

DEPARTMENT OF TRANSPORTATION

DES-OE MS #43
1727 30TH Street, 2ND Floor
Sacramento, CA 95816



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October 24, 2001

04-SF,Ala-80-13.9/14.3,0.0/1.6
04-012024
ACIM-080-1(085)8N

Addendum No. 5

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in THE CITY AND COUNTY OF SAN FRANCISCO AND ALAMEDA COUNTY IN SAN FRANCISCO AND OAKLAND FROM 1.3 km TO 3.3 km EAST OF THE YERBA BUENA ISLAND TUNNEL EAST PORTAL.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on November 14, 2001.

This addendum is being issued to revise the Project Plans, the Notice to Contractors and Special Provisions, and the Proposal and Contract.

Project Plan Sheets 437, 441, 446, 450, 506, 714, 718, 719, 722, 739, 740, 741, 742, 743, 744, 751, 752, 753, 754, 755, 756, 890, and 904 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

In the Special Provisions, Section 5-1.14, "COST REDUCTION INCENTIVE PROPOSALS," the following paragraph is added after the seventh paragraph:

"If the proposed CRIP affects the seismic performance of the structure, as determined by the Engineer, the Contractor shall present the CRIP proposal to the Seismic Safety Peer Review Panel (SSPRP). It is anticipated that this presentation to the SSPRP will require a 2-month notice and 6 meetings (occurring once a month). The meeting location(s) will be in California, and the meeting location and schedule will be determined by the SSPRP. The Engineer will not further consider said CRIP unless it is approved by the SSPRP. The Contractor's cost of preparing the SSPRP presentation and attending the SSPRP meetings and the Department's costs of investigating said proposal, presentation, meeting attendance, and compensation to the SSPRP, including any portion thereof paid by the Contractor, shall be excluded from consideration in determining the estimated net savings in construction costs."

04-SF,Ala-80-13.9/14.3,0.0/1.6
04-012024
ACIM-080-1(085)8N

In the Special Provisions, Section 5-1.23, "PAYMENTS," the following paragraph is added after the fourth paragraph:

"Plate steel for fabrication of structural steel, stored within the State of California, and fabricated elements for structural steel, fabricated and stored within the United States, will be eligible for partial payment if the Contractor furnishes evidence satisfactory to the Engineer that its storage is subject to or under the control of the Department and that it has been designated or fabricated specifically for this project and is of such character that is not adaptable to any other use."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "GENERAL," the seventh paragraph which starts with "Section 6.5.4 of AWS D 1.5" is revised as follows:

"Section 6.5.4 of AWS D 1.5 is replaced with the following:

The QC Inspector shall inspect and document each joint preparation, joint fit-up, and assembly practice. The QC Inspector shall verify, inspect and document each welder performance (including tack welders) for conformance with the approved WPS. The QC Inspector shall examine the work to make certain that it meets the requirements of Sections 3 and 9.21. The size and contour of welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities shall be aided by strong light magnifiers, or such other devices as may be helpful. Acceptance criteria different from that specified in this code may be used when approved by the Engineer."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "GENERAL," the twelfth paragraph is revised as follows:

"A sufficient number of QC Inspectors shall be provided to ensure continuous inspection when any welding is being performed for each welding operation and at each welding location."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "GENERAL," the fourteenth paragraph is revised as follows:

"The following additional requirements shall apply to AWS D 1.1:

When joint details that are not prequalified per AWS D 1.1 are proposed for use in the work, welders using these details shall perform a qualification test plate using the approved WPS variables and the joint detail to be used in production. The test plate shall be the maximum thickness to be used in production. The test plate shall be mechanically or radiographically tested as directed by the Engineer. Mechanical and radiographic testing and acceptance criteria shall be as specified in AWS D 1.1."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "GENERAL," the following paragraph is added after the fourteenth paragraph:

"The following additional requirements refer to and shall apply to AWS D 1.5:

- A. Partial joint penetration welds shall be qualified in each position. Unless prequalified, per AWS D 1.5, fillet welds (including reinforcing fillet welds) shall be qualified in each position. The weld test(s) shall be welded using the groove weld PQR(s) welding parameters.
- B. Tests to qualify partial joint penetration welds shall use Figure 5.3.

