.

A suggested, but not mandated method of achieving the required residual is to add sodium metabisulfite at a ratio of 1.4 parts sodium metabisulfite to 1 part chlorine. Sodium metabisulfite shall conform to AWWA Standard B601.

Prior to disposal of de-chlorinated water, the City will take samples, the cost of which will be borne by the City, and test for chlorine residual at discharge locations along the pipeline. If the test results indicate that the discharge water exceeds the allowable chlorine residual, the Contractor shall re-neutralize until test results indicate a chlorine residual of 0.01 mg/l or less. The cost for re-testing chlorine residual after initially failing to meet the requirements shall be borne by the Contractor. At no time shall any un-neutralized water be discharged to the City storm drain system.

4.14 Traffic Loop Modifications

General

The work to be performed for this item, in general, includes furnishing and installing all necessary equipment and materials to modify the detector loops at the intersection of Folsom

Boulevard and Wissemann Drive. Included in the work shall be furnishing and installing conduits, detector loops, detector cables and Type B detector handholes and all appurtenances called for in these Special Provisions.

Detector Loop Lead-in Conduit

Detector loop lead-in conduit installation shall include saw-cutting, trenching, conduits, and all other materials required for a complete installation at the required location.

The Contractor shall install PVC conduit from the existing sidewalk pull box to each new detector handhole or termination point. All sidewalk removed to complete this item shall be saw-cut on a neat straight line and replaced in kind. Each existing pull box where new conduit is installed shall be removed and replaced with a new pull box.

Conduits

Conduits shall be in accordance with the City of Sacramento’s Standard Specifications, except for the following:

- A. All conduit termination in pull boxes, standards, pedestals, and cabinets shall rise vertically and shall not slope in any direction.
- B. Where conduit is installed by “Trenching Installation of Conduit in Paved Streets” method, the Contractor shall use an approved procedure to prevent the conduit from floating when concrete is poured.
- C. Conduits shall be installed a minimum of twenty-four (24) inches from all existing manholes and valve covers.

Pull Boxes

Pull boxes shall be in accordance with the City of Sacramento’s Standard Specifications, except for the following:

- A. All pull boxes shall be placed in sidewalk areas and shall not be placed in driveways, in vehicular traveled lanes, or in sidewalk handicapped ramp areas. Unless otherwise specified, pull boxes shall be placed at least five (5) feet from existing driveways.

Pull boxes shall be placed as shown according to the details shown on the Plans and according to these Special Provisions.

Wiring

Wiring shall be in accordance with Section 34-13 of the Standard Specifications, except for the following:

After taping, all splices shall be painted with an approved electrical coating which will resist oil, acids, alkalies, and adverse environmental conditions.

6' x 6' Inductive Detector Loops

The six-foot by six-foot inductive detector loops shall conform to all requirements of the Detector Loop Details Sheet included in these Special Provisions.

Detector loops shall be installed as specified in these Special Provisions and as directed by the Engineer. All existing loops to be replaced shall be disconnected by sawcutting in a minimum of two places. The new six-foot by six-foot loops shall be sawcut into the new detector handholes as shown on the Plans. No splicing will be allowed in the detector handholes.

Detector Conductor Loop

The Contractor shall comply with Section 34-12 of the City Standard Specifications.

Unless otherwise specified, each loop shall be three (3) turns of conductors. Unless otherwise shown on the Plans, each new detector loop shall be six feet by six feet centered in the street lane.

Slots cut in the pavement shall be blown out with compressed air and dried and inspected for any sharp objects or corners which shall be removed prior to installation of loop conductors.

The loop conductors shall be installed with the slots using a 5/16-inch to 1/4-inch wooden paddle. As it is installed, the wire shall be kept under slight tension and shall be kept in the slots with suitable cardboard wedges. The cardboard wedges shall not be removed until the loop sealant operation requires removal.

Loop conductors shall be installed without splices and shall terminate in the nearest pull box. The detector's loops shall be joined in the nearest pull box in combination of series and parallel so that optimum sensitivity is obtained at the sensor unit. Final splices between loops and lead-in cable shall not be made until the operation of the loops under actual traffic conditions is approved by the Engineer. Each detector loop shall be identified and tagged by loop number, start (S), and finish (F). For example: Phase 4D1-1S & Phase 4D1-1F; Phase 4D1-2S & Phase 4D1-2F.

All loop conductors for each direction of travel for the same phase of traffic signal system in the same pull box, shall be spliced to a cable which shall be run from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet. Splices to the cable shall be made in pull boxes only. All splices to the lead-in cable and between loops and the lead-in cable shall be soldered as specified in State Standard Specifications in Section 86-2.09C, "Connectors and Terminals". Open flame soldering will not be permitted.

Each detector loop circuit shall be tested by the Contractor, with the Engineer in attendance, for continuity, circuit resistance, and insulation resistance at the controller location. The loop circuit resistance shall not exceed 0.50 ohms plus 0.35 ohms per 100 feet of lead-in cable. The insulation resistance shall be performed between each circuit conductor and ground. The

meggard insulation resistance shall not be less than 200 megohms. The Contractor shall replace any detector loop that fails this requirement at the Contractor's expense.

Order of Loop Installation

The detector loops shall be installed after pavement key cutting and prior to installation of the new asphaltic concrete surfacing. For new streets or complete replacement of existing asphaltic concrete section, the detector loops shall be installed before the final lift of asphaltic concrete.

Depth of Loops and Conductors in the Traveled Way

All conductors and conductor loops installed in the traveled way shall be installed so that the tip of the conductor is a minimum of one (1) inch below the surface grade of the street.

Inductive Loop Sealant

Only the following methods may be used for inductive loop sealant:

- A. Asphaltic Emulsion and Sand Method
 - 1) Immediately after the loop wires have been installed, the slot shall be filled with an anionic asphaltic emulsion conforming to the State Standard Specifications for Rapid Setting No. 1 (RSI).
 - 2) Dry 20 mesh sandblasting sand shall then be poured in and around the slot. A suitable and approved tool shall then be used to work the asphaltic emulsion up through the dry sand.
 - 3) The slot will then be inspected for any dry spots in the sandfill. Any dry sand spots will then be wetted with more asphaltic emulsion.
 - 4) More dry sandblasting sand shall then be added to the slot and the asphaltic emulsion will again be worked up through the sand until a uniform mix of asphaltic emulsion and sand with no voids completely fills the slot to the level of the surrounding road surface.
 - 5) A final thin layer of sand will then be added to the surrounding surface to absorb the excess asphaltic emulsion.
 - 6) The traveled way may be opened to vehicular traffic immediately after installation of the asphaltic emulsion and sand loop sealant.
- B. Sackrit Method

After conductors are installed in the slots cut in the pavement, paint binder shall be applied to all vertical surfaces of slots in accordance with the provisions in Section 94, "Asphaltic Emulsions" of the State Standard Specifications. The slots shall then be filled with asphaltic concrete sealant.

Asphaltic concrete sealant shall be a mixture of sand and liquid asphalt. The percentage of sand in the asphaltic concrete sealant shall conform to the following:

<u>Screen Size</u>	<u>Percentage Passing</u>
#4	100
#8	91
#16	63
#30	39
#50	24
#100	10
#200	7

The sand shall be uniformly mixed with six (6) percent SC800 liquid asphalt conforming to Section 93 of the State Standard Specifications.

Temperature of sealant material during installation shall be above 70 degrees F. Sealant placed in the slots shall be compacted by use of an eight (8) inch diameter 1/8-inch thick steel hand roller or other tools approved by the Engineer. Compacted sealant shall be flush with the pavement surface. Excess sealant remaining after rolling shall be reused. Traffic may be released immediately over compacted material.

Detector Handholes

The Contractor shall construct Type B Detector Handholes according to CALTRANS Standard Plans, Plan ES-5E. Handholes shall be installed as shown on the Plans and as directed by the Engineer.

Detector Lead-In Cable

Detector lead-in cable shall be "Canoga" Type 30003, or approved equal. Detector lead-in cable shall conform to the following specifications:

Lead-in cable shall consist of four (4) NO. 18 A.W.G. stranded copper conductors insulated with nine (9) mils minimum of polypropylene, color coded, parallel laid, twisted together with four to six turns per foot. An amorphous interior moisture penetration barrier shall be provided to prevent hosing, siphoning, or capillary absorption of water along cable interstices. The outer jacket shall be thirty (30) mils minimum in thickness, high density polyethylene conforming to ASTM Designation: D-1248, 65T for Dielectric Material, Type I, Class C, Grade 5, J3. The diameter of the Cable shall be approximately 0.25 inch.

Aluminum-polyester shielding shall be applied around the conductors.

The detector lead-in cable shall be continuous from the pull box adjacent to the conductor loops to the controller unless otherwise shown on the Plans.

Splicing of detector lead-in cables to loop conductor and splicing of detector cables when called for on the plans shall be as follows:

- A. Splices shall be made in pull boxes only. All splices to lead in cable shall be soldered.
- B. The ends of the splice shall then be inserted into an approved insulated spring type connector of the correct size.
- C. The splice shall then be insulated by "Method B" of the State Standard Plans, Sheet E-13, or as directed by the Engineer.
- D. When detector cables and detector loops are initially installed, precautions shall be taken to insure the cables and loops remain water tight prior to splicing. If splicing is not to be done immediately after installation, the ends of the conductors and cables shall be dipped in electrical insulating liquid which shall render them water tight. The insulating liquid shall be fast drying, resistant to oils, acids, alkalies, and corrosive atmospheric conditions and shall be compatible with the insulations used in the conductors and cables.

All conductors and cables shall be installed and splices shall be made in a dry environment.

Inspection

Inspection shall be in accordance with section 34-22 of the City Standard Specifications.

4.15 Payment

No separate payment will be made to the Contractor for complying with the requirements of this section. The cost of such work shall be included in whatever bid item the Contractor deems appropriate.

END OF SECTION

SECTION 5 - ITEMS OF PROPOSAL

Item No. 1 Mobilization (Note: The maximum amount bid for "Mobilization" shall be six (6) percent or less of the total base bid.)

This item shall consist of preparatory work and operations, including, but not limited to, those items necessary for bonding, insurance, movement of personnel, equipment, supplies, and incidentals to the project site(s), and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items.

Payment and contract amount for "Mobilization" shall conform to Section 11 - Mobilization of the State Standard Specifications. The contract lump sum price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in mobilization.

Item No. 2 Construction Photographs to Provide

This item shall consist of providing pre-construction and post-construction photographs or video of all work. Photographs or video shall meet the requirements of Section 11 of the City Standard Specifications, except as modified herein or as directed by the Engineer. The Contractor's photographer shall at all times be equipped to take either interior or exterior exposures.

The Contractor shall submit as many photographs or as much video as necessary to clearly depict the condition of the existing pavement and landscaping features at each property adjacent to the construction work. Special emphasis shall be placed on existing pavement, structures, flowerbeds, trees, or any other improvements in close proximity to the construction area. Upon completion of work at each property, the Contractor shall have post-construction photographs or video taken at the same locations and from the same perspective that the pre-construction photos or video were taken. All photographs or video shall be taken with a digital still camera or video recorder and provided to the City on a DVD.

Contractor shall be paid half of the lump sum price upon approval of the pre-construction photos, and the remaining amount upon acceptance and approval of the post-construction photographs.

Payment for construction photographs shall be at the contract lump sum price bid and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in accordance with the City Standard Specifications, these Special Provisions, and as directed by the Engineer.

Item No. 3 14-Inch Diameter Water Transmission Main to Furnish and Install

This item shall consist of furnishing and installing 14-inch welded steel water transmission main pipe and fittings at the locations and alignments shown on the Plans and to the details given.

The 14-inch pipe shall have flanges that match the magnetic meter flanges. The magnetic meter flanges shall be ANSI B16.5 forged 150 lb flange as described in these specifications. The pipe shall be fabricated to match the inside diameter of the magnetic meter with a tolerance of plus or minus 1/8". As such, it is acceptable to make the lining thicker to match inside diameters. The entire section of 14-inch pipe shall have the same dimensions unless directed otherwise by the engineer.

The Contractor shall restore surfaces in kind unless otherwise specified on the Plans or in these Special Provisions. Pavement cutting and restoration shall conform to the provisions of the City Standard Specifications and these Special Provisions. All surface restoration, including striping, whether concrete, landscaping, asphaltic concrete, or any other material as specified in these Special Provisions, shown on the Plans, and as encountered on the job site, shall be included with this item unless otherwise specified.

Payment shall be at the contract unit price bid per linear foot of water transmission main pipe furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place including pavement cutting and removal, trenching, furnishing and placing pipe, backfilling, pressure testing, disinfecting, and repaving or other surface restoration.

Item No. 4 24-Inch Diameter Water Transmission Main to Furnish and Install

This item shall consist of furnishing and installing water transmission main pipe and fittings at the locations and alignments shown on the Plans and to the details given.

The Contractor shall restore surfaces in kind unless otherwise specified on the Plans or in these Special Provisions. Pavement cutting and restoration shall conform to the provisions of the City Standard Specifications and these Special Provisions. All surface restoration, including striping, whether concrete, landscaping, asphaltic concrete, or any other material as specified in these Special Provisions, shown on the Plans, and as encountered on the job site, shall be included with this item unless otherwise specified.

Payment shall be at the contract unit price bid per linear foot of water transmission main pipe furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place including pavement cutting and removal, trenching, furnishing and placing pipe, backfilling, pressure testing, disinfecting, and repaving or other surface restoration.

Item No. 5 12-Inch Diameter Water Main to Furnish and Install

This item shall consist of furnishing and placing water main pipe, elbows and fittings at the locations, to the alignments and to the details shown on the Plans.

This item shall also include furnishing and installing elbows to change the vertical alignment of the proposed water main to avoid conflicts with existing underground utilities.

Surface restoration associated with this item shall be performed as specified elsewhere in these Special Provisions and paid for under this item. The Contractor shall restore surfaces in kind unless otherwise specified on the Plans or in these Special Provisions. Pavement cutting and restoration shall conform to the provisions of the City Standard Specifications and these Special Provisions. Striping and speed bump replacement, concrete, landscaping, asphaltic concrete, or any other material replacement encountered, shall be included in this item.

Payment shall be at the contract unit price bid per linear foot of water main furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 6 14-Inch Diameter Motorized Operated Butterfly Valve to Furnish and Install

This item shall consist of furnishing and installing Motorized Operated Butterfly valve (MOV) at the location indicated on the Plans, to the lines, grades, and details given. The specification for the actuator can be found in the Appendix.

Payment shall be at the contract unit price bid for each MOV furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 7 24-Inch Diameter Butterfly Valve to Furnish and Install

This item shall consist of furnishing and installing butterfly valves at the locations indicated on the Plans, to the lines, grades, and details given.

All clearing, trench excavation, backfilling, and surface restoration required for installation of the butterfly valves shall be included in the unit cost of furnishing and placing the water main pipe.

Payment shall be at the contract unit price bid for each butterfly valve furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 8 6-Inch Blow-Off to Furnish and Install

This item shall consist of furnishing and installing blow-offs at the locations indicated on the Plans.

Payment shall be at the contract price bid for each blow-off furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this in place.

Item No. 9 2-Inch Air Vacuum and Release Valve to Furnish and Install

This item shall consist of furnishing and installing air vacuum and release valves at the locations indicated on the Plans.

Payment shall be at the contract unit price bid per each air vacuum and release valve furnished and installed and shall include full compensation for furnishing all labor, material, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 10 Access Manhole to Furnish and Install

This item shall consist of furnishing and installing access manholes at the locations indicated on the Plans.

Payment shall be at the contract unit price bid per each access manhole furnished and installed and shall include full compensation for furnishing all labor, material, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 11 Standard Fire Hydrant to Furnish and Install

This item shall consist of furnishing and installing a standard fire hydrant at the locations indicated on the Plans.

Apex Blue, two-way, type BB, reflective pavement markers, or approved equal, shall be placed using Crafcro Qwikstix adhesive, or approved equal, for each standard fire hydrant installation. The reflectors shall be placed 6"-12" from the road centerline adjacent to the hydrant on an imaginary line from the hydrant perpendicular to that centerline.

If the road has an island divider, the reflector shall be placed 6"-12" from the nearest division of traffic lanes to the hydrant, and on an imaginary line from the hydrant perpendicular to that division of lanes. If a hydrant is placed at an intersection, reflectors shall be placed on all streets adjacent to the hydrant. In no case shall a marker be placed on a maintenance hole, valve box, lane striping, existing marker, or other road appurtenance.

All hydrant bonnets shall be painted with OSHA approved safety paint. The color shall be based on the diameter of the main that the hydrant is connected to, as follows:

Red:	for 6" and smaller mains
Yellow:	for 8"-10" mains
Green:	for 12" and larger mains

Surface restoration associated with this item shall be performed as specified elsewhere in these Special Provisions and paid for under this item.

The fire hydrant lead and valve shall be paid for under this item.

Payment shall be at the contract unit price bid for each standard fire hydrant furnished and installed and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 12 Connection to Existing Water System

This item shall consist of furnishing all plant, labor, equipment, and materials to make the tie-in connections, including but not limited to, valves, couplings and fittings, to the existing water distribution and transmission systems as shown on the Plans.

Payment shall be at the contract lump sum price bid for connecting to existing water system and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place, including trenching, cutting, and making connections.

Item No. 13 Corrosion Monitoring System to Furnish and Install

This item shall consist of furnishing all plant, labor, equipment and materials to install the corrosion monitoring system, as shown on the Plans and as specified herein.

Payment shall be at the contract lump sum price bid for furnishing and installing the corrosion monitoring system and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 14 Trench Sheeting, Shoring, and Bracing to Furnish and Install

This item shall consist of furnishing and installing all trench shoring, sheeting, and bracing associated with this project in accordance with the requirements of the City Standard Specifications.

Payment for trench shoring, sheeting, and bracing shall be at the contract lump sum price bid for furnishing and installing trench sheeting, shoring, and bracing and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 15 Unsuitable Material, to Remove and Replace

This item shall consist of furnishing all labor, equipment and materials to remove and replace unsuitable materials in accordance with the requirements of the City Standard Specifications and these Special Provisions.

Payment shall be at the contract unit price bid per ton for unsuitable material replaced and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 16 Miscellaneous Asphaltic Concrete to Place

This item shall include miscellaneous asphaltic concrete removal and replacement for right-of-way repairs. This work is not shown on the Plans but shall be performed by the Contractor at the direction of the Engineer.

Asphaltic concrete removed and replaced for installation of the water main, connecting existing and new mains, fire hydrants, air release valves, blow-offs, access manholes, butterfly valves, and gate valves shall not be included in this item.

Asphaltic concrete shall be removed and replaced in accordance with the City Standard Specifications and these Special Provisions on Pavement Cutting and Surface Restoration.

The quantity of asphaltic concrete shown on the Proposal is for bidding purposes only. The unit price indicated will not be adjusted because the actual quantity varies from the quantity shown on the Proposal. If no miscellaneous asphaltic concrete is removed or replaced then the quantity shown for this item will be deleted.

Payment shall be at the unit price bid per square foot of asphaltic concrete to place and shall include full compensation for furnishing all labor, material, tools, equipment, incidentals and for performing all work necessary to complete this item in place.

Item No. 17 Miscellaneous Concrete to Remove and Replace

This item shall include miscellaneous concrete removal and replacement for right-of-way repairs. Concrete shall meet the applicable portions of Sections 10, 18, and 19 of the City Standard Specifications. Limits of concrete removal and replacement shall be approved by the Engineer prior to work.

All concrete used for surface restoration in public right-of-way shall be included in the appropriate bid items of these Special Provisions.

The quantity of concrete shown on the Proposal is for bidding purposes only. The unit price indicated will not be adjusted because the actual quantity varies from the quantity shown on the Proposal.

Payment shall be at the unit price bid per square foot of concrete to remove and replace and shall include full compensation for furnishing all labor, material, tools, equipment, incidentals and for performing all work necessary to complete this item in place in accordance with these Special Provisions, the City Standard Specifications and as directed by the Engineer.

Item No. 18 Water Quality to Provide

This item shall consist of furnishing, installing, and maintaining water quality control elements associated with this project in accordance with these Standard Specifications. Also included in this item is the preparation and implementation of the SWPPP as described in section 1.13 of these specifications.

Payment shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment, processing and incidentals and for doing all work involved in designing, placing and maintaining in effective condition all erosion, sediment and pollution control BMPs as specified in these Special Provisions, and as directed by the Engineer.

Item No. 19 – Furnish and Install 14-inch Magnetic Flow Meter

This item shall include all work shown on the drawings and outlined in the specifications necessary to furnish and install a 14-inch flow meter on the proposed 14-inch water main. This item also includes furnishing and installing the flow meter transmitter.

Specifications for this work are found in the Appendix of these Special Provisions.

Payment shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in this item.

Item No. 20 – Furnish and Install Concrete Vault

This item shall include all work shown on the drawings and outlined in the specifications necessary to furnish and install the concrete vault. Specifically, this work shall include but not be limited to furnishing and installing concrete vault, excavation to place the vault, access hatch, sump pump and associated piping, pipe supports, hoist sleeves, ladders and ladder safety posts extensions.

Specifications for this work are found in the Appendix of these Special Provisions.

Payment shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in this item.

Item No. 21 - Electrical Improvements

The work to be performed for this item includes, but is not limited to, furnishing and installing all necessary electrical equipment and instrumentation and materials for the PH sensor, conductivity sensor, analyzer, instrumentation, PLC System, service pedestal, antenna, antenna pole, conduits, conductors, and all appurtenances to perform the work as indicated on the drawings and called for in these Special Provisions. This item also includes all work involved with making all electrical connections for the flow meter and testing as shown on the drawings and specified in the contract documents.

Specifications for this work are found in the Appendix of these Special Provisions.

Payment shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in this item.

Item No. 22 - Potholes

This item shall consist of potholing at the locations indicated on the Plans or as directed by the Engineer.

The quantity of potholes as shown on the Proposal is for bidding purposes only. The unit price indicated will not be adjusted because the actual quantity varies from the quantity shown on the Proposal. If it is not necessary to pothole then the quantity shown for this item will be deleted.

Some pothole information was obtained in August 2006. The results can be found in Appendix B and are also in the profile view of the plans.

Payment shall be at the contract unit price bid per each pothole and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place.

Item No. 23 Traffic Loop Modifications

This item shall consist of furnishing and installing all necessary equipment and materials to modify the detector loops as shown on the plans and described in these Special Provisions.

Payment shall be at the contract lump sum price bid and shall include full compensation for furnishing all labor, materials, tools and equipment, and for performing all work necessary to complete this item in place, including installing conduits, detector loops, detector cables and Type B detector handholes.

Item No. 24 Traffic Control

This item shall consist of furnishing, installing, and maintaining traffic control elements associated with this project in accordance with these special provisions. This work shall also include furnishing and installing two Changeable Message Signs as specified in these Special Provisions and as directed by the Engineer. The signs shall remain on site and operational for the duration of the project with the location to be approved by the Engineer. Contractor shall submit the language to be included on the message to the City for review.

Payment shall be at the lump sum price bid and shall include full compensation for furnishing all labor, materials, tools, equipment, processing and incidentals and for doing all work involved in designing, placing and maintaining traffic control elements as specified in these Special Provisions, and as directed by the Engineer.