04-SF,Ala-80-13.9/14.3,0.0/1.6
04-012024
ACIM-080-1(085)8N

- C. For qualification of weld joints that do not conform to Figures 2. 4 or 2.5, two WPS qualification tests are required. One test is to be conducted using Figure 5.1 and one test is to be conducted using Figure 5.3. The test per Figure 5.3 is to be conducted using the same welding electrical parameters that were established for the test conducted per Figure 5.1.
- D. The travel speed, current, and voltage that are used for the tests conducted per Sections 5.12 or 5.13 shall be consistent for each weld joint.
- E. For WPS (Welding Procedure Specifications) qualified per 5.13, the values to be used for calculating ranges for current and voltage are to be based on the average of all the weld passes made in the test. Heat input shall be calculated using the average of the current and voltage of all the weld passes made in the test for WPS qualified per 5.12 or 5.13.
- F. Two qualification tests are required for WPS utilized for welding plate greater than 38mm in thickness. One test is to be conducted using 20mm thick test plates and one test is to be conducted using test plates with a thickness of 38mm to 50mm inclusive. Either a maximum heat input test and minimum heat input test may be conducted, or two maximum heat input tests may be conducted.
- G. Macrotech tests are required for each WPS qualification test. The acceptance criteria shall be per Section 5.19.3.
- H. When a weld joint is to be made using a combination of qualified WPS, each process shall be qualified separately.
- I. When a weld joint is to be made using a combination of qualified and prequalified processes, the WPS shall show both processes and the limitations of essential variables for both processes. This includes weld bead placement."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "GENERAL," the following paragraphs are added after the fifteenth paragraph:

"Each welder, welding operator and tack welder proposed for performing a given weld on FCM shall be qualified by tests that have been passed within 6 months prior to performing said weld. The requalification tests shall comply with Section 5.21.4 and Section 12.8.2."

"Heat straightening shall not be proposed as a fabrication process for the steel orthotropic box sections."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "WELDING QUALITY CONTROL," the ninth paragraph is revised as follows:

"The QCM shall be currently certified as an AWS Certified Welding Inspector (CWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors." The QCM shall be present daily at the job site, Contractor's project field office, or at one of the project steel fabrication sites, unless otherwise approved by the Engineer."

In the Special Provisions, Section 8-3.01, "WELDING," subsection "WELDING QUALITY CONTROL," fourteenth paragraph, item J is revised as follows:

"J. Ten books each of all AWS welding code and the FCP, which are applicable, to the welding to be performed. Said books and the FCP shall become the permanent property of the Department; and"

Addendum No. 5
Page 4
October 24, 2001

04-SF,Ala-80-13.9/14.3,0.0/1.6
04-012024
ACIM-080-1(085)8N

In the Special Provisions, Section 10-1.24A, "MARINE PILE DRIVING ENERGY ATTENUATOR," is added as attached.

In the Special Provisions, Section 10-1.38, "WELDED HEADED BAR REINFORCEMENT," is replaced with the attached Section 10-1.38, "HEADED BAR REINFORCEMENT".

In the Special Provisions, Section 10-1.49, "TRAVELER SCAFFOLDS," is revised as attached.

In the Special Provisions, Section 10-150, "TRAVELER SCAFFOLD MECHANICAL," is revised as attached.

In the Proposal and Contract, the Engineer's Estimate Item 64 is revised, Items 131 and 132 are added and Item 130 is deleted as attached.

To Proposal and Contract book holders:

Replace the entire Engineer's Estimate in the Proposal with the attached revised Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This office is sending this addendum by UPS overnight mail to Proposal and Contract book holders to ensure that each receives it.

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Office Engineer

Attachments

10-1.24A MARINE PILE DRIVING ENERGY ATTENUATOR

This work shall consist of designing, furnishing, installing, operating, monitoring, maintaining, and removing an air bubble curtain system to attenuate underwater noise (sound pressure) generated by driving 2.5 meter cast-in-steel shell concrete piling. For purposes of this specification, pile installation refers to the all activities involved with driving a single pile; pile driving refers to the time when the hammer is physically driving the pile.

Attention is directed to "Relations with United States Coast Guard," of these special provisions regarding navigation requirements.

Attention is directed to "Order of Work," of these special provisions regarding redriving of existing test piles.

The approved energy attenuating system shall also be used during the restrike of the existing test piles.

GENERAL

An air bubble curtain system is generally composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipes, and a frame. The frame facilitates transport and placement of system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation.

Air bubble curtain system shall conform to the following:

- A. Air bubble system shall consist of multiple and concentric layers of perforated aeration pipes stacked vertically in accordance with the following:

Water Depth (m)	No. of Layers
0 to 5	1
5 to 10	2
Greater than 10	3

- B. Pipes in any layer shall be arranged in a geometric pattern, which shall allow for the pile driving operation to be completely enclosed for the full depth of the water column.
- C. The lowest layer of perforated aeration pipes shall be designed to prevent sinking into the bay mud.
- D. The system shall provide a minimum bubble flux of 3.0 cubic meters per minute per linear meter of pipe in each layer.
- E. Gauges shall be provided in accordance with the following:
1. Pressure gauges shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.
 2. Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet.

Gauges shall be installed so as to be accessible to the Engineer. The Contractor shall keep a continuous log of all gauges when the system is operating. Readings shall be logged every 30 minutes and at other times, as determined by the Engineer, when variation in the readings exceed 10%. The Contractor shall maintain a graphical plot showing the variation of the gauge readings with time.

Operating values for pressure and flow rates will be established by the Engineer during restrikes of the existing steel piles. If the pressure or flow rate in any gauge falls below 90% of its operating value, the Contractor shall cease pile driving operations until the problem is corrected.

Air pressure and air flow gauges shall be calibrated by a private laboratory approved by the Engineer prior to use in the bubble curtain system. Gauges shall be accurate to within 2 percent.

The Contractor shall monitor the condition of the bubble curtain system and prepare inspection reports daily during pile installation operations and no less than every other day during periods of no activity.

The Contractor's design, installation, maintenance, monitoring, operation and removal of the bubble curtain system shall take into account the site conditions and the requirements of pile installation. Factors to be taken into account include anchoring, moving, and dismantling the system; configuration of bay bottom; water velocity; water-surface conditions; air and water temperatures; and positioning of pile and pile-driving equipment relative to the bubble curtain system.

Water velocity at the site is expected to vary from zero to 2 knots and vary in direction due to changes in tidal flow. The design of the system shall ensure that the system extends from bay bottom to the water surface during maximum water-current conditions and accommodates tidal changes.

The pile-driving barge shall be isolated from the noise-producing operations. This isolation shall be such that noise from the pile driving operation is not transmitted through the barge to the water column. Padding and avoidance of metal-to-metal contact shall be included. The barge deploying or containing the pile-driving equipment is not required to be contained within the system.

Air compressors, where utilized, shall be mounted on rubber pads or other sound isolating devices, in order to decrease the sound transmitted from the compressors to the water column.

The Contractor shall completely remove the air bubble curtain system at the completion of the project and the system will remain the property of the Contractor.

WORKING DRAWINGS

The Contractor shall submit working drawings with supplement for the bubble curtain system to the Engineer for approval in conformance with the provisions in "Working Drawings," of these special provisions, except as otherwise noted. Working drawings with supplement shall be signed by a Mechanical Engineer who is registered in the State of California. Working drawings shall include the following:

- A. Complete details of the system including mechanical and structural details.
- B. Details of anchorage components, air compressors, supply lines, distribution manifolds, aeration pipes and frame.
- C. Details of proposed means of isolating noise-producing systems on the pile-driving barge.