END OF SECTION

APPENDIX A

SECTION	TITLE
<u>DIVISION 1 - GENERAL REQUIREMENTS</u>	
01410.....	QUALITY CONTROL
01780.....	OPERATION AND MAINTENANCE DATA
01750.....	TESTING, TRAINING AND FACILITY STARTUP
<u>DIVISION 2 - SITE CONSTRUCTION</u>	
02315.....	EARTHWORK
<u>DIVISION 3 - CONCRETE</u>	
03150.....	CONCRETE ACCESSORIES
03200.....	CONCRETE REINFORCEMENT
03300.....	CAST-IN-PLACE CONCRETE
03431.....	PRECAST CONCRETE VAULT
<u>DIVISION 5 - METALS</u>	
05451.....	ANCHOR BOLTS
05500.....	METAL FABRICATION
<u>DIVISION 8 - DOORS AND WINDOWS</u>	
08600.....	ALUMINUM ACCESS HATCH
<u>DIVISION 15 – MECHANICAL</u>	
15121.....	PIPE COUPLINGS
15135.....	SUBMERISBLE PUMPS
15201.....	VALVE ACTUATORS
<u>DIVISION 16 – ELECTRICAL</u>	
16010.....	ELECTRICAL WORK
16110.....	RACEWAY SYSTEMS
16120.....	LOW VOLTAGE WIRE AND CABLE
16922.....	MISCELLANEOUS EQUIPMENT
16950.....	OPERATIONAL TESTING
17100.....	PROCESS CONTROL & INSTRUMENTATION SYSTEMS
17101.....	INSTRUMENTATION
17102.....	FLOW MEASURING SYSTEM
17520.....	RTU/PLC SYSTEM

**SECTION 01410
QUALITY CONTROL**

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Cooperate with the Engineer's selected testing agency and all others responsible for testing and inspecting the work as described herein.
2. Payment for specified initial testing: The City will only pay for **initial** material strength testing of items described in 1.02 TESTING DESCRIPTION, subparagraph A.1, herein. Contractor shall be responsible to pay for all other testing.

1.02 TESTING DESCRIPTION

A. Material Strength:

1. The City will only pay for initial testing services for concrete strength and slump, soil compaction, and grout strength.
2. When initial tests indicate non-compliance with the Contract Documents, the costs of any additional tests required for determining compliance will be deducted by the City from the Contract Sum as reflected in the progress payments due the Contractor.

B. Operational Testing: All operational tests shall be paid for by the Contractor.

1.03 REFERENCES

ANSI/ASTM D3740	Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
ANSI/ASTM E329	Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY

- A. Representatives of the testing laboratory shall have access to the work at all times and at all locations where the work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.02 TAKING SPECIMENS

- A. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

**** END OF SECTION ****

**SECTION 01780
OPERATION AND MAINTENANCE DATA**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Requirements Included:
1. Compilation of product data and related information required for maintenance of products.
 2. Preparation of operation and maintenance data and instructions for systems and equipment.

1.02 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT

- A. Prior to system and equipment tests, one (1) complete, bound copy of the data in the form of an instructional manual shall be submitted for approval. Provide four (4) copies of the manual, with all applicable test forms completed, prior to the completion of the contract. One of the four copies shall contain the original documentation/manuals and not photocopies.
- B. Binders: Commercial quality, 8-1/2 X 11 inch three-ring binders with hardback, cleanable, plastic covers; two inch (2") maximum ring size: equal to Avery D-Ring binder model number AVY79-799. When multiple binders are used, correlate data into related consistent groupings. (Fill binders no more than ¾ full.)
- C. Spine and Cover: Identify each binder with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS": List title of Project and identify subject matter of contents on each.
- D. Arrange content by systems, under section numbers and sequence of Table of Contents of this Project Manual.
- E. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages. Also include electronic copy of drawings (preferably in latest version of AutoCAD).

- H. Provide one (1) copy of the manual in electronic format. (Text: Corel Word Perfect, version 9 and/or Microsoft Word/ Office 2000, or Adobe format (PDF) and Drawings: AutoCAD/Release 14 or Adobe format (PDF), all on CD.)

1.04 CONTENTS, EACH VOLUME

- A. Provide a Table of Contents: Provide title of Project; names, contract number, addresses, and telephone numbers of Design Engineer and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. For Each Product or System: List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly highlight and identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- F. Warranties and Bonds: Bind in copy of each.
- G. Date system or equipment installed.

1.05 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture-protection and Weather-exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

- D. Additional Requirements: As Specified in individual Specifications sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Provide operation and maintenance manual in conformance with Section 01330 and requirements herein. Include instruction for all seasonal maintenance.
- B. Use operation and maintenance manuals as basis of training or Owner's personnel.
- C. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during any training of Owner's personnel.

1.08 SUBMITTALS

- A. Submit two (2) copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by City, submit documents within ten days after acceptance. Mark or highlight specific part numbers.
- C. Submit one (1) copy of completed volumes in final form fifteen (15) days prior to final inspection. Copy will be returned after final inspection with Design Engineer comments. Revise content of documents as required prior to final submittal.
- D. Submit two (2) copies of revised volumes of data in final form within ten (10) days after final inspection.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

**** END OF SECTION ****

**SECTION 01750
TESTING, TRAINING, AND FACILITY START-UP**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Equipment and system testing and start-up, services of manufacturer's representatives, training of City personnel, and final testing requirements for the completed facility.

1.02 CONTRACT REQUIREMENTS

- A. Testing, training, and start-up are requisite to the satisfactory completion of the Contract. Testing, training, and start-up shall be completed within the Contract Time. Allow realistic time frame for testing, training, and start-up activities. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing functional testing, performance testing, and operational testing. Provide competent, experienced technical representatives of equipment manufacturers for assembly, installation and testing guidance, and operator training.

1.03 START-UP PLAN

- A. Submit start-up plan for each piece of equipment and each system not less than three (3) weeks prior to planned initial equipment or system start-up.
1. Provide detailed information and schedule for the following activities:
 - a. Manufacturer's services
 - 2.05.1** Installation certifications
 - 2.05.2** Operator training
 - 2.05.3** Completion of Operation and Maintenance Manual
 - 2.05.4** Functional testing
 - 2.05.5** Performance testing
 - 2.05.6** Operational testing
- B. Provide testing plan with test logs for each item of equipment and each system when specified. Include testing of alarms, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters.
- C. Provide summary of shutdown requirements for existing systems which are

necessary to complete start-up of new equipment and systems.

1.04 PERFORMANCE TESTING

- A. Test equipment for proper performance at point of manufacturer of assembly when specified.
- B. When Source Quality Control Testing is Specified:
 - 1. Demonstrate equipment meets specified performance requirements.
 - 2. Provide certified copies of test results.
 - 3. Do not ship equipment until certified copies have received written acceptance from Engineer. Written acceptance does not constitute final acceptance.

1.05 GENERAL START-UP AND TESTING PROCEDURES

- A. Mechanical Systems:
 - 1. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
 - 2. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to insure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
 - 3. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
- B. Electrical Systems: As specified in Division 16.
- C. Instrumentation Systems: As specified in Division 16.

1.06 FUNCTIONAL TESTING

- A. Functionally test mechanical and electrical equipment for proper operation after general start-up and testing tasks have been completed.
- B. Verify compatibility of new equipment with existing: Demonstrate proper, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration.
- C. Perform initial checks in the presence of and with the assistance of manufacturer's representative.

- D. Demonstrate proper operation of each instrument loop function as specified in Division 16.

1.07 CERTIFICATION OF PROPER INSTALLATION

- A. At completion of functional testing, furnish written report prepared and signed by manufacturer's authorized representative, certifying equipment:
 - 1. Has been properly installed, adjusted and aligned.
 - 2. Is free of any stresses imposed by connections or anchor bolts.
 - 3. Controls, protective devices, instrumentation, and control panels are properly installed, calibrated, and functioning, as designed.
 - 4. Control logic for start-up, shutdown, sequencing.
- B. Co-sign the reports along with the manufacturer's representative and subcontractor.

1.08 TRAINING OF OWNER'S PERSONNEL

- A. Provide at least four (4) hours of training, at agreed upon times, to designated Owners personnel in operation, adjustment, and maintenance of products, mechanical, electrical, instrumentation equipment, and installed items. Utilize manufacturer's representatives to conduct training sessions.
- B. Provide Operation and Maintenance Manual for specific pieces of equipment or systems two (2) weeks prior to training session for that piece of equipment or system.
- C. Satisfactorily complete functional testing before training Owner's personnel.
- E. Schedule training sessions during the hours of Monday – Friday: 7 a.m. – 12 p.m.; and/or 1 p.m.-3:30 p.m.

1.09 OPERATIONAL TESTING

- A. Conduct operational test of the improvements after completion of operator training. Demonstrate satisfactory operation of equipment and systems in actual operation. Conduct operational test for continuous seven (7) day period.
- B. Immediately correct defects in material, workmanship, or equipment which became evident during operational test.

- C. Repeat operational test when malfunctions or deficiencies cause shutdown or partial operation of the facility or results in performance that is less than specified.

1.10 RECORD KEEPING

- A. Maintain and submit following records generated during start-up and testing phase of project:
 - 1. Daily logs of equipment testing identifying all tests conducted and outcome.
 - 2. Logs of time spent by manufacturer's representatives performing services on the job site.
 - 3. Equipment lubrication records.
 - 4. Electrical and instrumentation test results as required in Division 16.

**** END OF SECTION ****

**SECTION 02315
EARTHWORK**

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, grading, and compaction, regardless of type or class, that is required to complete the work shown on the drawings and specified herein. The work shall include, but not necessarily be limited to: clearing; excavation for structures, footings, fence posts, hand holes, pull boxes, duct, conduit, pipe, and paving; backfilling; filling; embankment construction; grading; disposal of surplus and unsuitable materials; and all related work such as dust control, sheeting, shoring, bracing, and control of water.

1.02 DEFINITIONS

- A. Relative compaction: The measured field dry density divided by the maximum dry density determined in accordance with ASTM D1557, expressed as a percentage.

- B. Prepared Subgrade: Any excavated or graded surface formed as the result of work by the Contractor upon which any fill, aggregate base, sand, gravel, structure, or other material is to be placed.

1.03 REFERENCE PUBLICATIONS

A. The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Unless otherwise indicated, the latest edition of referenced publications in effect at the time of the bid shall govern.

American Society of Testing Materials (ASTM)	
ASTM D1557	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using a 10-lb Rammer and 18-inch Drop

ASTM D2487	Test Method for Classification of Soils for Engineering Purposes
ASTM D2922	Density of Soil and Soil Aggregate in place by Nuclear Methods
ASTM D3017	Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods
ASTM D4318	Liquid Limit, Plastic Limit and Plasticity Index of Soils
State of California - Department of Transportation	
Caltrans	1992 Standard specifications
City of Sacramento	
CSSS	Standard Specifications, latest edition

1.04 SUBMITTALS:

A. Submit the following for approval in accordance with Section 01330, SUBMITTALS:

1. Test Reports of measured fill/ backfill/ or embankment density, moisture, and relative compaction.
2. Samples and index property test results indicating conformance with the specifications of each imported material and any embankment fill material proposed for use. Contractor shall notify the Engineer of the source of the material and shall furnish for approval to the inspector a representative sample weighing approximately 50 pounds, at least 10 calendar days prior to the date of anticipated use of such material.

PART 2 - PRODUCTS

2.01 GENERAL

A. Materials shall meet requirements of City of Sacramento Standard Specifications.

PART 3 - EXECUTION

3.01 GENERAL EARTHWORK REQUIREMENTS

A. Construction, including excavation, backfill, compaction, dewatering, and bracing systems, shall conform to the plans and these specifications.

3.02 EXCAVATION

- A. Excavate to the lines and grades shown or required to complete the construction. Make allowance for forms, supports, etc.
- B. If over-excavation occurs due to Contractor error, at any foundation, or where proposed structures will bear thereon, or at the bottom of any channel, over-excavated areas will be filled to finish subgrade with Controlled Density Fill, properly leveled to finish lines and grades.
- C. Side slopes of excavations shall be no steeper than the safe stable slope for the soils encountered.
- D. If, at the time of excavation, it is not possible to place material in its intended permanent location, then the material shall be stockpiled in approved areas for later use. No extra payment will be considered for stockpiling or double handling of excavated material.

3.03 BACKFILL

- A. Backfill for laying pipe shall be in accordance with CSSS and these specifications.
- B. Shape excavated trench bottom to assure uniform contact with the full length of the installed line and remove any sharp edged materials that might damage the line. Compaction shall be maintained beneath the line. Place initial backfill by hand placement around the utility to just over half depth, and compact in a manner to insure against lateral or vertical displacement. Place initial backfill to 6 inches above the utility line by hand placement.
- C. No fill shall be placed during weather conditions for which the Contractor cannot insure the specified compaction. After placing operations have been stopped because of adverse weather conditions, no additional fill material shall be placed until the last layer compacted has been checked and found to be compacted to the specified density.
- D. Independent testing may be made on each layer to assure adequate compaction throughout the entire area. If the dry densities are not satisfactory to the Engineer, the Contractor will be required to increase the weight of the compactor or the number of passes as required to produce the specified densities.

- E. Backfill shall not be placed against walls until the concrete has obtained a compressive strength equal to the specified 28 day compressive strength. Where backfill is to be placed on both sides of the wall, the backfill shall be placed simultaneously on both sides to prevent differential pressures. The Contractor shall submit a schedule of wall shoring, bracing, and backfilling that is coordinated with the concrete curing, test cylinder reports, and the design assumptions, and obtain approval from the Engineer prior to proceeding.

3.04 COMPACTION:

- A. Embankment Fill, Engineered Fill, Backfill, and Trench Backfill shall be compacted to at least 90 percent relative compaction.
- B. The uppermost 0.5-feet of the prepared subgrade beneath all paving and/or gravel surfacing placed this contract, whether in an excavated, original grade, filled, or backfilled area, shall be compacted to at least 95 percent relative compaction.
- C. Do not place any form work, concrete, or surfacing material until underlying compaction tests are satisfactory to the Engineer.

3.05 GRADING AND SURFACE FINISH WORK:

- A. Grading shall be performed at such places as are required to obtain the final lines, grades and elevations shown on the Drawings. All unacceptable material encountered, of whatever nature within the limits of grading, shall be removed and disposed off site.
- B. All fill slopes shall be compacted by slope rolling and trimming, or shall be overfilled and trimmed back to planned grade, to expose a firm, smooth surface free of loose material.
- C. Prepare landscaped areas for proper planting of previously removed plants or new plants. Remove trench and backfill materials from adjacent areas to permit unhindered growth of plants. Replace all damaged existing plant material to original or better condition. Planted areas that do not reestablish at the commencement of the next growing season shall be replaced at Contractor's cost.
- D. Cleanup: Prior to final inspection and acceptance, remove all rubbish and excess material for disposal as approved, and leave area in a neat,

satisfactory condition.

3.08 DISPOSAL

- A. All surplus excavated and imported material not utilized in the construction shall be removed and disposed of off site.

****END OF SECTION****

**SECTION 03150
CONCRETE ACCESSORIES**

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preformed expansion joint material.

1.02 SUBMITTALS

A. Product Data:

1. Preformed Expansion Joint Material: Submit sufficient information on each type of material for review to determine conformance of material to requirements specified.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Preformed Expansion Joint Material:

1. Use specific type in any application as indicated on the Drawings.
2. Thicknesses and Dimensions of Materials: Shall be as indicated on the Drawings or as required according to the way joint material is used.
3. Bituminous Fiber Type: Manufacturers: One of the following or equal:
 - a. Tammstech, Inc., Hornboard/fiber
 - b. Burke Concrete Accessories Inc., Fiber Expansion Joint

PART 3 - EXECUTION

3.01 INSTALLATION

A. Joints:

1. Construct expansion, contraction, and construction joints as

- indicated on the Drawings.
2. Prefomed Expansion Joint Material: Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.

**** END OF SECTION ****

**SECTION 03200
CONCRETE REINFORCEMENT**

PART 1 - GENERAL

1.01 DESCRIPTION: Provide reinforcing steel as shown on the Plans.

1.02 REFERENCE PUBLICATIONS

- A. The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of publications at the time of bid shall govern.
- B. American Concrete Institute (ACI) Standard

ACI 318	Building Code Requirements for Reinforced Concrete.
ACI SP-66	ACI Detailing Manual.

- C. American Welding Society (AWS):

AWS D 12.1	Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
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- D. City of Sacramento Standard Specifications (CSSS):

Section 10-25	Reinforcing Steel
Section 21	Placing Steel Reinforcement

- F. Concrete Steel Reinforcing Institute (CRSI):

1MSP	Manual of Standard Practice(1997)
1SPLBK	Reinforcement Anchorages and Splices(1997)
1DET	Reinforcing Bar Detailing(2000)
1PLACE	Placing Reinforcing Bars(1997)

1.03 SUBMITTALS

A. Shop Drawings:

1. Reinforcing Steel: Before starting concrete work, submit shop drawings in accordance with Section 01330-SUBMITTALS. Comply with requirements of ACI 318, ACI SP-66, CRSI 1MSP, CRSI 1SPLBK, and CRSI 1DET. Show bar size, dimensions, bends, placing, and construction joint details. Submit drawing showing locations of any construction joints not shown on the plans. Maximum submittal drawing size shall be 22-inches by 34-inches. Submit type, size, and location of all slab and bar supports. Hooks, lap splices, bends and offsets shall be in accordance with the drawings. Obtain approval before shop fabrication.

B. Certificates of Compliance:

1. Submit Certificate of Compliance stating that reinforcement complies with specified requirements. Reinforcing steel shall be properly identified. Contractor shall bear costs for test of steel by an approved laboratory if the reinforcing steel is not properly identified.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Conform to CSSS Section 10-25 except as modified herein. All materials covered by this Section shall be manufactured in the United States.
- B. Supports for reinforcing bars: Galvanized steel chairs and accessories or plastic coated units for work exposed to view, weather, or moisture so that finished surfaces will not be marred or stained; use precast concrete only (no metal), suitably sized for load distribution, in slabs-on-grade. Use no supports of wood or other cellulose material. Do not expose supports or accessories to view in architectural concrete.

PART 3 - EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Prior to installation of reinforcing steel work, Contractor shall inspect surfaces to receive work, and arrange for satisfactory correction of defects in workmanship and material that could have adverse affect on reinforcing steel work.

3.02 FABRICATION AND DELIVERY

- A. General: Conform to CSSS Section 21 except as modified herein.
- B. Bending and Forming: Fabricate indicated size bars into shapes and lengths shown on approved shop drawings by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not in schedule will be rejected.
- C. Marking and shipping: Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material.

3.03 INSTALLATION

- A. General: Conform to CSSS Section 21, CRSI 1MSP, and CRSI 1PLACE except as modified herein.
- B. Reinforcement Welding: Where reinforcement welding is approved by the Engineer, perform welding by direct electric arc process, with trained and experienced certified operators. Conform to AWS D12.1. Use low-hydrogen electrodes. Do not tack weld reinforcing bars.
 - 1. Preparation: Clean surfaces to be welded of loose scale and all foreign material. Clean welds each time electrode is changed. Chip burned edges clean before welds are deposited.
 - 2. Characteristics of welds: When brushed with wire brushes, completed welds shall exhibit uniform section, smoothness of welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion with penetration into base metal. Cut out welds, or parts of welds found defective, and replace with proper welds.

- C. Concrete pours: At each location during concrete placing, inspect reinforcement and maintain bars in correct positions. Templates to maintain the correct position of reinforcing may be required. Contractor shall install templates, if required by the inspector, at no additional cost to the City.
- D. Contractor shall receive approval in writing from the Engineer of all reinforcing work prior to ordering concrete for placement.

****END OF SECTION****

**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Scope of Work:

1. Unless otherwise directed, provide concrete as specified herein and as shown on the plans.

1.02 REFERENCE PUBLICATIONS:

A. The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of publications in effect at the time of bid shall govern.

B. American Concrete Institute (ACI) Standard:

ACI SP-15	Field Reference Manual: Standard Specifications for Structural Concrete with Selected ACI and ASTM references.
ACI 211	Recommended Practice for Selecting Proportions for Concrete.
ACI 301	Structural Concrete for Buildings.
ACI 302	Guide for Concrete Floor and Slab Construction.
ACI 304	Recommended Practice for Measuring, Mixing and Placing Concrete.
ACI 305	Hot Weather Concreting.
ACI 306	Cold Weather Concreting.
ACI 309	Consolidation of Concrete.
ACI 318	Building Code Requirement for Reinforced Concrete, with Commentary.

C. American Society for Testing and Materials (ASTM) Standards:

ASTM C 31	Method of Making and Curing Concrete Test Specimens.
ASTM C 33	Concrete Aggregates.
ASTM C 39	Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 94	Ready Mixed Concrete.
ASTM C 143	Slump of Portland Cement Concrete.
ASTM C 150	Portland Cement.
ASTM C 171	Sheet Materials for Curing Concrete.
ASTM C 172	Method of Sampling Freshly Mixed Concrete.

ASTM C 192	Making and Curing Concrete Test Specimens in the Laboratory.
ASTM C 227	Test for Potential Alkali Reactivity of Cement-Aggregate Combinations.
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method.
ASTM C 260	Air Entraining Admixture for Concrete.
ASTM C 289	Test of Potential Reactivity of Aggregates.
ASTM C 295	Petrographic Examination of Aggregates.
ASTM C 309	Liquid Membrane Forming Compounds for Curing Concrete.
ASTM D 98	Calcium Chloride.

ASTM D 1785	Poly (Vinyl Chloride) PVC Plastic Pipe, Schedules 40, 80 and 120.
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D. City of Sacramento Standard Specification (CSSS):

Section 10	Construction Materials.
Section 20	Concrete in Structures.

1.03 CONDITIONS

- A. Notes pertaining to concrete on the Plan sheets are a part of these Specifications.
- B. Testing: Comply with the requirements of the CSSS.

1.04 SUBMITTALS

A. MANUFACTURER'S DATA

- 1. Proposed mix designs, including admixtures
- 2. Curing Material

B. Certificates:

- 1. Submit Certificate of Compliance that concrete meets the specified requirements.
- 2. Delivery tickets for all concrete delivered to the project site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland cement: ASTM C150, Type II or Type III.

- 1. Concrete: Standard gray cement. Use same brand for surfaces not to be painted.

B. Water: Clean and free of substances injurious to concrete.

C. Aggregate:

1. Do not use aggregates that are alkali reactive when tested by ASTM C227, C289, or C295.
2. Unless otherwise noted, maximum coarse aggregate size shall be 1½-inches for walls and slabs greater than or equal to 12-inches thick, and 1-inch for walls and slabs less than 12 inches thick.
3. Provide hard, washed, fine and coarse aggregates conforming to ASTM C33, including requirements for sampling and testing, except that loss after 500 revolutions in Los Angeles machine shall not exceed 40%. Limit material finer than No. 200 sieve to a maximum of 3% of the fine aggregate.

D. Non-shrink grout: Master Builders premixed "Embeco", Burke's "Metallic Grouting Compound"; Sonneborn-Desoto "Ferrolith-G", or approved equal.

E. Curing materials:

1. Liquid curing compound: ASTM C309, Type 1 (Clear) containing a fugitive dye.
2. Sheet material: Double-layered, reinforced, stainproof, waterproofed Kraft paper, ASTM C171, regular type.

F. Admixtures:

1. General: Provide only as indicated below. Submit manufacturer's data for admixtures, and use only those approved by Engineer. Use shall be in accordance with the manufacturer's recommendations.
2. Water reducing: "Plastocrete", Sika Chemical Corporation; "WRDA with Hycol", W.R. Grace, or approved equal. Conform to ASTM C49A, Type A. Use in all mixes.
3. Retarding: "Plastiment", Sika Chemical Corporation, or approved equal. Use for hot weather concreting only.