The supplement to the working drawing shall include the following:

- A. Independently checked design calculations.
- B. Materials list including the name of the manufacturer and the source, model number, description, and standard of manufacture.
- C. Manufacturer's descriptive data and catalog cuts for all products proposed for the system including air compressors.
- D. Calculations showing pressure loss in the piping system and estimated flows from the most removed orifice of the aeration piping.

Within 40 working days after the approval of the contract, the Contractor shall submit working drawings, with supplements, to the Engineer. The Contractor shall allow the Engineer 20 working days to review the working drawings. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the working drawings within 15 working days of receipt of the Engineer's comments. The Contractor shall allow the Engineer 10 working days to review the revised working drawings.

The Contractor shall submit inspection reports in conformance with "Working Drawings," of these special provisions within 48 hours following inspection.

MEASUREMENT AND PAYMENT

Bubble curtain systems will be measured and paid for at the contract lump sum price for marine pile driving energy attenuator.

The contract lump sum price paid for marine pile driving energy attenuator shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in marine pile driving energy attenuator, complete in place, including maintaining and removing air bubble curtains, as specified in these special provisions, and as directed by the Engineer.

Full compensation for inspections and monitoring of bubble curtain systems and isolation of pile-driving barge from pile installation noise shall be considered as included in the contract lump sum price paid for marine pile driving energy attenuator and no additional compensation will be allowed therefor.

10-1.38 HEADED BAR REINFORCEMENT

Headed bar reinforcement, consisting of furnishing and friction welding or integrally forging heads onto one or both ends of bar reinforcement, shall conform to the requirements in ASTM Designation: A 970/A 970M including appendixes, the provisions of Section 52, "Reinforcement," of the Standard Specifications, the details shown on the plans, and these special provisions.

At the Contractor's option, forged headed bar reinforcement may be used where welded headed bar reinforcement is shown on the plans.

GENERAL

Prior to performing any manufacturing, the Contractor shall submit to the Engineer the manufacturer's Quality Control (QC) manual for the fabrication of headed bar reinforcement. As a minimum, the QC manual shall include the following:

- A. The pre-production procedures for the qualification of materials and equipment;
- B. The methods and frequencies for performing QC procedures during production;
- C. The calibration procedures and calibration frequency for all equipment;
- D. A system for the identification and tracking of all friction welds. The system shall have provisions for permanently identifying each weld and the parameters used to perform it;
- E. The welding procedure specification (WPS) for friction welded headed bar reinforcement; and
- F. A system for marking headed bar reinforcement.

Quality Control is the responsibility of the Contractor. As a minimum, the Contractor shall perform inspection and testing prior to, during, and after welding or forging, and as necessary to ensure that materials and workmanship conform to the requirements of the specifications.

A daily production log for the manufacture of headed bar reinforcement shall be kept by the manufacturer for each production lot. The log shall clearly indicate the production lot numbers, the heats of bar material and head material used in the manufacture of each production lot, the number of bars in each production lot, welding or forging records, including tracking and production parameters for welds or forgings, and results of all tests performed.

A production lot of friction welded or integrally forged headed bar reinforcement is defined as 150 reinforcing bars, or fraction thereof, of the same bar size, with heads of the same size and type, produced from bar material of a single heat number and head material of a single heat number. A new production lot shall be started if the heat number of either the bar material or the head material changes before the maximum production lot size of 150 is reached.

The daily production log shall be submitted in writing to the Engineer within 7 days following the manufacture of any headed bar reinforcement.

The manufacturer shall furnish Certificates of Compliance accompanied by a copy of the mill test report to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each shipment of headed bar reinforcement delivered to the job site.

Forging of heads or integrally forged headed bar reinforcement shall conform to the requirements in ASTM Designation: A 788.

Welding, welder qualifications, and inspection of welding shall conform to the requirements for friction welding in ANSI/AWS C6.1.

Welding or forging shall be performed at an established and permanent fabrication facility.

Equipment used to perform friction welding shall be fitted with an effective in-process monitoring system to record essential production parameters that describe the process of welding the head onto the bar reinforcement. As a minimum, the parameters to be recorded shall include friction welding force, forge force, rotational speed, friction upset distance and time, forge upset distance and time, and other elements of the production process. The data from this in-process monitoring shall be recorded and preserved by the manufacturer for a minimum of one year after manufacture of the friction welded headed bars and shall be provided to the Engineer upon request.

Epoxy-coated headed bar reinforcement shall conform to the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications and these special provisions.

All edges on epoxy-coated heads shall be rounded. Sharp edges and burrs shall be ground smooth before applying epoxy coating.

The Contractor may submit a request to the Engineer in writing, to use alternative head dimensions which are different from those specified in Table 1 of the ASTM Designation: A 970/A 970M. The alternative head dimensions shall be designed using the concrete compressive strength shown on the plans and shall be in conformance with these special provisions. Alternative head dimensions will not be considered for approval unless the Contractor can prove that the alternative heads have been successfully produced and have had at least 2 years of satisfactory service in conditions similar to this application. The Contractor shall furnish, at the Contractor's expense, documentation satisfactory to the Engineer that the alternative head dimensions are suitable for the intended application. The documentation shall include, but not be limited to, calculations and test reports showing the following:

- A. The alternative head is capable of resisting the nominal tensile strength of the reinforcing bar when the bar reinforcement with the welded or forged head is embedded in concrete; and
- B. Shear or bending forces do not cause premature failure of the alternative head or crushing failure of the concrete under the alternative head.

ACCEPTANCE TESTS

Acceptance tests shall be performed at the Contractor's expense, at the manufacturer's plant or at a qualified laboratory with traceability to the National Institute of Standards and Technology (NIST), and in the presence of the Engineer, unless otherwise directed in writing.

Test samples shall be randomly selected by the Engineer from each production lot of friction welded or integrally forged headed bar reinforcement, which is ready for shipment to the job site. The Engineer shall be notified in writing at least 7 days prior to conducting any tests.

A minimum of 3 samples of friction welded or integrally forged headed bar reinforcement from each production lot shall be tested. One tensile test shall be conducted on each sample.

Tensile tests shall conform to the requirements specified in Section 7 of ASTM Designation: A 970/A 970M, except that at rupture, there shall be visible signs of necking in the reinforcing bar at a minimum distance of one bar diameter away from the head to bar connection. If one of the test specimens fails to meet the specified requirements one retest shall be performed on one additional sample, selected by the Engineer, from the same production lot. If the additional test specimen, or if more than one of the original test specimens, fail to meet these requirements all friction welded or integrally forged headed bar reinforcement represented by the tests will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications.

All headed bar reinforcement of each bar size from each production lot to be shipped to the site shall be tagged in a manner that each production lot can be accurately identified at the job site. All unidentified headed bar reinforcement received at the job site will be rejected.

MEASUREMENT AND PAYMENT

Quantities of headed bar reinforcement will be measured as units determined from the number of friction welded or integrally forged heads shown on the plans or as directed by the Engineer.

The contract unit price paid for headed bar reinforcement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing heads and friction welding or integrally forging heads onto bar reinforcement, including conformance with all testing requirements, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Bar reinforcement to be used in the manufacture of headed bar reinforcement will be measured and paid for as specified in Section 52, "Reinforcement," of the Standard Specifications, except that the lengths to be used in the computation of calculated masses of the bar reinforcement shall be the entire length of the completed headed bar, including heads.

Full compensation for placing the completed headed bar reinforcement into the work shall be considered as included in the contract price paid per kilogram for the bar reinforcement involved and no additional compensation will be allowed therefor.