G. Concrete overlay bonding materials: Burke Acrylic Bondcrete or equal.

2.02 DESIGN OF MIXES

A. General: The Contractor shall be responsible to design concrete mixtures resulting in the required 28-day compressive strength and other required characteristics. An approved laboratory shall design all mixes. Comply with ACI

211 "Recommended Practice for Selecting Proportions for Concrete" and ACI 304 "Recommended Practice for Measuring, Mixing and Placing Concrete" to produce plastic, workable mixture suitable for concrete work indicated, which will develop required compressive strengths, as indicated.

- B. Mix for conduit encasement: Concrete mix shall be Class D and contain a minimum of 5 sacks (470 pounds) of Portland cement per cubic yard. The maximum water/cement ratio shall be 0.50. The Contractor shall add red oxide, in the amount of 5 lbs. per cubic yard, to all concrete used for conduit encasement.
- C. Mix for antenna foundations, generator pads, building foundations and housekeeping pads, retaining walls, and footings: Concrete mix shall be Class B and contain a minimum of 6 sacks (564 pounds) of Portland cement per cubic yard. The compressive strength at 28 days shall be 4,000 psi. The maximum water/cement ratio shall be 0.50.
- D. The maximum slump for concrete shall be 4 inches. A tolerance of one inch above the maximum slump will be allowed, provided that the average of all batches is less than the specified maximum slump. Batches of concrete with slumps in excess of those specified will be rejected if their frequency of occurrence is excessive or the Contractor fails to take corrective action to reduce their occurrence. No water shall be added to the approved mix after batching except as approved by the Engineer.
- E. Batching and mixing: Use transit-mixed concrete from approved batch plant. Batching, mixing, and transportation of concrete shall conform to ASTM C94.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Embedded items: Includes installation of work built into concrete such as waterstop sleeves, anchor bolts, wood nailers, reglets, frames and sleeves for piping, conduit and fittings specified under other divisions. Provide facilities and supervision required for installation of inserts specified under other Sections, and perform cutting and reinforcing of forms required to accommodate them. Do not place any concrete until all inserted items are installed in their proper locations, secured against displacement, cleaned, inspected and approved. Furnish ties and supports necessary to keep embedded items in place when concrete is placed.

- B. Clean Up: Remove excess water from forms before concrete is deposited. Remove hardened concrete, debris, and foreign materials from interior of forms and from surfaces of mixing and conveying equipment.
- C. Wetting: Prior to placing concrete, wet wood forms sufficiently to tighten up cracks. Wet all other materials sufficiently to reduce suction and maintain concrete workability.
- D. Earth or Gravel Subgrade: Lightly dampen subgrade no more than 24 hours in advance of concrete placement, but do not muddy. Reroll where necessary for smoothness and remove loose earth material.
- E. Screeds (Flatwork): Set screeds at walls and at maximum of 8-foot horizontal distance between adjacent screeds.
- F. Weather: Do not place concrete during rainy weather unless approved measures are taken to prevent damage to concrete. Cure concrete placed during periods of dry winds, low humidity, high temperatures and other conditions causing rapid drying, initially with a fine fog spray of water applied immediately after finishing and maintained until final curing operations are begun. Comply with the following:
 - 1. Hot weather: ACI 305
 - 2. Cold weather: ACI 306
 - 3. Pumping concrete: Maintain close observation of ambient temperature both at pump location and at discharge end. Allow for wide variance of temperature change.

3.03 PLACING

- A. Formed concrete: Place concrete after subgrade, forms, and reinforcement has been approved. Limit free vertical drop in concrete walls or columns to three (3) feet. In other concrete, limit the drop to five (5) feet. Deposit concrete in horizontal layers not more than 18" deep and continue pouring until section is completed. Control rate of pouring and depth of layers so that each layer will be covered within one hour after it is poured. Pour columns to top and allow to settle two (2) hours before additional concrete is placed. Place concrete continuously between pour joints.

- B. Grouting: Grout mix shall be regular concrete mix with ½ the large aggregate omitted. Use to cover the following before additional concrete is placed:
1. Flat form surfaces next to congested steel.
 2. Construction joints.
 3. Top of column and wall footings.
 4. On surfaces where concrete has set.
- C. Vibration and tamping: As concrete is placed in forms, work concrete around reinforcing steel, built-in items and into corners and angles. Extra care shall be given to work architectural concrete around inserts, reveals, quirks, corners and plastic cones of ties to preclude rock pockets, air pockets, and other defects, and to produce sharp corners, edges and smooth surfaces. Provide mechanical vibrators operated by experienced employees for agitating concrete in forms. Vibrate thoroughly within five (5) minutes after layer is placed. Carry vibration well into previous layer. Vibrators shall not be used to transport concrete inside forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when submerged in concrete. Supplement vibration by suitable methods to eliminate voids along forms for full depth of layer as directed. Do not allow vibrators to strike overlaid plywood surfaces. Do not use vibrators to work concrete along forms. Keep at least one spare vibrator on job at all times while concrete is being placed. Comply with ACI Committee 309 consolidation of Concrete, Committee Report.
- D. Stoppage: Upon completion of a pour and after concrete has partially hardened, wash scum or laitance off surface with stiff brush and stream of water. When work is resumed, brush clean with wire brushes or sandblast, then place fresh concrete.
- E. Pumped concrete: Do not place concrete by pumping without prior written approval of the Engineer.
1. General: Do not use aluminum or aluminum lined pipe. Prevent concrete from contacting aluminum fittings.
 2. Mix: Do not add more water to mix unless approved by the Engineer. Check that the mix design entered on delivery ticket complies with that ordered.
 3. Pumps: Use only piston type pumps. Insure they are reversible. Make a standby pump available of no less capacity than that in use for operation at the job within one hour's notice.

3.04 CONSTRUCTION JOINTS

- A. The location and design of joints not shown or specified are subject to approval of the Engineer prior to placement of concrete.
- B. Horizontal Joints: Where joints occur in exposed concrete, set smooth painted wood strips in form to provide a straight and level joint in which upper pour laps lower pour. Place concrete level with, but not above top of pour joint strip as shown on Drawings. Allow 24 hours before concrete is placed over horizontal joints. Remove loose material and laitance. Clean by sandblasting, or wire brushing. Allow enough time between placing of adjacent pour sections to provide for initial shrinkage. Horizontal joints will not be allowed in beams, girders and slabs unless otherwise indicated.
- C. Vertical joints: Vertical joints not shown on the Drawings shall be so made and located as to least impair the strength of the structure and shall be approved by the Engineer prior to placement of concrete.

3.05 REPAIRS AND PATCHING

- A. General: Patch defective areas immediately following form removal. Remove honeycombed and other defective concrete to sound concrete, but not less than 1" deep. Make the walls of the cut area perpendicular to the surface. Do not feather out the edges. Dampen the patch area and the adjacent area six (6) inches around the patch area.
- B. Exposed concrete: For exposed concrete prepare a patching mortar of one part portland cement adjusted to match the color of the surrounding concrete and 2-1/2 parts sand with the least water required to produce a workable mass. Rework this mortar until it is the stiffest consistency that will permit placing. Brush the patch area with a bond of neat cement and water paste and apply patching mortar when the water sheen is off the bond. Strike off the mortar slightly higher than the surrounding surface, let set for one hour and finish flush with the surrounding surface. Tie holes shall be cleaned, dampened and filled solid with the above specified patching mortar.

3.06 FINISHING FORMED SURFACES

- A. Finish formed surfaces by removing any and all fins. The tolerances of finished formed surfaces shall conform to ACI 301.

3.07 FLATWORK

- A. General: Place floor slabs on grade in alternate strips. Place each unit against construction joint forms with formed control joints perpendicular to the poured strips. Pour slabs-on-grade against a moist subgrade. Wet the subgrade the day before placing concrete. Moisten subgrade just ahead of concrete as it is placed. Do not place concrete in standing water. Provide new, clean cut, sharp-edged wood headers at construction joints of suspended slabs. Deposit concrete evenly, consolidated with mechanical vibrators, particularly at side forms, and screed to indicated elevations and contours. Maintain full indicated thickness of slab over all parts of cambered support. Concrete shall be compacted with a grid tamper to eliminate voids and pockets and to produce a uniformly dense slab. Where ground slabs are left to receive deferred finishes, provide protection against contamination from time of placing concrete until time of placing finish. Remove contamination mechanically leaving a clean surface.
- B. Joints: Location and detail shall be as indicated. Tooling is required at control and pour joints.
1. Control joints: After concrete surface is screeded, cut concrete with a cutting bar, or other approved tool, approximately ¼" thick x 2" deep. Form straight clean lines. After slot is formed in stiff concrete, insert 1/8" thick x 1-1/2" strip of tempered hardboard or plastic joint form zip strip. Butt strips neatly to line and flush with concrete surface. Finish slab flush with top of hardboard strips without tooling.
 2. Construction joints: Form construction joints with 2" nominal dressed lumber, or approved steel forms. Provide enough stakes to prevent sagging and misalignment under construction loads. Leave forms in place as long as possible and remove without chipping the edge of the slab. Protect the slab edge until the adjacent slab is placed.
 3. Expansion joints: Provide sponge neoprene joint filler where shown on the Drawings. Place filler to provide space for sealant as indicated. Seal joints with specified sealant per manufacturer's printed instructions. Thickness of filler material is indicated.
- C. SLAB FINISHING
1. Broom Finish: Contractor shall apply a medium broom finish just after final troweling to all flat slabs not specified to receive another finish.

2. Wood float: Where wood float finish is indicated, screed slabs to elevations indicated. Compact with motor driven disk type compactor float and bull float to smooth, even surface. Perform final finishing with wood hand floats to give finished surface uniform, slightly roughened texture.
3. Steel trowel: Where steel trowel finish is indicated, tamp fresh concrete with a grid tamper enough to raise a thin bed of mortar to surface. Before finishing, remove any excess water. Level and compact with motor drive disk type compactor float. Immediately after floating, the surface shall be further leveled and compacted with a motor driven rotary trowel with flat-pitched blades. Final troweling shall be done with steel hand trowel after surfaces have become hard enough to produce a hard, dense, smooth, burnished surface.

3.08 CURING AND PROTECTING

- A. General: Do not use any curing method which will be incompatible with the specified applied finishes.
- B. Initial curing: Begin initial curing with water immediately after the final finishing operation. Keep the concrete continuously wet at least overnight. Use one of the following curing methods:
- C. FINAL CURING:
 1. Water or paper curing, mandatory for bridge slabs: Where water curing is used, keep surfaces continuously wet for seven (7) days. Where paper curing is used, keep the paper in place without torn areas for at least ten (10) days. Seal all joints in paper with a suitable waterproof cement or tape.
 2. Mandatory hot/dry weather curing: Use water curing for the first 24 hours of the required curing period.
 3. Optional curing: Surfaces not specified to receive a mandatory curing method may be cured by water, membrane, or paper curing. Use clear curing compound for all membrane curing and paper curing. Water and paper curing to be as specified above.
- D. Formed surfaces: Wood forms left in place during the final curing period shall be kept tight, wetting if necessary. If forms are removed during the curing period, one of the specified curing methods, as approved by Inspector, shall be applied immediately and continued for the remainder of the curing period.

3.09 MISCELLANEOUS

A. GROUTING AND DRYPACKING

1. Grout: One (1) part cement, two (2) parts sand and sufficient water that the grout will just flow under its own weight. Water reducing and workable agent may be added at the Contractor's option.
2. Drypack: One (1) part cement, 2 parts sand, with just enough water to bind the materials together.
3. Installation: Dampen surfaces before grouting and slush with neat cement. Force grout into place and rod so as to fill all voids and provide uniform bearing under plates. Provide smooth finish on exposed surfaces and damp cure for at least three (3) days.

B. Non-shrink grout: Mix and place under structural steel base plates in accordance with manufacturer's printed instructions.

C. Bonding hardened concrete to freshly mixed concrete:

- 1) Clean surface thoroughly.
- 2) Roughen surface
- 3) Apply a bonding agent, either Sikadur 32 Hi-Mod Epoxy Adhesive, as manufactured by Sika Corporation, Concessive Liquid (LPL) as manufactured by Master Builders, or BurkEpoxy MV as manufactured by The Burke Company or equal.

3.10 QUALITY CONTROL

A. The Engineer shall be responsible for the routine quality control testing of concrete mixes.

B. Slump Test: Slump test shall be performed at the job site by the Engineer in accordance with ASTM Test Method C 143.

C. Compressive Strength Tests: Each day concrete is poured, the Engineer shall mold four concrete test cylinders in accordance with ASTM C31. City shall pay for the service of an independent testing company to cure and test the concrete cylinders in accordance with ASTM C39 and C172 unless samples fail to meet requirements, in which case Contractor shall pay for retesting done to the same requirements. Cylinders shall be tested at 7 days, 14 days, 21 days, and 28 days.

D. The Contractor shall assist the Engineer in obtaining samples of fresh concrete.

E. Methods of sampling and testing concrete mixtures shall include but not be limited to the following:

Composite Samples:	ASTM C172.
Specimen Preparation:	ASTM C31.
Compressive Strength:	ASTM C39.
Air content:	ASTM C173 or C231.
Slump:	ASTM C143.
Unit Weight:	ASTM C138

F. Evaluation and acceptance of concrete and concrete structures shall be in accordance with Chapters 17 and 18 of ACI 301.

****END OF SECTION***

**SECTION 03431
PRECAST CONCRETE VAULT**

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Scope of Work:

1. Precast concrete vault for flow meter and associated items.

1.02 QUALITY ASSURANCE:

1.021 Referenced Standards

- A. The publications referred to hereinafter form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition of publications in effect at the time of bid shall govern.
- B. American Concrete Institute (ACI) Standard:
- C. Cast In Place Concrete Section 03300.
- D. City of Sacramento Standard Specification (CSSS):

Section 10	Construction Materials.
Section 20	Concrete in Structures.

- E. PCI Design Handbook Precast and Prestressed Concrete.
- F. California Building Code

1.021 Qualifications:

- A. Provide units manufactured by plant which has regularly and continuously engaged in manufacturing of units of same type as those required for a minimum of 3 years.

- B. Assure manufacture's testing facilities meet requirements of ASTM E329.

1.03 CONDITIONS

- A. Notes pertaining to concrete on the Plan sheets are a part of these Specifications.
- B. Testing: Comply with the General and Special Conditions.

1.04 SUBMITTALS

- A. Submit shop drawings in accordance with the Special Provisions.
- B. Submit manufacturer's catalog data on precast concrete items. Show dimensions of vaults and thickness of walls, floors and top slabs. Show reinforcing steel. Show materials of construction by ASTM reference and grade.
- C. Certificates:
 - 1. Certification of manufacturer's testing facility qualifications.
- D. Submit manufacturer's design calculations and certification signed and sealed by a professional civil or structural engineer registered in the state of California that vault design and construction comply with the specified design load conditions and the referenced ASTM specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Manufacturers

Precast concrete vaults shall be manufactured by Brooks Products Inc., Utility Vault Company or Jensen Precast or approved equal.

2.02 DESIGN

- A. Design Requirements

- 1. Precast concrete vaults shall comply with ASTM C858 except as modified herein.
- 2. Design loads shall be in accordance with ASTM C857 except as modified herein. A minimum equivalent static soil pressure of 50 lb/ft³ shall be assumed.
- 3. Design shall also comply with the following restrictions:
 - a. The maximum reinforcement ration allowed is one-half the reinforcing ration that would produce a balanced strain condition.

- b. Earth pressure shall be converted to a horizontal pressure using a coefficient of earth pressure at rest of 0.5 and not a coefficient of active earth pressure.
- c. Include a live load of AASHTO HS 20 on vault.

- 4. Precast vault construction shall be in the form of monolithic wall rings. Do not use panel walls.
- 5. Minimum wall thickness shall be 8 inches. Design knockout wall panels to accommodate loading pressures defined above.
- 6. Design units and connections in strict accordance with ACI 318 , the PCI Design Handbook Precast.
- 7. Design shall ensure a minimum 1.25 factor of safety against flotation during a 100 year flood event.
- 8. Design units taking into account reduced cross section and openings

B. Cement shall be ASTM C150 Type II.

2.02 FABRICATION

- A. Do not fabricate units until shop drawings have been approved by Engineer and returned to Contractor and support locations have been field verified by Contractor.
- B. Manufacture, quality, dimension and erection tolerances of all units to be in accordance with both PCI MNL-116 and PCI Design Handbook Precast and Prestressed Concrete.
- C. Cast all members in smooth rigid forms which will provide straight, true members of uniform thickness and uniform color and finish.
- D. Finish all repairs smooth and to match adjacent surface texture and color.
- E. Vault aluminum access hatch and other embed items shall be cast with the concrete vault at the vault factory unless approved otherwise by the Engineer. Precast vault manufacturer shall coordinate with the access hatch manufacturer. Provide embedded items as shown on the Drawings unless prior approval is received from the Engineer to do otherwise.
 - 1. Cast lifting handles into units at or near support points. Remove lifting handles after units are erected.
- F. Cast openings larger than 6 inches square or 6 inches diameter in units at time

of manufacture. Make smaller openings by neat cutting or neat drilling by trades requiring them. Coordinate sizes and locations of all openings before fabrication of units.

- G. Openings or "knock outs" in precast concrete vaults shall be located as shown on the Drawings and shall be sized to sufficiently permit passage of the largest dimension of pipe and /or flange, in accordance with penetration details shown on the Contract Documents.
- H. Automatically weld headed studs and deformed bar anchors to members to provide full penetration weld between studs, bar anchors and members they are attached to.
- I. Weld steel shapes and plates per AWS D1.1 and reinforcing steel per AWS D1.4.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The bottom of the structure shall be placed on 12 inches of compacted, crushed rock base and graded to the elevation shown on the plans.
- B. Contractor to be responsible for maintaining structure as required to resist forces due to wind, erection, or any other source that may occur before structure is completed.
- C. Use only erection equipment adequate for placing units at lines and elevations indicated on Drawings. Do not damage units or existing construction during erection. Erect units using lifting handles cast into the units.
- D. Backfill and compact around the vaults using fill as specified in Section 2315.
- E. Vault joints shall be sealed using same materials as described in Section 25 of the CSSS.

****END OF SECTION****

**SECTION 05451
ANCHOR BOLTS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section specifies anchor bolts complete with washers and nuts. Unless otherwise specified, anchor bolts shall be hot-dip galvanized or type 304 stainless steel and shall conform to the equipment manufacturer's recommendations.

1.02 REFERENCES

- A. This section contains references to the following documents. They are a part of this section as specified and modified. The latest edition of referenced publications in effect at the time of the bid shall govern. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ANSI A58.1	Minimum Design Loads for Buildings and Other Structures
ASTM A36/A36M	Structural Steel
ASTM A307	Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A320/A320M	Alloy-Steel Bolting Materials for Low Temperature Service
UBC-97	Uniform Building Code

1.03 SUBMITTALS

- A. Submittals shall be provided in accordance with Section 01330 for all bolt systems not cast-in-place and shall include the following information.
 - 1. Data indicating load capacities.
 - 2. Chemical resistance.
 - 3. Temperature limitations.
 - 4. Installation instructions.
- B. Evaluation Report for expansion and wedge type anchors as specified in paragraph 3.04.
- C. Design calculations in accordance with Paragraph 2.03.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Anchor bolt holes in equipment support frames shall not exceed the bolt diameters by more than 25 percent, up to a limiting maximum oversizing of ¼ inch. Unless otherwise specified, minimum anchor bolt diameter shall be ½ inch.
- B. Expansion, wedge, or adhesive anchors set in holes drilled in the concrete after the concrete is placed will not be permitted in substitution for anchor bolts except where otherwise specified. Upset threads shall not be acceptable.

2.02 MATERIALS

- A. Anchor bolt materials shall be as specified below.

Material	Purpose	Specification
Stainless steel bolts, nuts, washers	Anchor bolts for pipe support anchors, ladders and discharge pipe straps	ASTM A320, Type 304 ^a

PART 3 - EXECUTION

3.01 GENERAL

- A. Fieldwork, including cutting and threading, shall not be permitted on galvanized items. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or isolators. Grouting of anchor bolts with nonshrink or epoxy grouts shall be in accordance with the bolt manufacturer's recommendations.

3.02 CAST-IN-PLACE ANCHOR BOLTS

- A. Anchor bolts to be embedded in concrete shall be placed accurately and held in correct position while the concrete is placed or, if specified, recesses or blockouts shall be formed in the concrete and the metalwork shall be grouted in place in accordance with Section 03300. The surfaces of metalwork in contact with concrete shall be thoroughly cleaned.
- B. After anchor bolts have been embedded, their threads shall be protected by grease and the nuts run on.

3.03 ADHESIVE ANCHOR BOLTS

- A. Use of adhesive or capsule anchors shall be subject to the following conditions:
 - 1. Approval from Engineer for specific application and from supplier of equipment to be anchored, if applicable.
 - 2. Anchor diameter and grade of steel shall be per contract documents or per equipment supplier specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease, and oils.
 - 3. Adhesive capsules of different diameters may be used to obtain proper volume for the embedment, but no more than two capsules per anchor may be used. When installing different diameter capsules in the same hole, the larger diameter capsule shall be installed first. Any extension or protrusion of the capsule from the hole is prohibited.
 - 4. All installation recommendations by the anchor system manufacturer shall be followed carefully, including maximum hole diameter.
 - 5. Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill.

6. Holes shall be blown clean with compressed air and be free of dust or standing water prior to installation.
7. Anchor shall be left undisturbed and unloaded for full adhesive curing period.
8. Concrete temperature (not air temperature) shall be compatible with curing requirements of adhesives per adhesive manufacturer. Anchors shall not be placed in concrete below 25 degrees F.

**** END OF SECTION ****

**SECTION 05500
METAL FABRICATIONS**

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Furnish all labor, materials, equipment and incidentals required to install shop fabricated metals items, as shown on the drawings and specified herein, including but not limited to: pipe supports, hoist sleeves, ladders and ladder safety posts extensions.

1.03 SUBMITTALS

- A. Manufacturer's certificate of compliance shall be submitted for approval on all materials and manufactured products provided under this specification.
- B. Shop drawings shall be submitted for approval in accordance with Section 01330: SUBMITTALS. Also submit for approval catalog cuts, templates and erection and installation details, as appropriate, for all metal fabrications. Submittals shall be complete in detail; shall indicate thickness, type grade, class of metal and dimensions; and shall show construction details, reinforcement, anchorage and installation with relation to the structure of which they are part.

1.04 REQUIREMENTS

- A. General: The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Items specified to be galvanized, shall be hot-dip processed after fabrication. Galvanizing shall be in accordance with ASTM A123, A153, A386 and A525, as applicable.
- B. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included.
- C. All bolts, anchors, supports, braces, connection and other items necessary for completion of the miscellaneous metal work shall be provided. Necessary lugs and brackets shall be provided so that the work can be assembled in a neat and substantial manner. Holes for bolts and screws shall be drilled or punched.