10-1.49 TRAVELER SCAFFOLDS

This work shall consist of furnishing, fabricating and installing two under-deck traveler scaffolds in accordance with the details shown on the plans and provisions in Section 55, "Steel Structures," Section 57, "Timber Structures," of the Standard Specifications, and these special provisions.

The fourth paragraph in Section 55-2.02, "Structural Steel," and the fourth paragraph in Section 55-2.07, "Unidentified Stock Material," of the Standard Specifications shall not apply.

The following substitutions of high-strength steel fasteners shall be made:

METRIC SIZE SHOWN ON THE PLANS	IMPERIAL SIZE TO BE SUBSTITUTED
ASTM Designation: A 325M (Nominal bolt diameter and thread pitch (mm))	ASTM Designation: A 325 (Nominal bolt diameter (inch))
M16 x 2	5/8
M20 x 2.5	3/4
M22 x 2.5	7/8
M24 x 3	1
M27 x 3	1 1/8
M30 x 3.5	1 1/4
M36 x 4	1 1/2

All bolts, nuts and washers, except where these are stainless steel, shall be galvanized in accordance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Traveler scaffolds shall be cleaned and painted in accordance with the requirements for of "Clean and Paint Structural Steel," of these special provisions.

Tubular or pipe connections

Dimensional details and workmanship for welded joints in tubular and pipe connections shall conform to the provisions in Part C, Structural Details; Part D, Special Provisions for Welding Tubular Joints; and Part E, Workmanship, in Section 10 of AWS D1.1.

Decking

Plywood panels for decking shall conform to or exceed the requirements of U.S. Product Standard PS-1-9S for APA Structural 1 BB Marine Grade. Plywood shall be pressure treated. Plywood decking shall be painted on all sides.

Toeboards

Toeboards shall be pressure treated S4S Douglas Fir. Toeboards shall be painted on all sides.

Pressure treatment of wood

Pressure treatment shall conform to AWWA Standard C1 to a retention of at least 1.95 kg/m³.

Hardware

Hardware shall consist of all fasteners, shackles, rope thimble, carriage bolts with attached washer used to attach decking to the steel structure, lag screws or bolts through the toeboards, blind rivets, oil impregnated bronze bars, stainless steel socket set screws, or any other hardware shown on the plans to attach the decking or toeboards to the traveler structure and shall conform to Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications.

Measurement and Payment

Traveler scaffolds will be measured and paid on a lump sum basis.

The contract lump sum price paid for traveler scaffold shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing the traveler scaffolds, complete in place, including plywood decking, toeboards, cleaning and painting steel, and hardware, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.50 TRAVELER SCAFFOLD MECHANICAL

GENERAL.--

Traveler scaffold mechanical consists of furnishing, fabricating, and installing the traveler scaffold mechanical equipment, including the on board air lines, in accordance with the details shown on the plans, the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

The fourth paragraph in Section 55-2.07, "Unidentified Stock Material," of the Standard Specifications shall not apply.

Mechanical work shall include furnishing all labor, materials, equipment and services required to provide operating travelers.

EQUIPMENT

All equipment shall be manufactured from material that is resistant to deterioration or corrosion in a marine environment or shall have a protective coating to provide such resistance. Seals and gasket material shall be suitable for air or non-corrosive gases and shall be resistant to deterioration in a marine environment and to hydrocarbons (air-entrained petroleum or vehicle exhaust).

Miscellaneous bolts, nuts, washers, fasteners, and springs shall be 18-8 stainless steel.

All equipment shall be capable of operating in a temperature range of -6° C to 95° C and shall be rated for operation in a pressure range 170 kPa gauge to 1,000 kPa gauge.

CODES

All work, including equipment, material and installation, shall conform to California Administrative Code, Title 8, Division of Industrial Safety.

SUBMITTALS

In addition to the requirements of "Drawings" of these special provisions, five bound identified copies of complete description, information and performance data covering material and equipment furnished shall be submitted to the Engineer for approval. Installation shall not commence until the Engineer approves the submitted equipment.