Burning of holes is prohibited. Poor matching of holes shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

- D. Dissimilar Materials: Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint conforming to MIL-C 18484 or to TT-V-51 or a coat of zinc chromate primer conforming to TT-P 645 to prevent galvanic or corrosive action.
- E. Workmanship: Miscellaneous metal work shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean, true lines and surfaces. Welding shall be continuous along the entire area of contact (except where tack welding is specifically shown on the drawings). Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces for work in place shall have a smooth finish, and exposed riveting shall be flush. Where tight fits are required, joints shall be milled to a close fit. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Work shall be executed and finished in accordance with approved drawings, cuts and details.
- F. Qualifications of Welders: Welding to or on structural steel or miscellaneous items of structural steel such as lintels and ladders shall be performed by certified welders
- G. Anchorage: Anchorage shall be provided where necessary for fastening metal items securely in place.
- H. Galvanized Materials: Unless otherwise indicated or approved, all exposed ferrous metal and structural steel shall be hot-dipped galvanized. Fabricated items shall be ground smooth at welded joints, edges, and corners and galvanized after fabrication.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Conformance to Requirements: Materials shall conform to the requirements specified for the particular item; and where these requirements are not specified

in detail, the materials shall be suitable for the intended usage of the item. The materials listed below shall conform to the respective specifications and other requirements as designated below:

1. Aluminum: Alloy 6061-T6, raised pattern plate, thickness as indicated, ¼ inch minimum.
2. Stainless steel bars, plates, bolts and nuts shall conform to ASTM A193 Type 316.
3. Structural carbon steel for riveted, bolted, or welded work shall conform to ASTM A36.
4. Steel pipe for structural use shall conform to ASTM A53.
5. Structural steel tubing for riveted, bolted or welded work shall conform to ASTM A500 or A501.
6. Steel nuts and bolts shall conform to ASTM A307.
7. Washers: Circular washers shall be flat and smooth and conform to ANSI B27.2, Type A. Beveled washers for American Standard beams and channels shall be square or rectangular, shall taper in thickness and shall be smooth. Washers shall conform to FF-W-84. Flat washers shall be suitable for the use intended.

2.02 FABRICATED ITEMS

- A. Pipe Supports: Supports shall be Grinell adjustable pipe saddle support or Standon Model S96 Flanged Cradle Pipe Support or approved equal. Support shall be hot dipped galvanized. Support shall allow removal of the flow meter without bracing of the existing system.
- B. Ladder:
 1. Materials shall be 6063-T5 aluminum alloy.
 2. Safety shall conform to local, State and Occupational Safety and Health Administration standards as minimum.
 3. Rungs:
 - a. Shall be one – inch minimum solid square bar with 1/8 inch grooves in top and deply serrated on all sides.
 - b. Capable of withstanding 1,000 pound load without failure.

4. Side Rails: Minimum 4 inch by ½ inch flat bars.
 5. Fabrication: Welded construction of size, shape, location, and details indicated on the drawings.
- C. Hoist Sleeves: Supply and install hoist sleeves as shown on the drawing. Sleeves shall be flush mounted as manufactured by Pulsue, Model DSP-C1 or approved equal.
- D. Ladder Safety Post Extensions: Shall be made of mill finish aluminum and allow for installation on ladder shown in the contract documents. Product shall be The BILCO Company, Model LLU -4 or approved
1. Furnish and install ladder safety post extensions where indicated on plans. The ladder safety post extensions shall be pre-assembled from the manufacturer.
 2. Performance characteristics:
 - a. Tubular post shall lock automatically when fully extended.
 - b. Safety post shall have controlled upward and downward movement.
 - c. Release lever shall disengage the post to allow it to be returned to its lowered position.
 - d. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" on center and clamp brackets to accommodate ladder rungs up to 1-3/4" in diameter.
 3. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
 4. Balancing spring: A alloy spring mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
 5. Hardware: All mounting hardware shall be Type 316 stainless steel.
 6. Finishes: Factory finish shall be mill finish aluminum.

PART 3 - EXECUTION

3.01 FABRICATION

A. All metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.

B.

3.02 GALVANIZING

- A. Galvanizing shall be performed by the hot-dip process after fabrication into the largest practical sections. The galvanizing shall conform to the requirements of ASTM A123. Fabrication shall include all operations such as shearing, punching, forming, bending, welding, riveting, etc. When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the spelter coating.

3.03 INSTALLATION

- A. Contractor shall be responsible for installation of all miscellaneous metal fabrications. Items to be attached to concrete after such work is completed shall be installed in accordance with the details shown. All dimensions shall be verified at the site before fabrication is started. All installation shall be done in a workmanlike manner and be set true and plumb and in accordance with the Drawings and this specification.
- B. Submit product design drawings for review and approval.
- C. The installer shall check as-built conditions and verify the manufacturer's ladder safety post details for accuracy to fit the application prior to fabrication. The installer shall comply with the ladder safety post manufacturer's installation instructions.
- D. The manufacturer shall furnish fasteners necessary for installing ladder safety post.

****END OF SECTION****

**SECTION 08600
ALUMINUM ACCESS HATCHES**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included: Furnishing and installing factory fabricated vault access doors.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM), 100 Bar Harbor Drive, West Conshocken, PA 19428-2959; (610) 832-9585, fax (610) 832-9555

1. ASTM A 36-93a: Standard Specification for Structural Steel

1.03 SUBMITTALS

- A. Product Data: Provide manufacturer's product data for all materials in this specification.
- B. Shop Drawings: Show profiles, accessories, location, and dimensions.

1.04 PRODUCT HANDLING

- A. All materials shall be delivered in manufacturer's original packaging.
- B. Store materials in a dry, protected, well-vented area. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.05 SUBSTITUTIONS

- A. Proposals for substitution products shall be accepted only from bidding contractors and not less than (10) working days before bid due date. Contractor guarantees that proposed substitution shall meet the performance and quality standards of this specification.

1.06 JOB CONDITIONS

- A. Verify that other trades with related work are complete before installing vault access door(s).
- B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- C. Refer to the construction documents, shop drawings, and manufacturer's installation instructions.
- D. Observe all appropriate OSHA safety guidelines for this work.

PART 2 - PRODUCTS

2.01 ACCESS HATCH

- A. Furnish and install where indicated on plans vault access door type JD-AL manufactured by The BILCO Company, 1-203-934-6363, Fax: 1-203-933-8478, or model DTD-HD by Syracuse Castings West, 1 -801-544-5728, Fax. 1 -801-544-9571 or approved equal.

The vault access door shall be double leaf. The vault access door shall be pre-assembled from the manufacturer. The access door shall be cast in place with the precast concrete vault unless approved otherwise by the Engineer.

- B. Performance characteristics:
 - 1. Covers: Shall be reinforced to support a minimum live load of incidental AASHTO HS-20.
 - 2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 3. Operation of the cover shall not be affected by temperature.
 - 4. Entire door, including all hardware components, shall be highly corrosion resistant. Please consult the manufacturer when doors are to be installed in unusually harsh environments or extremely corrosive conditions.
- C. Covers: Shall be ¼" (6.3 mm) aluminum diamond pattern.
- D. Frame: Channel frame shall be ¼" (6.3mm) extruded aluminum with bend down anchor tabs around the perimeter. A continuous EPDM gasket shall be mechanically attached to the aluminum frame to create a barrier around the

entire perimeter of the cover and significantly reduce the amount of dirt and debris that may enter the channel frame.

- E. Hinges: Shall be specifically designed for horizontal installation and shall be through bolted to the cover with tamperproof Type 316 stainless steel lock bolts and shall be through bolted to the frame with Type 316 stainless steel bolts and locknuts
- F. Drain Coupling: Provide a 1-1/2" (38mm) drain coupling located in the right front corner of the channel.
- G. Lifting mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed 1/4" gusset support plate.
- H. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover and the latch release shall be protected by a flush, gasketed, removable screw plug.
- I. Hardware:
 - 1. Hinges: Heavy forged aluminum hinges, each having a minimum 1/4" (6.3 mm) diameter Type 316 stainless steel pin, shall be provided and shall pivot so the cover does not protrude into the channel frame.
 - 2. Covers shall be equipped with a hold open arm which automatically locks the cover in the open position.
 - 3. Covers shall be fitted with the required number and size of compression spring operators. Springs shall have an electrocoated acrylic finish. Spring tubes shall be constructed of a reinforced nylon 6/6-based engineered composite material.
 - 4. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.
 - 5. Hardware: Shall be type 316 stainless steel.
 - 6. Finishes: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.
 - 7. Hatch shall have a recessed handle and locking mechanism. It also shall have a mechanism to allow installation of a keyed padlock for securing the door.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Submit product design drawings for review and approval to the architect or specifier before fabrication.
- B. The installer shall check as-built conditions and verify the manufacturer's vault access door details for accuracy to fit the application prior to fabrication. The installer shall comply with the vault access door manufacturer's installation instructions.
- C. The access door shall be cast in place with the precast concrete vault unless approved otherwise by the Engineer.

****END OF SECTION****

**SECTION 15121
PIPE COUPLINGS**

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Flexible couplings and grooved couplings.

1.02 REFERENCES

- A. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).
- B. American Society for Testing and materials (ASTM):
 - 1. A 36 - Specification for Structural Steel.
 - 2. A 53 - Specification for pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. A 325 - Specification for High-Strength Bolts for Structural Steel Joints.
- C. Society of Automotive Engineers (SAE).

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Shop drawings detailing dimensions and materials.
- C. Piping Layout Drawings: Coordinate preparation of required piping layout drawings such that coupling center sleeve sizes are clearly identified on drawings.
- D. Manufacturer's published installation instructions.

PART 2 - PRODUCTS

2.01 FLEXIBLE COUPLINGS

- A. See City of Sacramento Standard Specifications.

2.02 GROOVED COUPLING

- A. Grooved-end pipe couplings shall be ductile iron, ASTM A 536 (Grade 65-45-12). Gaskets shall be EPDM and shall conform to ASTM D2000.
- B. Bolts in exposed service shall conform to ASTM A183, 110,000 psi tensile
- C. Grooved-end coupling for welded steel pipe shall be Victaulic Style 77 or approved equal.
- D. Pipe to receive grooved couplings shall have grooves "cut-in" in accordance with AWWA C-606.

2.01 GASKETS FOR FLEXIBLE COUPLINGS

- A. Provide gasket materials for process piping applications as follows:
 - 1. All Applications: EPDM.

PART 3 - EXECUTIONS

3.01 INSTALLATION

Install pipe flexible couplings in accordance with the manufacturer's recommendation.

END OF SECTION

**SECTION 15135
SUBMERSIBLE PUMPS**

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install submersible pump as shown on the plans and described in these specifications.

1.02 SUBMITTALS

- A. Submit manufacturer's catalog cuts, installation instructions, and verification of compliance.
- B. Submit operation and maintenance data. Include maintenance instructions, assembly views, lubrication instructions, and replacement parts lists.

PART 2 PRODUCTS

2.01 GENERAL

- A. The pumps shall be designed for continuous operation.

2.02 PRODUCTS

- A. Design
 - 1. The submersible pump shall be a Zoeller Model M 53 or approved equal.
 - 2. The basic design shall include the following:
 - a. Float operated submersible (NEMA 6) 2 pole mechanical switch and variable level long cycle systems available.
 - b. Corrosion resistant powder coated epoxy finish.
 - c. No sheet metal parts .
 - d. Stainless steel screws, switch arm, guard and handle.
 - e. Watertight neoprene square ring between motor and pump housing.
 - f. Solid buoyant polypropylene float.
 - g. Oil-filled, hermetically sealed, automatic reset thermal overload protected motor

- h. Upper and lower sleeve bearings running in bath of oil.
- i. Entire unit pressure tested after assembly
- j. Carbon and ceramic shaft seal
- k. Maximum temperature for effluent or dewatering 130 degrees F.
- l. Passes ½" spherical solids
- m. 1 ½" NPT discharge.
- n. On point: 7¼"
- o. Off point: 3"
- p. Major width: 10 3/32 "
- q. Major height : 10 1/16"
- r. Watertight and dust tight
- s. Permanently oiled bearings
- t. Cast iron switch case, motor and pump housing
- u. Engineering thermoplastic base
- v. Engineered glass filed, plastic impeller with metal insert
- w. Stainless steel guard and handle
- x. Lower and upper bearings, oil fed cast iron

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be in strict accordance with the manufacturer's instructions, and the approved shop drawings.

****END OF SECTION****

SECTION 15201

VALVE ACTUATORS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. **General:** The CONTRACTOR shall provide electric actuator for the butterfly valve with appurtenances, complete and operable, in accordance with the Contract Documents. The provisions of this specification section shall apply to the butterfly valve, except where otherwise indicated in the Contract Documents.
- B. **Unit Responsibility:** A single Supplier shall be made responsible for furnishing and for coordination of design, assembly, testing, furnishing, installation, and functional operation of the valve actuator and their associated valves; however, the CONTRACTOR shall be responsible to the OWNER for compliance with the requirements of each valve specification section.
- C. **Maintenance Support:** The manufacturer shall have a local automation center within 100 miles from the facility where the actuator will be used, shall be the authorized local stocking distributor of parts and units, and the service center for the motor actuators supplied.

1.2 CONTRACTOR SUBMITTALS

- A. **General:** Submittals shall be furnished in accordance with the Special Provisions.
- B. **Shop Drawings:** Shop Drawings of the actuator shall be submitted together with the valve submittals as a complete package.
- C. **Technical Manuals:** The CONTRACTOR shall furnish technical manuals for the motor actuator in accordance with the requirements of the Special Provisions.

1.3 DUTIES OF THE MANUFACTURER'S QUALIFIED FACTORY REPRESENTATIVE

- A. A manufacturer's engineering representative for the equipment specified herein shall be present at the jobsite for the frequency and minimum duration (travel time excluded) to provide the City with a certificate of installation.
- B. **Functionality:** The electric actuator shall be coordinated with power and instrumentation equipment indicated elsewhere in the Contract Documents.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. **General:** The new butterfly valve shall be provided with a ¼ turn power actuator. The CONTRACTOR shall furnish the actuator complete and operable with mounting hardware, motor(s), gears, controls, wiring, solenoids, hand wheels, levers, chains, and extensions, as applicable. The actuator shall be capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering. All wiring for the motor-driven actuator shall be identified by unique numbers.
- B. **Materials:** The actuator shall be a current model of the best commercial quality materials and liberally-sized for the maximum expected torque necessary to open and close the butterfly valve. All materials shall be suitable for the environment in which the valve is to be installed.
- C. **Mounting:** The actuator shall be securely mounted by means of brackets or hardware specially designed and sized for this purpose and of ample strength. The word "open" shall be cast on each valve or actuator with an arrow indicating the direction to open in the counter-clockwise direction. The actuator shall be equipped with position indicators. Where possible, the manual actuator shall be located between 48 and 60 inches above the floor or the permanent working platform.
- D. **Standard:** Unless otherwise indicated and where applicable, the actuator shall be in accordance with ANSI/AWWA C 540 - AWWA Standard for Power-Actuating Devices for Valves.
- E. **Functionality:** The electric actuator shall be coordinated with power and instrumentation equipment indicated elsewhere in the Contract Documents.

2.2 ELECTRIC MOTOR ACTUATORS

- A. **General:**
 - 1. **Equipment Requirements:** The electric motor-actuated valve control unit shall be attached to the actuating mechanism housing by means of a flanged motor adapter piece. The actuator shall consist of single phase 240 VAC electric motor, worm gear reduction, absolute position encoder, electronic torque sensor, reversing motor contactor, electronic control, protection, and monitoring package, manual override handwheel, valve interface bushing, LCD display, and local control switches. All items shall be contained in a NEMA 4X enclosure. Actuator design life shall be a minimum one million drive sleeve turns.
 - 2. **Gearing:** The motor actuator shall include the motor, reduction gearing, reversing starter, torque switches, and limit switches in a weather-proof NEMA 4X assembly, unless otherwise indicated. The actuator shall be a single or double reduction unit consisting of spur or helical gears and worm-gearing. The

spur or helical gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. All gearing shall be accurately cut. All power gearing shall be grease- or oil-lubricated in a sealed housing. Ball or roller bearings shall be used throughout. Actuator output speed changes shall be mechanically possible by simply removing the motor and changing the exposed or helical gear set ratio without further disassembly of the electric actuator.

3. Starting Device: Except for modulating valves, the unit shall be so designed that a hammer blow is imparted to the stem nut when opening a closed valve or closing an open valve. The device should allow free movement at the stem nut before imparting the hammer blow. The actuator motor must attain full speed before stem load is encountered.
4. Position Sensing: Valve position shall be sensed by an optical, absolute position encoder and position shall be 100 percent repeatable. Open and closed positions shall be stored in permanent, non-volatile memory. The encoder shall measure valve position at all times, during motor and hand wheel operation, with or without power present, and without use of a battery. Position resolution shall be better than 0.1 percent for valves requiring 50 turns or more.
5. Torque Sensing: A electronic torque sensor shall be included. The torque limit may be adjusted from 40-100 percent of the unit rating in 1 percent increments. The motor shall be de-energized if the torque limit is exceeded. A boost function shall be included to prevent torque trip during initial valve unseating, and a "jammed valve" protection feature, with automatic retry sequence, shall be incorporated to de-energize the motor if no movement occurs. If unseating torque exceeds actuator capability, during the by-passed portion of travel, the actuator shall de-energize and protect the motor. The motor thermal protection device shall not be used for this function.
6. Hand Wheel Operation: A permanently-attached hand wheel shall be provided for emergency manual operation. The hand wheel shall not rotate during electrical operation. The maximum torque required on the hand wheel under the most adverse conditions shall not exceed 60 lb-ft, and the maximum force required on the rim of the hand wheel shall not exceed 60 lb. An arrow and either the word "open" or "close" shall be cast or permanently affixed on the hand wheel to indicate the appropriate direction to turn the hand wheel.
7. Motor: The motor shall be of the totally-enclosed, non-ventilated, high-starting torque, low-starting current type for full voltage starting. The motor shall be rated at 240 VAC, single phase, using Class F insulation and a motor frame with all dimensions in accordance with the latest revised NEMA MG Standards. The observed temperature rise by thermometer shall not exceed 55 degrees C above an ambient temperature of 40 degrees C when operating continuously for 15 minutes under full rated load. With a line voltage ranging between 10 percent above to 10 percent below the rated voltage, the motor shall develop full rated torque continuously for 15 minutes without causing the thermal contact protective devices imbedded in the motor windings to trip or the starter overloads to drop-out. All bearings shall be of the ball type and thrust bearings shall be provided where necessary. All bearings shall be provided with suitable

seals to confine the lubricant and prevent the entrance of dirt and dust. Motor conduit connections shall be watertight. Motor construction shall incorporate the use of stator and rotor as independent components from the valve operation such that the failure of either item shall not require actuator disassembly or gearing replacement. The motor shall be furnished with a space heater suitable for operation on 120-volt, single-phase, 60-Hz circuit unless the entire actuator is an hermetically-sealed, non-breathing design with a separately sealed terminal compartment which prevents moisture intrusion.

B. Electric Motor Actuators:

1. General: The electric motor actuator shall be an AC reversing/modulating type complete with pad lockable local-stop-remote switch and an open-close switch shall be included for local valve actuator control. The control switches shall not penetrate the controls cover and shall be design to electrically isolate the actuator internal components from the external environment. The open-close switch may be configured for maintained or push-to-run (inching) control. The Liquid Crystal Display shall indicate valve position as a percent of open, 0-100 percent, and current actuator status. "STATUS OK" shall be displayed for an operable actuator. If the actuator is not operable, the appropriate alarm shall be displayed. The alarm shall be continuously displayed until the actuator is operable. Red, Green, and Yellow LED's shall be included to indicate open, close, stopped, and moving indication. Control station with open/close and local/off/remote selector switches shall be provided as shown on the Contract Drawings. The electric actuator shall have the ability to be either open or close the valve by a remote PLC using a relay contact per the Plans.
2. Control Module: The control module shall include power and logic circuit boards, control transformer, and protection fuses. The module shall also include a reversing contractor, local control switches, LCD display, and LED indicators. All internal wiring shall be flame resistant, rated 1050C, and UL listed. The controls shall be rigidly mounted on a steel plate and easily removable through the use of plug-in connectors. The actuator shall be provided with terminals for the connection of an auxiliary 24 Vdc power supply to externally power the electronic control package and LCD panel without AC power.
3. Starters:
 - a. Modulating: Positioning shall be accomplished by comparing the command signal to an internal position feedback. The internal feedback shall be of the non-contacting type. Available adjustments shall include zero, span, proportional band, deadband, and signal polarity. It shall also be possible to calibrate through the LCD panel an automatic failure position (open, close, or stop) upon loss of the 4-20 MA command signal. Potentiometers are not allowed. The actuators shall be sized to allow for 1200 start/stops per hour where modulating valves are required. A dedicated circuit to prevent undesired valve operation in the event of an internal circuit fault or erratic command signal shall be included. The

command inputs shall be optically coupled and require a pulse to turn on or off. In the event of an internal circuit fault, an alarm shall be signaled by tripping a Monitor Relay to give an LCD indication.

- b. Reversing: The reversing contractor shall be mechanically interlocked to prevent simultaneous energizing of the open and close coils. The control module shall also include an auto reversal delay to inhibit high current surges caused by rapid motor reversals. The control transformer shall include a vacuum impregnated coils and dual primary fuses. A phase detection and correction circuit shall be included which shall detect reversal of the power connection, or a lost phase, and prevent incorrect valve movement and motor damage.
- 4. Limit Switches: The electric actuator shall be provided with limit switches to indicate the position of the valve in the closed and open position. These switches shall provide a signal to a remote PLC indicating the position of the valve.
- 5. Calibrations: Actuator shall be non-intrusive. All calibration of the actuator settings shall be possible without removing any covers or any special tools and shall be performed directly through the use of the control panel. A configurable password shall be available to prevent unauthorized changes.

C. Manufacturer:

- 1. **Limitorque Corporation, AUMA, EIM, or approved equal.**

PART 3 -- EXECUTION

3.1 FIELD ADJUSTMENTS

- A. The field representative of the electric actuator shall adjust the actuator controls and limit-switches in the field for the required function.

3.2 INSTALLATION

- A. The actuator shall be located to be readily accessible for operation and maintenance, without obstructing walkways. The actuators shall not be mounted where shock or vibrations will impair their operation, nor shall the support systems be attached to handrails, process piping, or mechanical equipment.

- END OF SECTION -

SECTION 16010
ELECTRICAL WORK

PART 1 - GENERAL

1.01 SCOPE

- A. This Specification Section covers all electrical work, which consists of furnishing all necessary labor, equipment and materials required for the complete electrical system as specified and as shown on the Plans.
- B. Work Included:
 - 2. Equipment and materials to be furnished and installed by the Contractor under Division 16 shall include the following:
 - a. Raceway Systems (16110)
 - b. Low Voltage Wire and Cable (16120)
 - c. Miscellaneous Equipment (16922)
 - d. Operational Testing (16950)
 - e. Process Control & Instrumentation Systems (17100)
 - f. Instrumentation (17101)
 - g. Flow Measuring System (17102)
 - h. Programmable Logic Controller System (17520)

1.02 SUBMITTALS

- A. Descriptive literature for all materials furnished under this section shall be submitted in accordance with Section 5.-7 of the standard specifications.

1.03 CONSTRUCTION POWER

- A. The Contractor shall provide his own temporary construction lighting and electrical power as required in areas where work is being performed.

1.04 DRAWINGS

- A. The Contractor shall verify all conditions at the site and review all measurements to insure adequate space for installation of equipment.
- B. The locations of conduit and equipment, as indicated on the drawings, are in the desired locations. However, locations may be adjusted to meet the electrical and structural conditions as required.
- C. The drawings are essentially diagrammatic to the extent that offsets, bends, pull boxes, conduits, special fittings and the exact locations may not be completely

indicated. Furnish and install all conduit and equipment in available locations as required by conditions found at the site and as approved by the Engineer. Carefully study the drawings and premises in order to determine the best methods, exact locations, routes, noting the building obstructions, and etc. for conduit and equipment installation.

1.05 ELECTRICAL WORK CLOSEOUT

- A. Prepare the following items and submit to the Engineer before final acceptance:
1. Copies of all test results as required under Section 16950.
 2. Copies of O&M manuals as required under the Special Provisions.
 3. Notify the Engineer in writing when installation is complete and that a final inspection of this work can be performed. In the event defects or deficiencies are found during this final inspection they shall be corrected to the satisfaction of the Engineer before final acceptance can be issued.
- B. Electrical and control equipment shall be cleaned both inside and outside.

1.06 COORDINATION WITH SUB-CONTRACTORS

- A. General contractor shall be responsible to provide all sub-contractors with all specifications and drawings that pertain to their work on this project.

PART 2 - PRODUCTS

2.01 REFERENCES STANDARDS

- A. Work installed or material used shall comply with latest version of NEC, UL, and other applicable rules and standards of the industry.
- B. Equipment Anchors: Securely anchor electrical equipment. Anchoring shall have the capability of withstanding seismic forces per the 1994 California Code of Regulations, Title 24, Part 2, Section 2312, Seismic Zone 3, with $C_p = 1.0$ and $I = 1.5$. C_p may be two-thirds of the value specified for components mounted on foundations at grade or on floor slabs on earth grade.

2.02 MISCELLANEOUS EQUIPMENT/MATERIALS

- A. The Contractor shall include in his work furnishing and installing of the following:
1. Warning Signs: Unless otherwise shown on the plans, use signs of standard manufacture, #18 gauge minimum steel, baked enamel finish, red letters on white background. Provide warning signs per Title 24, CAC.
 2. Fuses: Furnish and install fuses of proper type and rating suitable for

equipment protected.

2. Provide one carton (3 fuses minimum) of each fuse rating for each pump control.

2.03 PLC CABINET INTERNAL WIRING

A. Interior wiring shall conform to the following:

1. Rubber grommets shall be used where wiring passes through holes in sheet metal unless indicated on the drawing.
2. Wiring shall not be tapped or spliced except at device terminals or on terminal blocks.
3. No more than two terminations shall be made at any one terminal.
4. B8, Class B minimum stranding and the wire shall have copper conductors and shall be minimum #16 for control and minimum #12 for power circuits. Hinge wiring shall be Class D minimum stranding. Solid wire is not allowed on this project.
5. All PLC cabinet wiring shall be TEW or MTW, unless otherwise specified.
7. All wiring shall be marked using tags with like numbers on both ends with wire numbers shown on the drawings. Tags using adhesives, tapes, or markers are not acceptable.
8. Tags shall be white heat-shrinkable with thermal transfer printing, three to one shrink ratio, 2 inches long and shall meet UL 224. Raychem Tyco shrink mark heat shrinkable sleeves or equal. Labels shall be readable after heat shrinking.

2.04 NAMEPLATES

A. Indoor: Laminated phenolic plastic, black front and back, white core, engraved to show white lettering. Use 3/16" high lettering at push button stations, thermal overload switches, receptacles, wall switches, and similar devices, where nameplate is attached to device plate. Use 1/4" high lettering at all other locations, unless otherwise specified or detailed. Engraved lettering shall be uniform block style all upper case.

Nameplates 1 1/2 inches high and smaller shall be 1/16" thick. Nameplates larger than 1 1/2" high shall be 1/8" thick. Edges of nameplates shall be beveled. Nameplates shall be fastened using nickel plated brass, cadmium plated steel or stainless steel screws. Attachment of nameplates with adhesive is not acceptable.

B. Outdoor: Engraved or embossed stainless steel.

- C. Inscription: If detailed on plans, use inscription exactly as shown; otherwise, describe adequately the function or use of equipment involved.

2.05 PAINTING AND FINISHES

- A. Boxes factory finished as follows:
 - 1. Surface Mounted Boxes: One prime coat over galvanizing, one coat of light gray synthetic enamel or lacquer.
 - 2. Flush Mounted Boxes: Galvanized only.
- B. A three coat finish consisting of primer, undercoat, and alkyd enamel finish of light gray, ANSI No. 61, shall be applied to all electrical enclosures unless otherwise specified.

2.06 INDICATING LIGHTS, PUSH BUTTONS, AND TERMINAL STRIPS

- A. Indicating lights shall be industrial, weatherproof NEMA 4/4X, transformer type, with LED type lamps, and push to test. Push buttons and terminal strips shall be NEMA style.

2.07 SPARE PARTS

- A. Fuses: 1 carton (3 fuses, minimum) of each fuse used on this project.

2.08 RELAYS, TIMERS, AND SWITCHES

- B. Contacts for all relays, timers, and switches shall be rated for 10 A minimum.

2.09 SERVICE PEDESTAL

- A. The new service pedestal shall be supplied and installed as shown on the Plans and shall conform to the serving utility requirements. The service pedestal shall be fabricated in accordance with the dimensions shown on the drawing. **The overall dimensions of the enclosure shall be 60" high x 30" wide x 35" deep.**

The service pedestal shall be fabricated from 14 gauge Type 304D stainless steel and meet current Caltrans Standard Specifications. The mounting brackets shall be 10 gauge type 304D stainless steel. All welds shall be of highest quality and ground smooth and finished so that grind marks are not visible.

The enclosure shall be rain tight and dust tight. All welds shall be ground smooth and finished so that grind marks are not visible. A hinged dead front plate with cutouts for the handles of the breakers and the switch shall be provided in addition to a hinged outside door equipped with a draw latch suitable for padlocking. Galvanized anchor bolts shall be inside or outside the service pedestal as shown on the Plans.

A hinged dead front plate with cutouts for the handles of the breakers and the switch shall be provided. A hinged outside door equipped with a heavy duty draw latch and two (2) heavy duty hasps suitable for padlocking shall be provided for the service section. The dead front panel on the service enclosure shall have a continuous stainless steel piano hinge.

The enclosure shall have no screws, nuts, or bolts on the exterior, except utility sealing screws. All screws, nuts, bolts, and washers shall be stainless steel. All hinges and hinge pins shall be stainless steel. No surface of the pedestal shall be deflected inward or outward more than 1/16" measured from the intended plane of the surface.

The service pedestal shall consist of a separate metering section and a service section. The meter section shall have a removable cover-top, side, and front sections welded together so that it is rain tight and padlockable.

Service enclosures shall be factory wired and conform to NEMA Standards. All control wiring shall be stranded copper, No. 14 AWG THHN/THWN rated for 600 Volts. All control wiring shall be marked with permanent clip sleeve wire markers. Felt, pencil, or stick back markers will not be acceptable. A copy of the wiring diagram for the service pedestal shall be enclosed in plastic and mounted on the inside of the service section.

All circuit breakers, contactors, and wire shall be listed by UL or ETL. The pedestal shall conform to the NEMA 3R standard. The terminal lugs or strips shall be copper or alloyed aluminum. All terminals shall be compatible with either aluminum or copper conductors.

The service pedestal shall have provisions for the installation of up to a total of 12 single-pole circuit breakers, including brass links and mounting hardware. **All circuit breakers shall be mounted in a GE panel board or equal.**

Nameplates of a reasonable size identifying the control unit therein shall be installed on the dead front panel. Nameplates shall be black laminated with a white plastic center. All nameplates shall be fastened by screws.

The entire service pedestal shall be constructed with the highest quality workmanship and shall meet all applicable codes.

The metered electrical service will be served from the serving utility as shown on the Plans. Service shall be wired for 120/240 volts, three-wire and single phase as shown on the Plans.

B. The following equipment shall be mounted in the service pedestal:

1. One two-pole, 120-volt alternating current main breakers with 100-ampere trip and a rating of 22,000 ampere AIC at 120/240 volts mounted within the panel board. Main breaker shall have internal common trip. Each pole shall have individual on-off control and handle tie for common operation. Breaker shall be GE, Square D, or approved equal.
2. One two-pole, 120-volt alternating current main breakers with 20-ampere trip and a rating of 22,000 ampere AIC at 120/240 volts mounted within the panel board. Breaker shall have internal common trip. Each pole shall have individual on-off control and handle tie for common operation. Breaker shall be GE, Square D, or approved equal.
3. Four single-pole, 120-volt alternating current branch circuit breakers with 20-ampere trip and a rating of 22,000-ampere AIC at 120/240 volts mounted within the panel board. Breakers shall be GE, Square D, or approved equal.
4. Four single-pole, 120-volt alternating current branch circuit breakers with 15-ampere trip and a rating of 22,000-ampere AIC at 120/240 volts mounted within the panel board. Breakers shall be GE, Square D, or approved equal.
5. One solid copper neutral bus.
6. Incoming terminals (landing lugs).
7. Solid neutral terminal strip.
8. Terminal blocks and fuses for the various devices within the cabinet.
9. One UPS, see specification section 16922.
10. PLC system including panduit, see specification section 17520.
11. Two fluorescent lighting fixtures with separate on/off switch. Ballasts for fluorescent fixtures shall be integral with fixture, high power factor, and electronic.
12. Two GFCI receptacles rated for 120 VAC and 20 A. GFCI Receptacles shall be ivory, NEMA 5-20R furnished with stainless steel plates. Receptacles shall be Leviton #6899, G.E. #TGTR115, Square D #GFDR120, or approved equal.
13. Two strip 100 W strip heaters with separate thermostat.
14. One exhaust fan with thermostat.
15. One digital indicator, see specifications section 17101.

16. One Hart Interface Module (HIM), see specifications section 17101.
 17. One water quality analyzer, see specifications section 17101.
 18. One flow meter transmitter as specified in section 17102 of the specifications.
 19. One UPS receptacle rated for 120 VAC and 20 A.
 20. One Leviton surge protector model number 3840-Din or approved equal.
 21. Provide AC and DC fuses per the Plans.
 22. Provide ABB Entrelec terminal blocks per the Plans.
 23. All appurtenances as shown on the plans.
- C. Light switches shall be single pole, specification grade, 277 volt, 3 wire, 20 ampere A.C., ivory in color with stainless steel cover plates. Furnish Hubbell 1221, Leviton 1201-2, or approved equal. Light switches shall be labeled with nameplates per section 16010.
- D. Service pedestal shall be manufactured by Tesco or approved equal. See plans for additional details, parts, and equipment layout.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All equipment installed by the Contractor shall operate to the Engineer's satisfaction. The Contractor shall be responsible for, and shall correct by repair or replacement, at his own expense, equipment which, in the opinion of the Engineer has been damaged by faulty mechanical or electrical assembly by the Contractor.
- B. The Engineer reserves the right to require changes in equipment location without incurring additional costs.
- C. Outdoor steel items on this job shall be manufactured from cold rolled low carbon steel. Outdoor steel mounting holes and cutting shall all be finished and then the item shall be hot dipped galvanized confirming with ASTM A123 and A153. Outdoor hardware on this job shall be 316 stainless steel.
- E. The contractor shall be responsible for coordination with SMUD for all power requirements.

END OF SECTION

SECTION 16110

RACEWAY SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

- A. This Specification Section covers the furnishing, installing and testing of all wireway, conduit, fittings, boxes, and supports as specified herein, as shown on the Drawings, and as required for a complete electrical installation.
- B. The provisions of Section 16010 of these Specifications shall apply, unless otherwise specified in this Section.
- C. The raceway system shall consist of the types and sizes as required and shall include all rigid steel conduit, flexible conduit, non-metallic conduit, wireway and accessories as required for the embedded and exposed raceway systems.
- D. Conduit accessories shall include Condulet type fittings, expansion and deflection couplings, chase nipples, locknuts, grounding bushings, flexible conduit fittings, supports, materials for sealing openings, and all other devices and materials required to complete the electrical raceway system.

1.02 SUBMITTALS

- A. Descriptive literature for all materials furnished under this section shall be submitted in accordance with Section 5-7 of the standard specifications.
- B. Submittals for the material and equipment for the Raceway Systems shall include, but shall not be limited to, the following:
 - 1. Catalog cuts showing manufacturer, catalog numbers, dimensions, weights and material for all raceway and accessories, specific items shall be identified on all catalog cuts.
 - 2. Dimensioned shop drawings.
 - 3. Certified test reports prepared by manufacturer.

PART 2 - PRODUCTS

2.01 REFERENCE STANDARDS

- A. Raceway systems supplied under this contract shall be designed, manufactured, and tested in accordance with the latest version of the following standards:

American National Standards Institute (ANSI) Publications:	
C33.92	Flexible Liquid-tight Metal Conduit
C80.1	Rigid Steel Conduit
C80.4	Rigid Steel Conduit Fittings
National Electrical Manufacturers Association (NEMA)	
FB 1	Fittings and Supports for Conduit Cable Assemblies
TC-2 & TC-3	Non-metallic Conduit and Fittings
RN 1	Rigid Steel Conduit PVC jacketed
Underwriters Laboratories Inc.	
UL 514A	Metallic Outlet Boxes, Electrical
UL-870	Wireways, Auxiliary Gutters and Associated Fittings
UL-6	Rigid Metal Electrical Conduit
UL 651	Schedule 40 and 80 Rigid PVC Conduit

2.02 CONDUIT AND CONDUIT FITTINGS

A. Material for the conduit system shall conform to the following:

1. **Steel Conduit:** Steel conduit, couplings, bends and nipples shall be in accordance with ANSI C80.1 and UL-6, hotdip galvanized inside and outside after fabrication and then coated with a bichromate finish. Conduit sizes shall be not less than 3/4 inch IPS. All fittings shall be listed per UL 514.
2. **Flexible Liquid-tight Metal Conduit:** Flexible liquid-tight metal conduit shall be in accordance with ANSI C33.92 and shall be galvanized steel core with a copper bonding conductor between the spiral segments and an extruded synthetic jacket overall to insure a liquid-tight conduit. The conduit shall be 3/4 inch American Brass sealtight Flexible conduit, or equal. Flexible conduit fittings shall be the grounding type and a design approved by the manufacturer for this type of flexible conduit.
3. **Rigid Galvanized Steel Conduit PVC Bonded (RGS/PVC):** Conduit shall conform to the requirements of NEMA RN1, type A40. Plastic coated conduit shall be rigid galvanized steel conduit to which an epoxy acrylic primer and a 40 mil thick polyvinyl chloride coating has been bonded. Bond strength shall exceed the tensile strength of the plastic coat. All elbows shall be factory made and PVC coated. All fittings used with plastic coated conduit shall be similarly coated with not less than 40 mils of polyvinyl chloride and shall be provided with type #316 stainless steel hardware. Furnish Occidental

Coating Company -type OCAL 40, Robroy Industries - type PLASTIBOND, or approved equal. For factory coated conduit, use overlapping PVC sleeves. Sleeves shall extend beyond end of fitting minimum distance equal to nominal diameter of conduit, and shall fit tightly over conduit coating to form a watertight joint. Joints and fittings shall be made tight with strap wrenches. All damage to PVC jacket shall be repaired with four separate applications of PVC paint. Finished patch shall be 0.040 inch minimum thickness. Conduit sizes shall be not less than 3/4 inch IPS.

4. Rigid Polyvinyl Chloride (PVC) conduit: PVC conduit shall be manufactured in accordance with UL 651. PVC conduit shall be Schedule 40 or Schedule 80 high impact polyvinyl chloride, UL listed for direct burial. Minimum size shall be 3/4 inch. Fittings used with PVC conduit shall be PVC solvent weld type.
5. Fittings: Fittings for rigid steel conduit shall be threaded type and shall conform to the requirements of ANSI C80.4. Locknuts shall be extra heavy galvanized steel. Bushings shall be galvanized malleable iron with insulating collars. Grounding bushings shall be locking type and shall be provided with feed-through compression lugs.
6. Locknuts shall be extra heavy electrogalvanized steel for sizes through 2 inches. Locknuts larger than 2 inches shall be electrogalvanized malleable iron. Furnish allied tube and conduit type GRC, Triangle PWC, Inc., type GRS or approved equal.

2.03 SUPPORTS

A. General Requirements:

1. Inserts, hangers, brackets and miscellaneous supports for electrical equipment and conduits must be designed with minimum safety factor of 4, based on ultimate strength of material used. For empty conduits, include weight of 4 Type XHHW copper wires of maximum permissible size.
2. Secure hangers, brackets, conduit straps, supports and electrical equipment by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; wood screws on wood construction. Wood or fiber plugs or concrete nails, are not acceptable.
3. All channels, fittings, clamps and accessories shall be hot dipped galvanized after fabrication for outdoor installations, and electro-galvanized for dry indoor installations. In wet or corrosive areas, such as wet wells and sumps, all channels, fittings, clamps and accessories shall be 316 stainless steel.

- B. Support channels steel shall conform to the requirements of ASTM A570. These shall be nominal 1 5/8" x 1 5/8" roll formed low carbon 12 gauge steel. One side of

the channel shall have a continuous slot with inturned lips. Double strut shall be two of these welded back to back. Support channels shall be filled with styrofoam to inhibit concrete seepage.

C. Conduit Supports:

1. Single Conduit Hangers: Steel City #C-149, Elcen Figure 13, Unistrut #J1205 through J1260, or equal, with 3/8" minimum diameter steel rod.
2. Trapeze Hangers: Steel City #B-900, Elcen Figure 600, Unistrut #P-1000, or equal, channel with 3/8" minimum diameter steel rods and with conduit clamps, as specified below.
3. Trapeze Conduit Clamps: Steel City #C-105, Elcen Figure 650, Unistrut #P-J111 through P-1124, or equal, for rigid conduit.
4. Riser Supports: Steel City #C-210, Elcen Figure 39, Unistrut #U991-7 through U991-60, or equal.
5. Finish
 - a. Hangers, channels, clamps, supports and rods, galvanized, cadmium plated or standard factory paint finish.
 - b. Conduit straps and single hole clamps, galvanized or cadmium plated.
 - c. Steel bolts, screws, nuts and washers, galvanized or cadmium plated.
6. All conduit supports and hardware mounted inside the wet well shall be 316 stainless steel.

2.04 DUCT AND CONDUIT CAULKING COMPOUND

- A. Compounds for sealing ducts and conduit shall have a putty like consistency workable with the hands at temperatures as low as 35 degrees F. and shall not slump at a temperature of 300 degrees F or harden materially when exposed to the air. Compounds shall readily calk or adhere to lean surfaces of asbestos cement, fiber, or plastic duct; metallic conduits or conduit coatings; concrete masonry, or lead; any cable sheaths, jackets, covers, or insulation materials; and the common metals. Compounds shall form a seal without dissolving, noticeable changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect upon the hands of workmen or upon materials. Contractor shall apply duct seal to all conduits entering the wet well or as directed by the Engineer.

2.05 BOXES AND CONDULET

- A. Boxes and Condulet shall be cast ferrous steel Form 7 with gasketed weatherproof covers and #316 stainless steel hardware for all indoor and outdoor applications.

NEMA 4X boxes shall be cast nonmetallic screw hub type with gasketed watertight covers and #316 stainless steel hardware. Each box shall be large enough to accommodate the required number and sizes of conduits, conductors, splices and devices per the NEC. Flush boxes shall have the front edge of box or ring flush with wall or ceiling finish.

2.06 WIREWAY

- G. Surface metal raceway shall be constructed in accordance with Underwriters' Laboratories Standards UL 870 for Wireways, Auxiliary Gutters and Associated Fittings. Every component including lengths, connectors and fittings shall be UL listed.
- B. Surface metal raceway shall be suitable for "lay-in" of conductors.
- C. All sheet metal parts shall be provided with a rust inhibiting phosphatizing coating and gray baked enamel finish. All hardware shall be plated to prevent corrosion. All screws installed toward the inside shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. General Requirements:
 - 1. Install an accessible raceway system for connection of all boxes, panelboards, cabinets, and equipment.
 - 2. All raceway shall be the type and size as shown on the Plans.
 - 3. Make bends for exposed conduit stub-ups completely below the surface. Make stubs vertical and arrange neatly.
 - 4. Where conduits turn up in accessible floor areas or under removable partitions, install coupling flush with finish floor surface (exclusive of floor covering). Provide flush threaded plug in this coupling where conduit is not to be extended.
 - 5. Spare Conduits: For flush mounted panels, run empty conduits from panel to accessible spaces above and below, unless otherwise shown. Install minimum of two 3/4" conduits (one up and one down) for every 3 single pole spare circuit breakers or spaces, or fraction thereof.
 - 6. Running Threads: Running threads shall not be acceptable.
 - 7. All bends and offsets, where required, shall either be made with factory made bends or shall be field bends made with a conduit bender designed

specifically for use with the type of conduit to be bent.

8. Minimum size of conduit shall be 3/4 inch. In no case shall the conduit size be smaller than that shown on the drawings.
9. The entire electrical raceway system shall be bonded and form a continuous metallic electrical conductor from service point to every box and shall be terminated with ground bushings connected to the panelboard ground bus per NEC.
10. All conduits which are installed shall be capped during construction to prevent the entrance of foreign material.
11. All conduit installed by the Contractor shall be of the type listed in the "Conduit Installation Table", at end of this section.
12. The maximum number of conduit bends shall be as follows: 90 degrees of conduit bends for up to 300 feet of conduit, 180 degrees of conduit bends for up to 200 feet of conduit, 270 degrees of conduit bends for up to 100 feet of conduit, 360 degrees of conduit bends for 50 feet of conduit or less.
13. Conduit terminating at floors or in cabinets, cubicles, and walls shall be identified by metal tags bearing the conduit number. The tags shall be securely attached to the conduit directly under the terminating bushing on both ends of the conduit.

B. Exposed Conduit:

1. All exposed conduits shall be run in straight lines parallel to column lines, walls or beams. Where conduits are grouped, the bends and fittings shall be installed so as to present an orderly appearance. Unnecessary bending or offsets shall not be acceptable. Conduits shall be kept at least 12 inches away from heating devices or similar equipment.
2. Supports for exposed conduit shall be in accordance with Title 24, CAC.
3. Supports and all hardware inside sump area shall be stainless steel.
4. Support conduits as close to 8 foot intervals as possible and within 1 foot of boxes or changes in direction. Use riser supports with clamps for vertical conduit risers.
5. For single conduit runs, use conduit straps with backplates or suspend from ceiling with single conduit hangers. Single hole malleable iron clamps may be used for horizontal runs on vertical surfaces. Perforated strap (plumber's tape), not acceptable.
6. For multiple conduit runs, group conduits together and support from ceiling

by means of trapeze hangers. Wall brackets may be used for conduit runs on vertical surfaces. Clamp each conduit to trapeze or bracket, using conduit clamp.

7. Fasten hanger rods to structural steel members with beam clamps or to concrete inserts set flush with surface. Install reinforcing rod through opening in concrete insert.
8. Exposed conduit shall be tightened securely and shall be supported rigidly in place, and all connections to outdoor boxes shall be watertight. All exposed conduit shall include, where required, the drilling of holes in the bottom and top of enclosures or plates and in the sides of enclosures of switchgear and other electrical equipment. The Contractor shall drill all holes in concrete for installation of expansion anchors for exposed conduit runs.