Before completion of the project, the Contractor shall submit two sets of operation and maintenance instruction and parts lists for all the equipment furnished.

WARRANTY

Warranties and guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

PRODUCTS

- A. **Piston motor driven trolley (motor trolley)** - Piston motor driven trolley shall be Ingersoll-Rand series ATE –MR 3/6 air driven trolley and shall be installed in accordance with the details shown on the plans. The drive wheels shall be connected to the air motor by means of a geared speed reducing power train.

Piston motor driven trolleys shall be rated by the manufacturer to have a manned platform rating as follows:

1. Outer trolleys 5.2 metric tonnes (service load) (2.8 metric tonnes Dead load + 2.4 metric tonnes Live load)
2. Inner trolleys 3.0 metric tonnes (service load) (1.5 metric tonnes Dead load + 1.5 metric tonnes Live load)

The manufacturer shall certify that the trolleys are structurally capable of carrying the stated service loads with a factor of safety of at least 5.0 and with any further factor of safety that the manufacturer requires in order to certify the trolleys for this application, recognizing that the platform has a secondary means of support via the brake trolleys which will support ten times total load.

The drive wheels shall be flat tread and be suitable for operation on the lower flange of the 127 mm wide traveler rail and shall provide adequate clearance from the splice plates and jumper assemblies.

The units shall have the "marine grade epoxy finish" option.

The air motor shall be 4 cylinder reversible, radial piston-type having a remote control valve chest. Crank pin and connecting rods shall be drop forged construction. Bearings and shafting shall have dust shields.

Starting, reversing and stopping of the traveler scaffold shall be accomplished by means of a remotely controlled throttle installed as shown on the plans.

The equipment specified is a standard Ingersoll Rand item.

Manufacturer	Distributor
Ingersoll Rand Company	Ingersoll-Rand Tool & Hoist Division 13107 Lakeland Rd. Santa Fe Springs, CA 90670 Telephone: (562) 777-0808 Fax: (562) 777-0818 Contact: Mr. Dave Hunt

The price quoted by the manufacturer for the piston motor-driven trolley, FOB Seattle, Washington and without load certification, is \$12,776 each. Bidders are to verify the price.

The above price is understood to be firm for all orders placed on or before March 29, 2002, provided delivery is accepted within 90 days after the order is placed.

- B. **Brake trolley** - Brake trolley shall be as shown on the plans. Brake trolleys shall have ductile iron or surface hardened steel wheels with flat treads and shall be equipped with thrust ball or roller bearings in hardened races and with dust seals. Trolley wheels shall be suitable for operation on the lower flange of the traveler rails. Trolley wheels shall be rated for a working load of 1360 kg each. Brake trolley shall have a marine grade epoxy finish.
- C. **Safety parking brake** - The brakes shall be spring-actuated to set the brake full stop. Brake release shall be by air pressure.
The brakes chamber shall conform to the details shown on the plans.
The position of the fabric-lined brake shoe shall be controlled by means of an operating cylinder having a bore of approximately 152 mm diameter and a single acting spring loaded piston. Stroke shall be 50 mm minimum.
The brake shall be rated at 360 kg clamping force at 50 mm and 900 kg at 0 mm stroke. The brake shall set at 25 mm stroke. Brakes shall release to 0 mm stroke under 480 kPa air pressure.
Brake shoe shall provide a minimum holding capacity of 2.7 kN.
Under a condition of zero gauge air pressure, the safety parking brake shall be in the "on" position preventing movement of the travelers.
The manufacturer of the safety parking brake shall furnish quick release valves.
- D. **Foot-operated poppet valve**. - The foot-operated poppet valve shall be a 3-way foot-operated, spring return, normally closed poppet valve. The valve shall have a bronze body and NPT National Pipe Thread ports and shall be suitable for 235 L/s at 860 kPa gauge minimum working pressure. Downstream side shall be at atmosphere when "off."
- E. **Throttle control valve** - The throttle remote control valve shall be a lever operated disc or rotor type. Valve shall have mechanite body and National Pipe Thread ports and, when supplied with 690 kPa gauge inlet air, the valve shall be rated for a flow capacity of 120 L/s. Valve shall be suitable for 860 kPa minimum working pressure.