C. Conduits in Concrete Slabs:

1. Conduits in concrete slabs shall be rigid galvanized steel and may be installed in structural slabs, or in slabs on fill, having a minimum thickness of 4" of concrete around the entire conduit.
2. Conduits will not be permitted to interfere with proper placement of principal reinforcement steel and must be located as directed. In structural slabs, place conduits carefully between upper and lower layers of steel. In prestressed concrete slab construction, place conduits in center of slab and do not support from prestressed steel.
3. Space conduits 8" minimum on centers, except place as wide as possible where they converge at panels or junction boxes.
4. Place conduits running parallel to slab supports (beams, columns, walls, etc.) not less than 12" from such supports.

D. Underground Conduits:

1. Buried Conduit:

- a. Buried conduits shall be a minimum of 24 inches below grade on runs not exposed to vehicular traffic and a minimum of 36 inches below grade when exposed to vehicular traffic. Buried conduits shall be installed per the Conduit Installation Table, see end of section for table. Backfill shall be compacted to 95%. Paved surfaces disturbed during trenching shall be repaired to pre-construction condition after installation is complete.
- b. All conduits entering or leaving the ground shall be sealed to prevent condensation of moisture inside the conduit. Conduit entrances in the bottom of switchgear, power distribution panels, switchboards, etc.,

shall project into the enclosure a minimum of three inches to prevent water from entering conduits.

- c. Concrete shall be Class "D" PCC in accordance with section 10-5 of the City of Sacramento Standard Specifications and shall have a compressive strength of 3000 PSI. A red oxide in the amount of 5 lbs. per cubic yard shall be mixed uniformly throughout the concrete.
- d. Contractor to place a 6" wide electrical caution warning tape in trench 12" above concrete as directed by the Engineer.

2. Duct Lines:

- a. Duct lines shall have a continuous slope downward toward pull boxes and away from switchgear with a pitch not less than 4 inches in 100 feet. Install end bells at duct terminations in handholes. Except at conduit risers, changes in direction or more than 5 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet, sweep bends may be made up of one or more manufacturer's 30 degree curved sections and straight sections. Manufactured risers shall have a minimum radius of 18 inches. The joints of the conduits shall be staggered by rows and layers so as to provide a duct line having the maximum strength. All duct runs shall be placed on an undisturbed excavated soil base wherever possible. Where duct runs pass through backfilled areas, the soil base shall be compacted to 95%.
- b. Duct joints shall be made by brushing a plastic solvent cement on insides of plastic coupling fittings and the outside of duct ends. Each duct and fitting shall then be slipped together with a quick one-quarter turn twist and held in to set the joint tightly.
- c. Plastic spacers as manufactured by the conduit supplier shall be used and shall be located five feet on centers. These spacers shall provide for conduit separation by a minimum of two inches between and four inches on the top, bottom and sides. Wire ties shall be made at each spacer location and shall be securely anchored to prevent conduit flotation during pouring. Duct runs shall be watertight.
- d. All ducts shall be inspected by the Engineer prior to pouring concrete. He shall inspect for backfill compaction, drainage slope, spacers, flotation ties and conduit condition, joints, and end bells. Concrete shall not be poured until this inspection is complete.
- e. Conduits shall be thoroughly swabbed immediately upon completion of pouring.
- f. After the concrete has set, but before backfilling, a mandrel having a

diameter the nominal conduit inside diameter, minus 1/4 inch, and not less than 8 inches long, shall be pulled through each conduit. The mandrel shall be lead covered or painted white to give indication of any protrusion on the inside of the conduit, which might injure the cable sheath. The ends of all conduits shall be suitably plugged, capped and protected from damage during construction.

- g. Ducts shall be stored to avoid warping and deterioration with ends plugged to prevent entry of any water or solid substances. Ducts shall be thoroughly cleaned before being laid. Plastic ducts shall be stored on a flat surface and protected from the direct rays of the sun.
- h. Concrete shall be Class "D" PCC in accordance with section 10-5 of the City of Sacramento Standard Specifications and shall have a compressive strength of 3000 PSI. A red oxide in the amount of 5 lbs. per cubic yard shall be mixed uniformly throughout the concrete.
- i. Contractor to place a 6" wide electrical caution warning tape in trench 12" above concrete as directed by the Engineer.

3. Conduit in Structural Concrete:

Runs of conduit to be embedded in concrete shall be rigidly supported in their proper positions while concrete is being placed. Ends of conduits shall be suitable plugged or capped during construction to prevent the entrance of concrete or other foreign matter. Connections shall be checked for tightness before being embedded.

4. Vertical Penetration of Grade:

- a. All risers penetrating ground shall extend 6 inches above grade.
- b. Conduit entrances in the bottom of switchgear, power distribution panels, switchboards, etc., shall project into the enclosure a minimum of three inches to prevent water from entering conduits.

5. Conduits Crossing Expansion and/or Contraction Joints:

Expansion couplings used in conduit runs crossing expansion or contraction joints in concrete shall be zinc coated and watertight.

E. Workmanship and Installation Requirements:

- 1. Where field changes are required, every precaution shall be taken to insure that the change is coordinated with other conduit, structural, and plumbing and piping work. Information shall be obtained regarding the completed raceway runs to insure that there will be no interference when the raceway run is extended or revised. A complete record of such changes shall be

made on the Drawings.

2. Conduits shall be cut square, threaded and reamed to remove sharp or rough edges and burrs. No running threads will be allowed. Conduit joints and connections shall be made waterproof and rustproof by application of a non-insulating thread compound, such as white lead or graphite, and zinc sealing material. Each threaded joint shall be thoroughly cleaned to remove cutting oil before the compound is applied.
3. Metallic conduits shall be bent cold to prevent damage to the protective coating. All bending shall be gradual and be done smoothly to permit the pulling on insulated electrical wires and cables without incurring damage to the insulation or sheath. Radius of curvature shall be not less than that permitted by NEC. The number of bends shall not exceed four 90 degree bends between pull points.
4. Conduit shall be rigidly secured to panels and other electrical equipment terminal boxes with locknuts and grounding bushings in such a manner that each system shall be electrically continuous throughout unless otherwise shown on the Drawings.
5. The raceway system shall be installed complete before conductors are installed. Concrete shall be removed from the inside of pull boxes after the forms are removed, and the threads for attaching devices and covers shall be cleaned. As soon as practicable after conduits are installed, conduits shall be swabbed with clean dry rags to show they are clean and dry.
6. To reduce damage to the zinc coating, only strap type wrenches shall be used. All places where the zinc coating is damaged shall be repaired with zinc-rich galvanizing repair compound.
7. Pull boxes, sized in accordance with NEC, shall be installed wherever necessary to avoid overly long straight runs or an excessive number of bends.
8. Raceway shall be installed with necessary fittings and supports.
9. Pull-tape shall be made out of woven aramid yarns and contain a silicon lubricate. The pull-tape shall have sequential footage markings and have a minimum tensile strength of 2500 lbs. Furnish and install pull-tape in all empty raceways, unless otherwise noted. Pull-tape shall be Dandy-Line or approved equal.
10. All underground conduits shall be inspected by the Engineer before backfilling the trench.

CONDUIT INSTALLATION TABLE

<u>CONDUIT INSTALLATION</u>	<u>CONDUIT TYPE</u>
Exposed Conduit (indoor & outdoor):	Rigid galvanized steel conduit.
Conduit in Concrete Slab:	Rigid galvanized steel conduit.
Underground Conduit:	Rigid galvanized steel PVC coated conduit where the conduit is directly in contact with the earth or schedule 40 PVC conduit with concrete encasement minimum of 4" all around for horizontal runs only.
Conduit in Duct Bank:	Schedule 40 PVC conduit with concrete encasement minimum of 4" all around for horizontal runs only.
Vertical or horizontal sweeps, risers, or stubs into underground boxes:	Rigid galvanized steel PVC coated conduit for entire sweep, underground runs 5' prior to riser or stub, and 6" above finished grade. Conduit 6" above finished grade shall be installed as exposed conduit.
Bottom Entrance of Switchgear, Distribution Panel, MCC, & etc:	Rigid galvanized steel PVC coated conduit.
Side or Top Entrance of Switchgear, Distribution Panel, MCC, & etc:	Rigid galvanized steel conduit.
Conduit Exposed to Corrosive Environment (sewer wet well)	Type 316 stainless steel conduit
Primary & Secondary of the SMUD Transformer:	Per SMUD standard specifications.
Bottom Entrance From SMUD Transformer to City Main Switchgear:	PVC conduit with concrete encasement minimum of 4" all around.
Motor Conduit Box to Rigid Wireway System:	Flexible liquid tight metal conduit.
Door Switch Sensor to Rigid Wireway System:	Flexible liquid tight metal conduit.

CONDUIT INSTALLATION

CONDUIT TYPE

Conduit From Junction Box
to Outside Building Lights:

Rigid galvanized steel conduit.

Conduit From Junction Box
to Trash Rack Lights:

Flexible liquid tight metal conduit.

Risers or Conduit Stubs Rising
Up From Concrete Duct Bank:

Rigid galvanized steel PVC coated conduit.

Equipment Subject to Vibration

Flexible liquid tight metal conduit.

Notes

1. All acceptable conduit materials are specified in specification 16110 section 2.02 A.
2. Any conduit not covered in the above categories shall be Rigid Galvanized Steel PVC coated.
3. All underground PVC conduits shall be encased in red concrete.
4. Contractor shall place a 6" wide electrical caution warning tape in all trenches 12" above concrete or as directed by the Engineer.

END OF SECTION

SECTION 16120

LOW VOLTAGE WIRE AND CABLE

PART 1 - GENERAL

1.01 SCOPE

- A. This Specification Section covers the furnishing, installing and testing of all wire and Cable required to complete the installation of equipment as specified herein and as shown.
- B. The provisions of Section 16010 of these specifications shall apply, unless otherwise specified in this Section.

1.02 SUBMITTALS

- A. Descriptive literature for all materials furnished under this section shall be submitted in accordance with Section 5-7 of the standard specifications.
- B. Submittals for the wire and Cable shall include, but shall not be limited to, the following:
 - 1. Submittals will include product data sheets for all cables, of each type and voltage rating, on which work is to be performed under this contract.
 - 2. Certified test reports prepared by manufacturer.

1.03 QUALITY ASSURANCE

- A. Wire and cable of the type and voltage rating shown on the contract drawings shall be of a design which has been in satisfactory use for not less than three years in a minimum of 20 installations. For purposes similar to those intended herein.
- B. Manufacturer shall provide certification that the manufacturer has been fabricating and assembling specified equipment (as described in A above) in his current facility for a minimum of five (5) years.
- C. All materials selected for the manufacture of the hardware shall be the best available for the purpose for which they are used, considering strength, ductility, durability and the best engineering practice.
- D. All cable have been manufactured within one year of installation.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Wire and cable shall be delivered complete, in manufacturer's original, unopened protective packaging. Packing materials shall be such as to prevent damage to the materials during transportation and handling.
- B. Wire and cable shall be handled in a manner to prevent damage to the coverings and conductor.
- C. Maintain protective coverings until ready for installation.

PART 2 - PRODUCTS

2.01 REFERENCE STANDARDS

- A. Wire and cable supplied under this contract shall be designed, manufactured, and tested in accordance with the latest version of the following standards:

American Society Testing Materials (ASTM)	
B-8	Concentric-Lay-Stranded Copper Conductors

Insulated Cable Engineers Association (ICEA)	
S-68-516	Ethylene Propylene Rubber Insulation

Underwriters Laboratory (UL)	
UL 20	General Use Snap Switches
UL 486A	Wire Connectors and Soldering Lugs
UL 83	Thermoplastic Insulated Wires
UL 510	Insulating Tape
UL 1072	Medium Voltage Cable

National Electrical Manufacturers Association (NEMA)	
WD-1	General Purpose Wiring Devices

National Electrical Code (NEC)

Institute of Electrical and Electronic Engineers (IEEE)

California Administrative Code (CAC) Title 24

2.02 LOW VOLTAGE WIRING

- A. Low voltage wiring shall be of the size and number shown and shall have the following characteristics. Sizes are indicated by American Wire Gauge (AWG) and minimum size shall be No. 12 AWG for power wiring and No. 14 AWG for control wiring, unless otherwise indicated.
- B. Voltage: 600 V.
- C. Conductors: Annealed copper 98% conductivity. Aluminum conductors are not acceptable.
- D. Conductor Stranding: All Conductors shall be stranded. Solid wire is not acceptable.
- E. Insulation: Thermoplastic insulated wires and cables shall be listed in UL 83. They shall be delivered to the job site in the manufacturer's unopened boxes or reels. Insulation for conductors and cables shall be rated 600 volts and shall be as follows:

Item	Sizes	Insulation
Branch	No. 12 to No. 10	THHN/THWN-2
Grounding	All	TW or bare
Feeders	No. 6 and above	THHN/THWN-2
Cords	No. 12	SO
Wet Locations	All	THWN
Corrosive Locations	All	THHN/THWN-2
VFD Feed to Motor	All	VFD rated, blended composite semiconductive, tray cable rated, UL type TC 90°C. 100% shielding with foil tape & tinned copper braid

- F. Insulation Colors: Insulation shall be continuously colored for the entire conductor length; except that feeders can be phased taped and all insulated grounding conductors must be green.
- G. Instrumentation/Telemetry Cable: Instrumentation and Telemetry Cable shall be multiple-pair, #16 AWG, twisted, overall shielded with PVC jacket. Shield shall be 100% and include #20AWG stranded, tinned copper drain wire. The conductors shall be polyethylene insulated. Manufacturer shall be Belden or equal.

- H. Telephone Cable: Telephone cable shall be 6 twisted pair with standard color code, #22 AWG, solid copper, polyethylene or polypropylene insulation, twisted pairs shall have varying lays, 100% shielded with .008" corrugated aluminum tape with ethylene copolymer coating on both sides, polyethylene jacket, filled with petrolatum-polyethylene gel filling compound, Clifford type BJFA, or equal.
- I. RS-485 Application: tinned copper, polyethylene insulated, twisted pair. Overall aluminum-polyester shield. 24 AWG stranded tinned copper drain wire. Overall tinned copper braid shield. Chrome PVC jacket. The cable shall be Belden 9842, or equal.
- J. Ethernet Application: Approved shielded CAT-5E or CAT-6 cable. Segment of Ethernet shall not exceed 90 meters under any circumstances.
- K. VFD rated cable: UL 44, XHHW-2, 600 V conductors, the cable shall have three symmetrically placed grounds to reduce problems associated with Pulse-Width Modulated AC drives. Continuous corrugated aluminum sheath 99.5% shall be applied over the assembly. The continuous sheath will be impervious to moisture, liquids, and gases. The cable shall have black PVC jacket, sunlight and oil resistant, per UL 1569. The VFD cable shall be Belden 295XX,

2.03 COLOR CODE

- A. Color code for three phase circuits shall be ph-A, ph-B, ph-C front to back, left to right and top to bottom. Color code for three phase circuits are listed in phase order. Color code shall be as follows:

120/240 volt power wiring	
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

480/277 volt power wiring	
Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	White

Ground	Green
--------	-------

Miscellaneous	
Control wiring	Red
DC Power Wiring	Blue

Signal wiring	
Positive (+)	Clear
Negative(-)	Black

2.04 GROUND CONDUCTOR

- A. Grounding electrode conductors shall be sized per NEC 2002 edition, table 250.66, unless otherwise noted on the Plans.
- B. Raceway and equipment grounding conductors shall be sized per NEC 2002 edition, table 250.122, unless otherwise noted on the Plans.

2.05 GROUND RODS

- A. Provide copper-encased steel ground rods at least 3/4 inch in diameter and 10 feet long unless otherwise indicated. Die-stamp each near the top with the name or trademark of the manufacturer and the length of the rod in feet. The rods shall have a hard, clean, smooth, continuous surface throughout the length of the rod. Ground rods shall be provided with precast ground wells.

2.06 WIRING MATERIALS

- A. Compression Connectors: Connectors shall be for use with copper conductors and shall conform to the requirements of UL 486A. Control and signal connectors shall be copper compression type nylon self insulated grip locking spade lugs. Power and grounding lugs and connectors for conductors No. 6 and larger shall be compression types of one piece tubular construction. These power compression connectors shall be copper long barrel terminals with corrosion resistant tin plating. Connectors shall be marked externally with wire size and type. Power connectors shall have NEMA configuration bolt holes on the pad. Connectors shall also have the proper mating compression die index and color code marked on the barrel. Furnish ILSCO #CRA/B-L series or approved equal.
- B. Splice Waterproofing Kits: Splice waterproofing shall be in kit form. Kit shall contain low viscosity polyurethane sealing and insulating material. The component materials of the insulation shall be in exact mixing ratio packages. Kit shall employ

a gravity poured method of a pressure injected method. Molds shall be flexible plastic with porous webbing. Molds shall be capable of accommodating odd shape splices. Kit shall be rated 600 V and water submersible. Furnish 3M Scotch cast 2104 and 85 series, or approved equal.

- C. Electrical Tapes: Tapes shall conform to the requirements of UL 510 and be rated: 105 degrees C, 600 V, flame retardant, hot and cold weather resistant. Vinyl plastic electrical tape shall be 7 mil black. Phase tape shall be 7 mil vinyl plastic, color code as specified. Electrical insulation putty shall be rubber based, elastic putty in tape form. Varnished cambric shall be 9 mil cotton tape impregnated with yellow insulating varnish and adhesive backed.
- D. Wire and Cable Markers: Every control and signal conductor shall be tagged with a permanently machine imprinted plastic nylon clip sleeve heat shrinkable or adhesive backed strip type labels protected with a clear plastic heat shrinkable tubing.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Wire and cable shall not be installed in conduit until the raceway system has been completed and cleaned. The equipment and methods for the installation of wire and cable shall insure that no cuts or abrasions in the insulation or protective covering or kinks in the conductors occur. Cables shall be pulled down grade with the feed in point at point of the highest elevation.
- B. The Contractor shall pull wire and cable into the conduit with sufficient length remaining at the ends to conveniently make connections to all equipment or devices.
- C. Where practicable, the minimum radius to which an insulated conductor shall be bent, whether permanently or temporarily during installation, shall be ten times the diameter over the outer covering for rubber and thermoplastic insulated cable.
- D. Where a lubricant is needed as an aid in pulling wire or cable, a nonconducting lubricant or cable-pulling compound approved by the wire and cable manufacturer and that is not injurious to the sheath or insulation shall be used. 600 V cable lubricants shall be soapstone, graphite or talc which shall be UL listed for thermoplastic insulation. Oil or grease shall not be used for lubrication. Excessive pulling stresses will not be permitted.
- E. Wire and cable shall be continuous, with no splices permitted except in enclosed steel boxes provided for the purpose, or in manholes. Shipping length of power cable shall be equal to a circuit length or summation of various circuit lengths to minimize cable waste.

3.02 INSTALLATION - LOW VOLTAGE WIRING

A. General Requirements:

1. Do not use blocks, tackle, or other mechanical means to pull in wires #8 AWG, or smaller. Cable pulling tensions shall not exceed the maximum pulling tension for stranded copper.
2. See section 16110 for pull rope/tape requirements.
3. Unless otherwise specified or shown, leave at least 9" of free conductor length at each unconnected outlet. The free ends of conductors shall be coiled neatly in outlet box.

B. Splicing and Termination of Conductors:

1. Conductors #10 AWG and smaller:
 - a. Twist conductors together to be electrically and mechanically secure.
 - b. Insulate splices, joints and free ends of conductors with insulation equivalent to that of conductors by taping with varnish-cambridge rubber tapes, or with high dielectric strength plastic tape.
2. Conductors #8 AWG and larger:
 - a. Splice and terminate conductors by use of connectors and terminal lug.
 - b. Do not use split bolt type connectors.
 - c. After initial set has been taken, re-tighten all pressure type connectors and lugs.
 - d. Insulate all splices, joints, and free ends of conductors as specified above.
 - e. Where aluminum lug is bolted with steel or copper bolt, use Belleville spring washer and flat washer. Belleville washer, either hardened and tempered steel, tin plated, or stainless steel. Flat washer, mild steel, tin plated, and slightly larger than Belleville washer.
3. Low Voltage Control Wiring: Splice by twisting conductors together so as to be electrically and mechanically secure. Other methods may be used if specifically approved by Engineer.

4. Underground Splices: Conductor and cable splices installed underground in manholes, pullholes and similar locations, shall be made watertight. Install waterproofing after insulating with tape on all splices in junction boxes or handholes. Follow manufacturer's written instructions. As a minimum molds shall be fitted uniformly webbed around the spliced conductors. Insulating and waterproofing material shall then be poured or injected into the mold. Do not allow cables to move until after material has cured one hour at 70 degrees F or eight hours below 70 degrees F.

C. Marking:

1. In addition to color coding, identify circuits as follows:
 - a. The Contractor shall assign to each wire or cable a unique identification number unless a number has been pre-assigned on the Plans.
 - b. Where an identification number has been pre-assigned on the Plans the Contractor shall use that number.
 - c. The same identification number shall be used for conductors having common terminals.
 - d. Identification numbers shall be shown on all As-Built drawings.
 - e. Identification numbers shall be located within 3" of wire terminations and shall not be located such that they are concealed in any raceway.
2. Each multiconductor cable shall be assigned a unique identification number. It is required that this cable number shall form part of the individual wire identification number for each conductor in the cable. Cable markers shall be attached to each cable at stub-up locations and at all intermediate pull box locations.

3.03 GROUNDING

- A. Permanently and effectively ground noncurrent metal parts of conduit systems, supports, cabinets, switchboards, equipment cases, motor frames, etc., and system neutral conductors per NEC. Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where conduits enter any panel or device, panels with open bottom or where shown on the drawings. Install a ground conductor in each raceway system. Contractor to install Ufer ground per NEC section 250.
- B. Grounding details shown on plans are minimum. If additional equipment, such as ground rods, clamps, conductors, etc., is required, furnish and install same without additional cost to City.

- C. Use ground clamps specifically designed for grounding purposes. Where ground conductor is in conduit, use ground clamp which grounds both conductor and conduit.
- D. Shielded instrumentation cable shall be grounded at one end of circuit only unless explicitly required by manufacturer of instrument or device to be grounded at multiple locations. Single ground point in each circuit shall be at the "receiving" end of the signal carried by the cable.

3.04 PREPARATION FOR OPERATION

- A. The wire and cable shall be properly installed, connected and tested by the Contractor before such equipment will be taken over for operational service.
- B. Identification markers and nameplates shall be properly and accurately installed.
- C. Torquing: Every worker assigned to tightening bolted connections on this job shall be required to have either a torque screwdriver or a torque wrench on site in their tool box. Each crew shall have one of each. All electrical, mechanical and structural threaded connections shall be torqued. Torque connections to the value recommended by the equipment manufacturer. If they are not available, see Section 16950 for torque requirements.

3.05 TESTS AND INSPECTIONS

- A. Insulated wire and Cable Dielectric Tests: After the wiring is installed and all taps and splices are completed, but before making connections to equipment terminals, the cable shall be given insulation tests in accordance with Section 16950 and NEMA and ICEA Standards.
- B. Continuity Tests:
 - 1. After wiring connections to equipment and devices have been made, the circuits shall be tested for continuity. The Contractor shall be responsible for notifying the City Resident Inspector when the wire or cable is ready to be tested, and the Contractor shall conduct the tests as instructed by the Engineer.
 - 2. If a failure is detected, the Contractor shall locate and determine the trouble, make necessary corrections to the installation and retest without additional cost to the City.
 - 3. Connection of the wiring to equipment or device terminal blocks or other connection points and furnishing and installing conductor identification tags at terminals or other connections shall be included as part of the equipment's installation.

- C. All tests required to insure the satisfactory installation, adjustment, operation and performance of all equipment and materials erected and installed under this specification, shall be the responsibility of the Contractor.
- D. The Contractor shall also responsible for furnishing all electrical test equipment, meters, instruments and miscellaneous equipment and perform all work required for the tests.
- A. Test Reports: The Contractor shall furnish the Engineer three copies of certified test reports showing the results of all tests specified herein.

3.06 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

- A. Demonstration of the operation of segments of systems shall not be construed as acceptability of the complete system. Acceptance will only be made on satisfactory demonstration of the complete operation of the system as a whole.
- B. If, in the opinion of the Engineer, test results show improper adjustment, operation, or performance of any equipment, and these deficiencies are due to negligence or unsatisfactory installation by the Contractor, the Contractor shall remedy the situation at no additional cost to the city.

END OF SECTION

SECTION 16922

MISCELLANEOUS EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers the furnishing and installation of the following equipment: antenna pole, magnetic door switch, uninterruptible power supply (UPS), and the float switch. Contractor shall coordinate the installation of the antenna pole with the City.

1.02 REFERENCE PUBLICATIONS

- A. The equipment covered under this contract shall be designed, manufactured, and tested in accordance with the latest version of the applicable industrial standards.

1.03 SUBMITTALS

- A. Manufacturers' Data:

1. Antenna Pole
2. Magnetic Door Switch
3. UPS
4. Float Switch

- B. Shop Drawings.

- C. Operations and Maintenance Manuals as specified in the Special Provisions.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall verify that they have been fabricating and assembling similar equipment for a minimum of five (5) years. Manufacturer shall be located in the United States.

PART 2 - PRODUCTS

2.01 ANTENNA POLE

- A. Provide a 50 foot long, hot dipped galvanized steel antenna pole and other additional mounting hardware required for a complete installation as shown on the drawings.

1. Antenna support members shall have sufficient strength to withstand local wind conditions of 80 MPH sustained.
2. All the mounting hardware shall be hot dipped galvanized or stainless steel.
3. Antenna pole and foundation shall be installed per contract drawings.
4. Antenna and cable shall be installed by the Contractor on the antenna pole prior to installing the antenna pole on the foundation.

2.02 MAGNETIC DOOR SWITCH (DS)

- A. Provide magnetic door switches for both doors on the service pedestal and vault hatches. Magnetic door switch shall be Sentrol model number 1044TW or approved equal. Door switch shall be of the SPDT type and color shall be natural.

2.03 UNINTERRUPTIBLE POWER SUPPLY

- A. The UPS shall provide full power to its connected load as shown on the Plans for a minimum of 30 minutes following loss of primary power and shall be an on-line system which provides continuous, no break power during complete blackouts or momentary interruptions. Transient power surges and dips shall not affect the operation of the devices connected to the UPS.
- B. The UPS shall be rated to provide a minimum of 700 VA, 490 W at output at 120 VAC at an efficiency of 88%. The UPS shall be a Powerware 9120 model number PW9120 700 or equal. Provide relay interface card option model number AS/400.
- C. Install UPS as shown on the drawing and provide all necessary wiring. Plug cords and receptacles shall be provided so that the UPS can be readily bypassed with power being obtained directly from the panelboard.
- D. Submit calculations and mounting details showing adequate spacing and cooling of the UPS compartment. Install necessary cooling fans and vents to keep a minimum temperature 5° below rated operational value.
- D. Total harmonic distortion : Less than 5% on fundamental sine wave.
- E. Battery: Maintenance free lead acid.

2.04 FLOAT SWITCH

- A. Float switch shall utilize a stainless steel float which moves with liquid level to actuate a magnetic reed switch. The single pole single throw float switch shall have a minimum electrical rating of 100 VA. The float switch shall be a Madison stainless steel full size float switch model number M5601 or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor shall be responsible for the installation of the equipment specified and shall pull all the cables and wires and make all the connections as shown on the Plans. The City will conduct tests to determine its acceptability.
- B. Antenna Alignment
 - 1. Contractor shall make arrangements with City to be onsite before antenna pole is raised.
 - 2. The Contractor shall make the antenna cable connections, install the cold shrink, and align the antenna **WHILE THE ANTENNA POLE IS ON THE GROUND.**
 - 3. The Contractor shall be responsible for the final alignment of the antenna as directed by the City.

3.02 FIELD TESTING

- A. After finishing all the connections, the Contractor shall cooperate with City during the testing.

END OF SECTION

SECTION 16950

OPERATIONAL TESTING

PART 1 - GENERAL

1.01 SCOPE

- A. The Contractor shall perform the tests as outlined in these Special Provisions.

1.02 GENERAL REQUIREMENTS

- A. These tests shall assure that all equipment is operational within industry and manufacturer's tolerances and is installed in accordance with design plans and specifications. The tests and inspections shall determine the suitability for energization and the suitability for Owner acceptance of the Contractor's work.

1.03 FAILURE TO MEET TEST

- A. Contractor shall replace the defective material or equipment and have tests repeated until test proves satisfactory to the Engineer without additional cost to the Owner.

1.04 SUBMITTALS

- A. The Contractor shall submit the following tests to the Engineer:
1. Wiring test.
 2. General start-up and testing procedures
 3. PLC and Instrumentation testing
- B. Three copies of each test mentioned above shall include the following data and be submitted with the Operation and Maintenance Manual:
1. Summary of project, construction contract numbers
 2. Description of equipment tested
 3. Description of test
 4. Test personnel
 5. List of test equipment used and calibration date
 6. Test results, date and weather conditions
 7. Conclusions and recommendations
 8. Appendix, including all test forms

PART 2 - PRODUCTS

2.01 TESTING COMPANY

- A. The testing company shall meet federal OSHA criteria for accreditation of testing laboratories, Title 29, Part 1907. Membership in the International Electrical Testing Association constitutes proof of meeting such criteria. The testing shall be performed by Electro Test, Apparatus Unlimited, Power Systems Testing, Hart Testing, or approved equal.

2.02 TESTING

- A. California Electrical Safety Orders (ESO) and Occupational Safety and Health Act (OSHA): The Contractor is cautioned that testing and equipment shall comply with ESO and OSHA as to safety, clearances, padlocks and barriers around electrical equipment energized during testing.

PART 3 - EXECUTION

3.01 PREOPERATIONAL TESTING

- A. All testing shall conform to International Electrical Testing Association (NETA) Maintenance and Acceptance specifications and shall utilize manufacturer's instruction manuals applicable to each particular apparatus.
- B. Upon completion of the test and inspections noted in these specifications, a label shall be attached to all serviced devices. These labels will indicate date serviced and the service company responsible.

3.02 WIRING TEST

- A. Verify all wire connections/terminations are per contact drawings or approved changes. Check for proper termination of all wires.

3.03 GENERAL START-UP AND TESTING PROCEDURES

- A. Remove rust preventives and oils applied to protect equipment during construction.
- B. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
- C. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
- D. Perform cold alignment and hot alignment to manufacturer's tolerances.

- E. Inspect valves, and tighten packing glands to insure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
- F. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
- G. Install gratings, safety chains, handrails, shaft guards, and sidewalks prior to operational testing.
- H. Functionally test mechanical and electrical equipment for proper operation after pre-rotation testing tasks have been completed.
- I. Demonstrate proper operation of each instrument loop function.

3.04 PLC AND INSTRUMENTATION TESTING

- A. See Section 17520 for testing the PLC and devices connected to the PLC.
- B. See Division 17000 for testing and calibration of the instrumentation.

3.05 OPERATIONAL TESTING

- A. After preoperational tests are complete, the Contractor shall conduct overall operational testing of the plant which shall be witnessed by the Engineer and other City personnel. City O&M personnel will assist the Contractor during operational testing.

END OF SECTION

SECTION 17100

PROCESS CONTROL AND INSTRUMENTATION SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

A. The **CONTRACTOR** shall provide the following Instrumentation and Control components in accordance with the Contract Documents. The components shall include, but not be limited to, the following:

1. Instruments specified in Division 17000.
2. Local control stations not provided as components of the specified equipment.
3. All Control Cabinets which are NOT equipped with the PLCs.
4. Fiber optic cabling, area switches (where noted on the drawings), hubs, valve networks, copper cabling, and related equipment.
5. Programmable Logic Controllers (PLC) and/or Remote Terminal Unit (RTU).

The **City** shall perform all PLC and operator interface panel programming.

B. The requirements of this Section apply to all components of the CONTROL SYSTEM unless indicated otherwise.

C. Responsibilities:

1. The **CONTRACTOR**, through the use of a qualified Instrumentation Supplier and qualified Electrical and Mechanical installers, shall be responsible to the City for the supplying, installation, labeling and termination of all instruments to the City furnished control cabinets and consoles.
2. The **CONTRACTOR** shall install all City furnished control cabinets and install City furnished consoles and connect external wires i.e. power and Ethernet.
3. Due to the complexities associated with the interfacing of numerous instruments, panels, local controls, PLC I/O devices, it is the intent of these specifications that the Instrumentation Supplier be responsible to the **CONTRACTOR** for the installation and termination of the components to both new and existing devices provided under other sections of this contract.

4. The Instrumentation Supplier shall perform the following work:
 - a. Prepare submittals.
 - b. Design, develop, and electronically draft loop drawings and control panel designs.
 - c. Prepare the test plan and the spare parts submittals.
 - d. Perform setup, bench calibration and loop checks after installation.
 - e. Oversee and certify installation of all devices provided under Division 17.
 - f. Oversee, document, and certify loop testing.
 - g. Provide hardware support during the performance test.
 - h. Prepare record drawings.

1.02 REFERENCE PUBLICATIONS

- A. The equipment covered under this contract shall be designed, manufactured, and tested in accordance with the latest version of the applicable industrial standards.

1.03 SUBMITTALS

- A. Provide submittals in accordance with the Special Provisions. Submittals shall be approved by the Engineer prior to manufacture and shipment.
- B. Provide Operations and Maintenance Manuals as specified in the Special Provisions.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall verify that they have been fabricating and assembling similar equipment for a minimum of five (5) years.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. **Code and Regulatory Compliance:** All work shall conform to or exceed the applicable requirements of the National Electrical Code.

- B. **Current Technology:** All meters, instruments, and other components shall be the most recent field-proven models marketed by their manufacturers at the time of submittal of the shop drawings unless otherwise required to match existing equipment.
- C. **Hardware Commonality:** All instruments which utilize a common measurement principle (for example, d/p cells, pressure transmitters, level transmitters which monitor hydrostatic head) shall be furnished by a single Manufacturer. All panel mounted instruments shall have matching style and general appearance. Instruments performing similar functions shall be of the same type, model, or class, and shall be from a single Manufacturer.
- D. **Loop Accuracy:** The accuracy of each instrumentation system or loop shall be determined as a probable maximum error; this shall be the square-root of the sum of the squares of certified "accuracies" of the designated components in each system, expressed as a percentage of the actual span or value of the measured variable. Each individual instrument shall have a minimum accuracy of plus and minus 0.5 percent of full scale and a minimum repeatability of plus and minus 0.25 percent of full scale unless otherwise indicated. Instruments which do not conform to or improve upon these criteria are not acceptable.
- E. **Instrument and Loop Power:** Power requirements and input/output connections for all components shall be verified. Power for transmitted signals shall, in general, originate in and be supplied by the control panel devices. All power supplies shall be mounted within control panels or in the field at the point of application.

2.02 SPARE PARTS AND SPECIAL TOOLS

- A.. The CONTRACTOR shall furnish a list of all spare parts and special tools required to calibrate and maintain all of the instrumentation provided under the Contract Documents.

2.03 FACTORY TESTING

- A. The CONTRACTOR shall provide copies of all factory tests for each piece of instrumentation.
- B. **The Contractor shall provide the Engineer with a factory calibration sheet on the flow meter indicating that the flow tube was calibrated at the factory.**
- C. **The Contractor shall provide the Engineer with a factory calibration sheet on the pressure transducer indicating that the pressure transducer was calibrated at the factory.**

D. The water quality analyzer, PH sensor, and conductivity sensor shall be loop calibrated at the factory as a complete assembly. The analyzer shall be loop calibrated at the factory with the two probes. The loop shall be calibrated using NIST traceable certified reference instruments. The loop calibration shall use the range of values as shown on the Plans. The Contractor shall provide the Engineer with a calibration certificate that includes the following:

1. Model and serial number of each instrument tested
2. NIST report numbers
3. The actual test data
4. Test standards
5. Date and time of the test

PART 3 -- EXECUTION

3.01 PRODUCT HANDLING

A. **Tagging:** Each component shall be tagged to identify its location, instrument tag number, and function in the system. A permanent stainless steel or other non-corrosive material tag firmly attached and permanently and indelibly marked with the instrument tag number, as given in the plans, shall be provided on each piece of the instrumentation. Identification shall be prominently displayed on the outside of the package.

3.02 MANUFACTURER'S SERVICES

- A. The CONTRACTOR shall furnish the following Manufacturer's services for the instrumentation listed below:
1. Perform factory calibration
 2. Oversee installation
 3. Verify installation of installed instrument
 4. Certify installation and reconfirm Manufacturer's accuracy statement
 5. Oversee loop testing, prepare loop validation sheets, and certify loop testing
 6. Oversee pre-commissioning, prepare pre-commissioning validation sheets, and certify pre-commissioning
 7. Train the OWNER's personnel

B. Manufacturer's services shall be furnished for the following equipment:

1. All analyzers
2. All probes
3. Flow meters
4. Pressure transducer

3.03 INSTALLATION

A. **General:**

All instrumentation, including instrumentation furnished under other Divisions, shall be installed under Division 17 and the manufacturers' instructions.

The monitoring and control system configurations indicated are diagrammatic. The locations of equipment are approximate. The exact locations and routing of wiring and cables shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment. All equipment shall be located and installed so that it will be readily accessible for operation and maintenance. Where job conditions require reasonable changes in approximated locations and arrangements, or when the City exercises the right to require changes in location of equipment which do not impact material quantities or cause material rework, the CONTRACTOR shall make such changes without additional cost to the City.

All power and signal wires shall be terminated with crimped type lugs.

All connectors shall be water tight.

All wires shall be mounted clearly with an identification tag that is of a permanent and reusable nature.

All wire and cable shall be arranged in a neat manner and securely supported in cable groups and connected from terminal to terminal without splices unless specifically approved by the ENGINEER. All wiring shall be protected from sharp edges and corners.

All mounting stands and bracket materials and workmanship shall comply with requirements of the Contract Documents.

3.04 CALIBRATION

- A. **General:** All devices provided under Division 17 shall be calibrated according to the manufacturer's recommended procedures to verify operational readiness and ability to meet the indicated functional and tolerance requirements.
- B. **Calibration Points:** Each instrument shall be calibrated at 20, 40, 60, 80 and 100% of span using test instruments to simulate inputs. The test instruments shall have accuracy's traceable to National Institute of Testing Standards.
- C. **Factory Calibration:** Instruments which have been factory calibrated shall be examined in the field to determine whether any of the calibrations are in need of adjustment. Such adjustments, if required, shall be made only after consultation with the ENGINEER.
- D. **Field Calibration:** Instruments which were not bench-calibrated shall be calibrated in the field to insure proper operation in accordance with the instrument loop diagrams or specification data sheets.
- E. **Calibration Sheets:** Each instrument calibration sheet shall provide the following information and a space for sign-off on individual items and on the completed unit:
 - 1. Project name
 - 2. Loop number
 - 3. Tag number
 - 4. Manufacturer
 - 5. Model number
 - 6. Serial number
 - 7. Calibration range
 - 8. Calibration data: Input, output, and error at 10 percent, 50 percent and 90 percent of span
 - 9. Switch setting, contact action, and deadband for discrete elements
 - 10. Space for comments
 - 11. Space for sign-off by Instrumentation Supplier and date

12. Test equipment used and associated serial numbers

- F. **Calibration Tags:** A calibration and testing tag shall be attached to each piece of equipment or system at a location determined by the ENGINEER. The CONTRACTOR shall have the Instrumentation Supplier sign the tag when calibration is complete. The ENGINEER will sign the tag when the calibration and testing has been accepted.

3.05 LOOP TESTING

- A. **General:** Individual instrument loop diagrams per ISA Standard S5.4 - Instrument Loop Diagrams, expanded format, shall be submitted to the ENGINEER for review prior to the loop tests. The CONTRACTOR shall notify the ENGINEER of scheduled tests a minimum of 30 days prior to the estimated completion date of installation and wiring of the instrument. After the ENGINEER'S review of the submitted loop diagrams for correctness and compliance with the specifications, loop testing shall proceed. The loop check shall be witnessed by the ENGINEER.
- B. **Control Valve Tests:** All control valves, cylinders, drives and connecting linkages shall be stroked from the operator interface units as well as local control devices and adjusted to verify proper control action, hand switch action, limit switch settings, torque settings, remote control actions, and remote feedback of valve status and position. Control valve actions and positioner settings shall be checked with the valves in place to insure that no changes have occurred since the bench calibration.
- C. **Interlocks:** All hardware and software interlocks between the instrumentation and the motor control circuits, control circuits of variable-speed controllers and packaged equipment controls shall be checked to the maximum extent possible.
- D. **Instrument and Instrument Component Validation:** Each instrument shall be field tested, inspected, and adjusted to its indicated performance requirement in accordance with its Manufacturer's specifications and instructions. Any instrument which fails to meet any Contract requirement, or, in the absence of a Contract requirement, any published manufacturer performance specification for functional and operational parameters, shall be repaired or replaced, at the discretion of the ENGINEER at no additional cost to the OWNER.
- E. **Loop Validation Sheets:** The CONTRACTOR shall prepare loop confirmation sheets for each loop covering each active instrumentation and control device except simple hand switches and lights. Loop confirmation sheets shall form the basis for operational tests and documentation. Each loop confirmation sheet shall cite the following information and shall provide spaces for sign-off on individual items and on the complete loop by the Instrumentation Supplier:

1. Project name

2. Loop number
3. Tag number, description, manufacturer and model number for each element
4. Installation bulletin number
5. Specification sheet number
6. Loop description number
7. Adjustment check
8. Space for comments
9. Space for loop sign-off by Instrumentation Supplier and date
10. Space for ENGINEER witness signature and date

F. **Loop Certifications:** When installation tests have been successfully completed for all individual instruments and all separate analog control networks, a certified copy of all test forms signed by the ENGINEER or the ENGINEER's representative as a witness, with test data entered, shall be submitted to the ENGINEER together with a clear and unequivocal statement that all instrumentation has been successfully calibrated, inspected, and tested.

3.06 PRECOMMISSIONING

- A. **General:** Pre-commissioning shall commence after acceptance of all wire test, calibration tests and loop tests, and all inspections have demonstrated that the instrumentation and control system complies with all Contract requirements. Pre-commissioning shall demonstrate proper operation of all systems with process equipment operating over full operating ranges under conditions as closely resembling actual operating conditions as possible.
- B. **Pre-commissioning Procedures and Documentation:** All pre-commissioning and test activities shall follow detailed test procedures and check lists accepted by the ENGINEER. All test data shall be acquired using equipment as required and shall be recorded on test forms accepted by the ENGINEER, which include calculated tolerance limits for each step. Completion of all system pre-commissioning and test activities shall be documented by a certified report, including all test forms with test data entered, delivered to the ENGINEER with a clear and unequivocal statement that all system pre-commissioning and test requirements have been satisfied.

- C. **Loop Tuning:** All electronic control stations incorporating proportional, integral or differential control circuits shall be optimally tuned, experimentally, by applying control signal disturbances and adjusting the gain, reset, or rate settings as required to achieve a proper response. Measured final control element variable position/speed setpoint settings shall be compared to measured final control element position/speed values at 20, 40, 60, 80 and 100% of span and the results checked against indicated accuracy tolerances.
- D. **Pre-commissioning Validation Sheets:** Pre-commissioning shall be documented on one of two types of test forms as follows:
1. For functions which can be demonstrated on a loop-by-loop basis, the form shall include:
 - a. Project name
 - b. Loop number
 - c. Loop description
 - d. Tag number, description, manufacturer and data sheet number for each component.
 2. For functions which cannot be demonstrated on a loop-by-loop basis, the test form shall be a listing of the specific tests to be conducted. With each test description the following information shall be included:
 - a. Specification page and paragraph of function demonstrated
 - b. Description of function
 - c. Space for sign-off and date by both the Instrumentation Supplier and ENGINEER
- D. **Pre-commissioning Certification:** The CONTRACTOR shall submit an instrumentation and control system pre-commissioning completion report which shall state that all Contract requirements have been met and shall include a listing of all instrumentation and control system maintenance and repair activities conducted during the pre-commissioning testing. Acceptance of the instrumentation and control system pre-commissioning testing must be provided in writing by the ENGINEER before the performance testing may begin. Final acceptance of the control system shall be based upon plant completion as stated in the General Conditions.

3.09 TRAINING

- A. **General:** The CONTRACTOR shall train the OWNER'S personnel on the maintenance, calibration and repair of all instruments provided under this Contract.
- B. **Instructions:** The training shall be performed by qualified representatives of the equipment manufacturers and shall be specific to each piece of equipment.
- C. **Duration:** Each training class shall be a minimum of 8 hours in duration and shall cover, as a minimum, operational theory, maintenance, trouble shooting/repair, and calibration of the instrument.
- D. **Schedule:** Training shall be performed during the pre-commissioning phase of the project. The training sessions shall be scheduled a minimum of 3 weeks in advance of when the courses are to be initiated. The ENGINEER will review the course outline for suitability and provide comments that shall be incorporated.
- E. **Agenda:** The training shall include operation and maintenance procedures, trouble shooting with necessary test equipment, and changing set points, and calibration for that specific piece of equipment.
- F. **Documentation:** The Contractor shall provide a copy of the training materials utilized during the lesson with all notes, diagrams, and comments.

3.10 ACCEPTANCE

- A. For the purpose of this Section, the following conditions shall be fulfilled before the WORK is considered substantially complete:
 - 1. All submittals have been completed and approved.
 - 2. The instrumentation has been calibrated, loop tested and pre-commissioned.
 - 3. The OWNER training has been performed.
 - 4. All required spare parts and expendable supplies and test equipment have been delivered to the ENGINEER.
 - 5. The performance test has been successfully completed.
 - 6. All punch-list items have been corrected.
 - 7. All record drawings in both hard copy and electronic format have been submitted.

8. Revisions to the OWNER'S Manuals that may have resulted from the field tests have been made and reviewed.
9. All debris associated with installation of instrumentation has been removed.
10. All probes, elements, sample lines, transmitters, tubing, and enclosures have been cleaned and are in like-new condition.

END OF SECTION

SECTION 17101
INSTRUMENTATION

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers the furnishing, installation, and testing of instrumentation as specified herein, as shown on the Drawings, and as required for a complete installation.

1.02 REFERENCE PUBLICATIONS

- A. The equipment covered under this contract shall be designed, manufactured, and tested in accordance with the latest version of the applicable industrial standards.

1.03 SUBMITTALS

- A. Provide submittals in accordance with the Special Provisions. Submittals shall be approved by the Engineer prior to manufacture and shipment.
- B. Provide Operations and Maintenance Manuals as specified in the Special Provisions.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall verify that they have been fabricating and assembling similar equipment for a minimum of five (5) years.

PART 2 - PRODUCTS

2.01 CONDUCTIVITY SENSOR

- A. The conductivity sensor shall be able to read both conductivity and temperature. Temperature shall be read by using a RTD in the center electrode.
- B. Sensor tube shall be 316 stainless steel.
- C. Sensor shall be capable of being inserted through a 1 ¼" NPT full port ball valve.
- D. Sensor shall operate within a temperature range of 32 to 221 degrees Fahrenheit.
- E. Electrodes shall be titanium.

- F. **Provide sensor with a conductivity cell constant of 1.0**
- G. Cabling: Provide manufacturers cabling from the conductivity sensor to the 1057 analyzer.
- I. The conductivity sensor shall be Rosemount Analytical Model No. **402VP-13-31** or approved equal. Provide 50 feet of interconnecting VP cable part number 23747-03 or approved equal.

2.02 PH SENSOR

- A. PH Sensor shall be a general purpose low resistivity glass with ph electrode and read PH values from 0 - 14.
- B. Sensor tube shall be titanium.
- C. Sensor shall be capable of being inserted through a 1 ¼" NPT full port ball valve.
- E. Sensor shall operate within a temperature range of 32 to 212 degrees Fahrenheit.
- F. Cabling: Provide manufacturers cabling from the PH sensor to the 1057 analyzer.
- G. The PH sensor shall be Rosemount Analytical Model No. **396RVP-10-21-54-99SQ10338** or approved equal. Provide the following accessories with the PH sensor:
 - 1. 25 feet of interconnecting VP cable part number 24281-01 or approved equal.
 - 2. Ball Valve / Packing Gland Assembly for 396RVP pH sensor part number 23765-00 or approved equal.

2.03 WATER QUALITY ANALYZER

- A. The water quality analyzer shall analyze conductivity, temperature, and PH. This unit shall provide three analog output signals for each measurement. Analyzer shall be FM approved.
- B. The analyzer enclosure shall be constructed out of polycarbonate and rated for a NEMA 4X/CSA 4 (IP650 environment).
- C. Analyzer shall contain a monochromatic graphic liquid crystal display with 128 x 96

pixel display resolution.

- D. The analyzer shall contain four programmable relays.
- E. Power Supply: 85 – 265 VAC switching, 47.5 – 65 Hz, 15 W.
- F. Current Outputs: Provide four 4-20 ma direct current outputs.
- G. The manufacturer's cables shall be installed between the conductivity and PH sensors to the conductivity analyzer.
- H. Operating range shall be from 32 to 131 degrees Fahrenheit.
- I. The water quality analyzer shall be Rosemount Analytical Model No.1057-02-20-32-48-UL or equal with wall/surface mounting accessory kit part number 23820-00.

2.04 HIM – HART INTERFACE MODULE

- A. Provide one HIM and connect as shown on the plans. The HIM system shall convert a HART digital signal to a serial RS485 Modbus RTU communication signal. The converter shall be Moore Industries model number HIM HART MB1AO 24DC - 1PRG DIN or approved equal.

2.05 PRESSURE TRANSMITTER

- A. The water pressure transmitter shall have an accuracy of $\pm 0.25\%$ of span with a power supply voltage varying between 12.5 to 36 volts DC. The static pressure ratings shall be 150 psi and the diaphragm material shall be stainless steel. Pressure transducer shall be equipped with built-in LCD indicator, Rosemount Option M6. The pressure transmitter shall be Rosemount "Smart" transmitter model No 3051TG-2-A-2B-2-1-J-S1-B4-M6 or approved equal. Each unit shall be calibrated for 0-85 psi at the factory and recorded on a calibration sheet. The calibration sheet shall be provided to the Engineer and filed in the O&M manual.

The contractor shall provide a instrumentation manifold valve for the pressure transducer and install the unit as shown on the plans. Provide a Parker combination instrumentation manifold valve model number HLS28M8F4F or approved equal.

2.06 DIGITAL INDICATOR

- A. Provide digital indicator as shown on the Plans. The digital indicator shall be 4~20 mA loop powered mounted within the service pedestal and scaled to read 0 – 85 PSI. The digital indicator shall be Newport Model No. 558B-ET or engineer approved equal.

PART 3 - EXECUTION

3.01 SHIPPING, HANDLING, AND DELIVERY

- A. The instrumentation equipment shall be protected for shipment by the manufacturer.

3.02 INSTRUMENTATION EQUIPMENT INSTALLATION

- A. The instrumentation equipment shall be installed per the manufacturer's recommendation and as shown on the plans.

3.03 STARTUP ASSISTANCE BY MANUFACTURE'S LOCAL REPRESENTATIVE

- A. The manufacturer shall provide delivery inspection, technical advice, startup inspection, Job-site operational diagnostics and calibration, approve/certify for operation, operational assistance, and one 2-hour Operation and Maintenance training class covering all instrumentation specified in this section. The Contractor shall provide an ISA calibration sheet for each instrument supplied. Each instrument shall then be calibrated to ISA standards and recorded.
- B. Pressure measuring systems shall be handled, installed, calibrated, loop-tested, pre-commissioned, and performance tested according to Section 17100, "Process Control and Instrumentation Systems."
- C. All instrumentation shall be tested and calibrated as outlined in Section 17100.
- D. **The water quality analyzer, PH sensor, and conductivity sensor shall be loop calibrated at the factory as a complete assembly, see Section 17100.**

PART 4 - WARRANTY

4.01 MANUFACTURER'S WARRANTY

- A. The manufacturer shall provide a one year warranty that covers parts, labor and travel. The warranty period shall start of the day the City accepts the project.

END OF SECTION

SECTION 17102

FLOW MEASURING SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers the furnishing, installation, and testing of one (1) magnetic flow measuring system as specified herein, as shown on the Drawings, and as required for a complete installation.

1.02 REFERENCE PUBLICATIONS

- A. The equipment covered under this contract shall be designed, manufactured, and tested in accordance with the latest version of the applicable industrial standards.

1.03 SUBMITTALS

- A. Provide submittals in accordance with the Special Provisions. Submittals shall be approved by the Engineer prior to manufacture and shipment.
- B. Provide Operations and Maintenance Manuals as specified in the Special Provisions.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall verify that they have been fabricating and assembling similar equipment for a minimum of five (5) years.

PART 2 - PRODUCTS

2.01 MAGNETIC FLOW MEASURING SYSTEMS

- A. General: Magnetic flow measuring systems shall measure volumetric flow rate by detecting the velocity of a conductive liquid that passes through a magnetic field. The flowtube shall be installed in-line with the process piping. Coils located on opposite sides of the flowtube shall create a magnetic field. As the conductive fluid moves through this field, a voltage shall be generated that is linearly proportional to the flow. The transmitter shall condition this voltage and produces output signals that are proportional to the velocity of the fluid being metered.

Each magnetic flow measuring system shall include a flowtube, signal cable, transmitter, and grounding rings. Each system shall be FM approved and

intrinsically safe.

B. Flowtube:

1. Flanged Type: In-line flow element with no constrictions in flow of fluid through meter consisting of metallic tube with ANSI B16.5, Class 150 bolt pattern. Flange material shall be compatible with the piping material and corrosion resistant. This flowtube will be installed in an area subject to periodic submergence and shall be I.P. 68 rated.
2. Electrode and Liner Materials: Shall be fully compatible with the process fluid. Refer to the chart below for electrode and liner material requirements. The liner shall meet the current requirements of the NSF/ANSI Standard 61. Provide written certification of the NSF/ANSI Standard 61 for each meter.

Process Fluid	Liner	Electrode
Water or Sewage	Polyurethane, Hard Rubber, or Neoprene	316 Stainless Steel

4. Grounding Rings: 316L SST, with an external tab to attach ground wiring. Contractor shall connect the grounding rings per the manufacturer's recommendations.

C. Transmitter:

1. Transmitter shall be remote mount.
2. Transmitter shall contain a backlit LCD display used for programming as well as for simultaneous display of flow rate and total flow in user-selectable engineering units, and readout of diagnostic error messages
3. Shall be furnished with local flow rate indication and local flow totalization indication, and scaled in user selectable engineering units.
4. Must be interchangeable with DC powered flowtubes of other manufacturers while maintaining system accuracy regardless of line size.
5. Diagnostics shall include self test, transmitter faults, analog output test, pulse output test, tunable empty pipe parameter, reverse flow testing, coil circuit fault, electronics temperature monitoring, magnetic field strength, ground wiring fault, high process noise analysis, and shall provide for calibration verification and 4 – 20 ma loop verification.

6. Power Supply: 90 – 250 VAC +/- 10%, 50 – 60 Hz or 12 – 42 VDC.
7. System Accuracy +/- 0.25% of rate from 1.0 to 30 feet per second.
8. Provide the manufacturer's cable to be installed between the remote transmitter and the flowtube.
9. Housing shall be rated NEMA 4X.
10. Operating range shall be from -5 to 140 degrees Fahrenheit and 0 to 100 percent relative humidity.
11. Local confirmation and diagnostic capability by a handheld communicator or software.

D. Signal Converter/Transmitter Output:

1. Analog Output: Isolated 4-20 milliamperes direct current.
2. Pulse Output: 0 – 10,000 Hz. Value must be capable of settings equal to desired volume in selected engineering units, adjustable from 0.5 to 100 m/s.
3. Shall be capable of indicating reverse flow and zero flow.
4. Provide communication board with Hart Protocol via current output.
5. Security lockout to prevent unwanted or unintentional changes.

E. Factory Calibration:

1. Flowtube shall be hydraulically calibrated at a facility, which is traceable to internationally recognized Calibration Standards. The calibrations procedure shall conform to the requirements of (ISO) 10012- 1, and "Quality Assurance Requirements for Measuring Equipment". A real-time computer generated printout of the actual calibration data indicating a three point calibration of the entire operating range shall be submitted to the ENGINEER prior to shipment of the meters to the project site. The calibration sheet shall also be filed with the O&M manual.

F. Approved Manufacturers

1. Rosemount
2. Krohne
3. Approved equal.

PART 3 - EXECUTION

3.01 SHIPPING, HANDLING, AND DELIVERY

- A. The flowmeters and associated equipment shall be protected for shipment by the manufacturer. The manufacturer shall take pictures of the flowmeter(s) and associated equipment before and during the crating process. The pictures shall be submitted to the Engineer. The manufacturer's Local Representative shall be present at the delivery of each flow meter to the job site.
- B. The Engineer as well as the manufacture's local representative must be on-site to witness the Contractor's unloading of the flow meter(s) and associated equipment. The manufactures local representative shall witness the uncrating of each meter and then inspect, verify, and certify in a written inspection report to the Engineer that all flowmeters and associated equipment have been inspected, are present, damage free, and ready for installation.

3.02 FLOWMETER AND ASSOCATED EQUIPMENT INSTALLATION

- A. The flow meter(s) shall be installed per the manufacturer's recommendation and as shown on the plans.

3.03 STARTUP ASSISTANCE BY MANUFACTURE'S LOCAL REPRESENTATIVE

- A. The manufacturer shall provide delivery inspection, technical advice, startup inspection, Job-site operational diagnostics and calibration, approve/certify for operation, operational assistance, and one 2-hour Operation and Maintenance training class.
- B. See section 17100 for further testing and calibration requirements.

PART 4 - WARRANTY

4.01 MANUFACTURER'S ORIGINAL WARRANTY AND EXTENDED WARRANTY

- A. The manufacturer shall provide a one year warranty that covers parts, labor and travel. The warranty period shall start of the day the City accepts the project.

END OF SECTION

SECTION 17520

RTU/PLC SYSTEM

PART 1 - GENERAL

1.01 SCOPE

- A. This Section covers the furnishing, programming, and installation of a Remote Telemetry Unit/Programmable Logic Controller (RTU/PLC) system, antenna, antenna cable, and other appurtenances necessary for a complete and operating system. **All items covered in this Specification shall be included as part of this contract. All items covered in this Specification shall be provided by the Contractor.** The RTU/PLC system shall contain a Modicon PLC, I/O modules, power supply, radio transceiver, circuit breakers, fuses, panduit, terminal blocks and all devices necessary for a complete system. **This system shall be mounted on DIN rail inside the service pedestal as shown on the Plans. The City will provide all the programming for the PLC.** The City will be responsible for providing all necessary work so that the PLC communicates with its regional site. This includes development of SCADA display graphic screens on the master SCADA network.

1.02 REFERENCE STANDARDS

- A. The equipment covered under this contract shall be designed, manufactured, and tested in accordance with the latest version of the following industrial standards:
1. American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE):
 - a. C37.90.2, Trial-Use Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.
 - b. C62.41, IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
 2. Electronic Industries Association (EIA):
 - a. TIA-232-E, Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange.

- b. 422-A, Electrical Characteristics of Balanced Voltage Digital Interface Circuits.
- 3. National Electrical Manufacturers Association (NEMA):
 - a. ICS 1, General Standards for Industrial Control and Systems.
 - b. ICS 1.1, Safety Guidelines for the Application, Installation and Maintenance of Solid State Control.
 - c. ICS 4, Terminal Blocks for Industrial Use.
 - d. ICS 6, Enclosures for Industrial Controls and Systems.
- 4. National Fire Protection Association (NFPA):
 - a. National Electric Code (NEC).

1.03 SUBMITTALS

- A. Provide four copies of submittals, in accordance with the Special Provisions, for all major components within the RTU/PLC system including the following:
 - 1. Back-pan plans, sections and details. Showing all major components mounted on the back-pan.
 - 2. Internal wiring and terminal blocks.
 - 3. Tabular I/O listing including the following data:
 - a. Each I/O point.
 - b. Name of each I/O device.
 - c. Instrumentation tag number of the I/O device in the Plans.
 - d. RTU/PLC system internal address of each I/O.
 - 4. Antenna and transmission cables.
 - 5. Radio.
 - 6. PLC.
 - 7. Power Supply.
 - 8. Antenna.

PART 2 - PRODUCTS

2.01 RTU/PLC SYSTEM

- A. RTU/PLC and associated equipment shall be mounted on DIN rail as shown on the Plans. The RTU/PLC system shall contain the following features:
- B. RTU/PLC system grounding and electrical spacing shall be in accordance with NEMA ICS 6.
- C. RTU/PLC shall be wired as defined below:
 - 1. Install all wiring without splicing in panduit raceways. Size the raceways per the requirements of the NEC. Raceways shall have removable covers.
 - 2. Wire bending space shall be in accordance with Tables 3-7B, C in NEMA ICS 6.
 - 3. Keep AC power lines separate from low-level DC lines, I/O power supply cables, and all I/O rack interconnect cables.
 - 4. Keep AC signal wires separate from DC signal wires.
 - 5. When I/O wiring must cross AC power wiring, it shall only do so at right angles.
 - 6. Allow 2 inches between the I/O modules and any raceway, between the terminal strip and raceway, and between the terminal strip and I/O modules.
 - 7. Bundle and tie down wires in a neat and orderly manner.
- D. The RTU/PLC system shall be grounded as follows:
 - 1. Separate ground wires from power wiring at the point of entry.
 - 2. Minimize ground wire length by locating the ground reference point as close as possible to the point of entry of the plant power supply.
 - 3. Ground all electrical racks or chassis and machine elements to a central ground bus.
- E. RTU/PLC termination requirements:
 - 1. Terminal block markings, mechanical characteristics and electrical characteristics shall be in accordance with NEMA ICS 4.

2. Make connections to I/O modules by terminating all field wiring to terminals on the I/O modules as shown on the Plans.
3. Terminals shall facilitate wire sizes 12 AWG and 14 AWG rated for 120 VAC applications.
4. Provide terminal blocks as shown on the Plans and with continuous marking strip.
5. Label each wire within the RTU/PLC system with wire numbers as shown on the Plans.
6. Provide terminals for individual termination of each signal shield.
7. Field wiring shall not be disturbed when removing or replacing an I/O module.

2.02 RTU/PLC AND INTERFACE MODULES

- A. The programmable logic controllers shall be **Groupe Schneider, Modicon 340 Series**. No other manufacturer shall be permitted as this equipment matches the City's installed base of Modicon PLCs. The City has standardized on Modicon PLCs throughout the City and has an installed base of several hundred units.
- B. **Provide the following Modicon M340 PLC parts**
 1. **One Rack – model number BMX XBP 0400**
 2. **One Processor – model number BMX P341 000**
 3. **One Power Supply – model number BMX CPS 2010**
 4. **One Discrete I/O Module – model number BMX DDM 16022**
 5. **One Analog Input Module – model number BMX AMI 0410**
 6. **One Communication Module – model number BMX NOM 0200**
 7. **One Shielded Cord set – model number BMX FTW 301S**
 8. **One Cord set – model number BMX FTW 301**

2.03 PERFORMANCE AND DESIGN REQUIREMENTS

- A. The RTU/PLC system shall accomplish the control requirements of the I/O list, Drawings, and Specifications.
- B. The design application and installation of the RTU/PLC system shall conform to NEMA ICS 1.1.

- C. The RTU/PLC system shall operate in ambient conditions of 32 to 140 Degree F temperature and 0 to 95 percent relative humidity without the need for purging or air conditioning.
- D. Input/Output Connection Requirements:
 - 1. Discrete inputs/outputs and analog outputs shall be fused as recommended by the manufacturer:
 - a. Provide blown fuse indication.
 - b. Fuses shall be in accordance with module manufacturer's specifications and installed at terminal block.
- E. All RTU/PLC control system components shall be capable of meeting or exceeding electromagnetic interference tests per ANSI/IEEE C37.90.2.
- F. Incorporate the following minimum safety measures:
 - 1. A main circuit breaker shall be placed in the power circuit as a means of removing power from the entire RTU/PLC system. Each power supply shall be protected by its own circuit breaker. Size breaker as shown on plans.
 - 2. Safe wiring:
 - a. The loss of power or control signal to the equipment shall result in the equipment either shutting down or operating safely.
 - b. Activation of alarms and stopping of equipment shall result from the de-energization of control circuits, rather than the energization of control circuits.
 - c. Shield twisted cables shall be used for low voltage signal wires and shall be placed in conduits segregated for that purpose only. In addition, the cables shall not be placed in the same conduit or bundled with the power cables.
- G. Construct RTU/PLC system with high noise immunity to prevent occurrence of false logic signals resulting from switching transients, relay and circuit breaker noise or conducted and radiated radio frequency interference.
- H. Operator intervention:
 - 1. Logic system failure shall not preclude proper operator intervention.

I. Power Supply Units:

1. **Provide regulated 24 VDC power supply rated for 100 W as shown on the plans. Power supply shall be ABB, Omron, or equal and be DIN mountable.** Power supplies shall be connected to provide power to the devices as shown on the Plans.
2. Each power supply shall be sized such that it will carry no more than 75 percent of its load as shown on the Plans.
3. Provide power supplies to successfully withstand surges in AC power circuits per the wave form, voltage amplitude, current amplitude, and frequency provided in IEEE C62.41.

2.04 MAINTENANCE MATERIALS

- A. Furnish the City with operation and maintenance manuals in accordance with the Special Provisions. Operation and maintenance manuals shall contain information on all components within this specification. The operations and maintenance manuals shall also be provided on a CD in accordance with the Special Provisions.

2.05 RADIO TRANSCEIVER

- A. **The radio shall be Microwave Data Systems radio transceiver, 902 - 928 MHz, frequency hopping, spread spectrum, model number MDS 9810 with network diagnostic package.** Install the radio inside service pedestal as shown on the plans.

2.06 DIRECTIONAL ANTENNA FOR RADIO

- A. Provide a directional antenna that meets the following requirements:

- Frequency Range: 902 to 928 MHZ
- Gain: 10 dB minimum
- Maximum Power Input: 150 watts
- Front to Back Ratio: Less than 1.5
- Lightning Protection: Direct ground protection to mast
- Connector: Type N male with neoprene housing

Mounting Hardware: Shall be stainless steel and as recommended by the antenna manufacturer to mount antenna to pole.

Lightning arrester: Polyphaser Corp. IS-50NX-C2.

The directional antenna shall be Kathrein Scala Division # RY-900A or equal.

- C. Contractor shall use "Never Seize" on antenna mounting bolts, so mounting hardware can be removed easily at a later date. Contractor shall ground the lightning arrester per the manufacturers recommendation.

2.07 TRANSMISSION CABLE(S)

- A. Supply the transmission cable to connect the radio antenna port (via 50 ohm "Superflex" cable/lightning arrester) with the antenna. This cable shall be low-loss foam-dielectric type, ½ inch in diameter, and sufficient length to route the cable from the antenna to the lightning arrester (field verify). The cable shall be weatherproof suitable for direct environmental exposure. Use "O" ring seals on connectors. **The transmission cable shall be Andrew Corp. LDF4-50A.** The cable shall be installed without splices.
- B. **Provide a section of "Superflex" cable between the radio and lightning arrester. This cable shall be Andrew Corp. FSJ1-50A or equal with factory installed type N connectors.**
- C. Connectors for the transmission cable shall be type N.
- D. The Contractor shall field verify the length of antenna cable required for the project. The cable shall be installed without splices.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor shall be responsible for the installation of the RTU/PLC system and shall pull all the cables and wires and make all the connections as shown on the Plans or as directed by the Engineer. The RTU/PLC system shall be installed in accordance with manufacturer's written instructions.
- B. The City will perform the following work:
 - 1. Verification of correct installation of RTU/PLC system.
 - 2. Verification of correct installation, type, and size of wiring terminated from

field devices, and to the RTU/PLC system.

3. Verification of correct connection of all power sources supplied to and from the PLC system.
 4. Verification of I/O terminations and proper device calibrations.
 5. Perform a point to point test of all the PLC functions that are transmitted back to control 12 at the CWTP. Verify that all data points are transmitted back to control 12 and update the control 12 database.
- C. If deficiencies are found in section "B" items 1 through 5 above, the Contractor shall immediately correct the problem at no cost to the City.
- D. The Contractor shall terminate the antenna and signal transmission cables with type N connectors and align the antenna on the pole before it is raised.
- E. The Contractor shall install the lightning protector, copper strap, and instrument grounding. The Contractor shall install a number 6 copper wire to connect the lightning arrester to the ground bus.

3.02 PLC FIELD TESTING

- A. After finishing all the connections, the Contractor shall cooperate with the City during the field testing.
- B. The City will perform the following:
1. Configure radio communication parameters.
 2. Configure radio output power.
- C. The City and Contractor shall perform a point to point test of all wiring between the PLC and field devices.
- D. All devices connected to the digital input card shall be operated to ensure that the PLC recognizes the changed state of each device.
- E. The City will program the PLC to operate all devices connected to the digital output card and then trigger these devices to operate. Any device that fails to operate shall be replaced at the contractor's expense.
- F. All analog devices connected to the PLC shall be calibrated per Section 17100. Each analog device shall be operated to determine if the PLC recognizes the analog signal.

3.03 DEMONSTRATION

- A. Contractor shall demonstrate RTU/PLC system operates according to Plans and specifications. If defects are found in the hardware or installation Contractor shall fix problems at no cost to the City.

END OF SECTION

APPENDIX B

POTHOLE DATA

POTHOLE DATA		EXARO TECHNOLOGIES CORP.			
Address	Asphalt Thickness	Soil Type	Utility	Depth to top of utility	Comments
8745 Folsom Blvd		Clay/rocks/roots	Electric		Went to 6.5' deep, couldn't find on locators mark 8' in from edge of sidewalk where it meets grass.
8746 Folsom Blvd	8"	Hard clay	8" water	37"	207" from face of curb
8747 Folsom Blvd	8"	Hard clay	4" gas	50"	151" from face of curb
8748 Folsom Blvd	8"	Hard clay	electric		Went 7' and didn't find
8545 Folsom Blvd	8"	Dirt, river rock	Storm drain culvert	18"	Found top of culvert at 18"; 8' wide