- F. **Compressed air piping** - Piping for air lines on the traveler shall be rigid pipe of the nominal size shown on the plans with flexible hose for no more than 750 mm connecting to the brakes and motors.
- G. **Ball valve** - Ball valves shall be Class 400 bronze body with bronze trim and threaded ends.
- H. **Whistle** - Whistles shall be 38 mm bell diameter and produce 100 dB tone minimum at 690 kPa supplied air pressure.
- I. **Whistle valve** - Whistle valve shall be a poppet valve, 2-way lever operated, normally closed type. The valve shall have brass steel body and NPT National Pipe Thread ports and, when supplied with 690 kPa gauge inlet air, the valve shall be rated for a flow capacity of 42 L/s, and shall be suitable for 1,000 kPa gauge minimum working pressure.
- J. **Hose** - Hose shall have a rubber core, 2 synthetic body plies and a weather and abrasion resistant cover. Hose shall have a minimum working pressure of 2,000 kPa. All clamps, couplings, and other hardware used in conjunction with the hose shall be made of stainless steel and shall be rated for 2,000 kPa.
- K. **Quick coupling** - Quick coupling shall be claw type, bronze body, with neoprene gasket. NPS threaded ends for pipe, and barb end for hose.
- L. **Pressure regulator assembly** - Pressure regulator assembly shall be combination type, with 50 micron filter element rating, automatic drain and plastic bowl, 0 kPa to 1,000 kPa pressure regulator with pressure gauge, and 500 ml lubricator. The filter and lubricator elements shall be similar in size and appearance and shall be supplied by the same manufacturer. A manual drain shall be supplied at the low point of the oil storage bowl. Port sizes for both elements shall be the line size.
- M. **Pressure gages** - Pressure gages shall be included and shall be 50 mm dial type, Grade A, and National Pipe Thread back ported. Pressure gages shall have a range of 0 kPa to 1,350 kPa.
- N. **Double check valve** - Double check valve shall be bronze body, NPT 3/8 inlets and NPT 1/2 outlet with a stainless steel ball. The valve shall be rated for 860 kPa minimum and shall be of the type used for truck braking systems.
- O. **Compressed air piping** - Piping for on board air lines shall be Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, Type S, Grade B. Fittings shall be extra heavy type, galvanized steel or malleable iron.

GENERAL

- A. **Operation** - When the distribution piping is connected to the bridge air system (620 kPa gauge) a single operator shall be able to operate the traveler by depressing the foot valve and moving the two hand throttles from the neutral position. The following shall be the sequence of operation:
 - 1. The foot-operated poppet valve is depressed.
 - 2. Air is transmitted to release the brake and provide air to the throttle valves.
 - 3. The hand controls of the throttle valves are moved to the desired port alignment to allow air flow to the motors.
 - 4. When the throttle and control handle is returned to the neutral position air supply to the motors is cut off and the motors stop.
 - 5. When the foot valve is released, air to the brake and throttle valve is cut off, causing the spring-loaded brake to set and the throttle valve to become inoperative. The foot valve is a dead man safety control which causes the brake to set whenever the pedal is released.

TESTING AND ADJUSTING SYSTEMS

Pre-test requirements - Before starting or operating systems, the Contractor shall flush and clean equipment and check for proper installation, lubrication and servicing.

General requirements - The Contractor shall test and start up mechanical systems upon project completion as hereinafter specified.

The Contractor shall follow the equipment manufacturer's break-in procedure before full load testing for all equipment. Final adjustments and balancing of the systems shall be performed so they will operate as specified.

The Contractor shall replace or revise any equipment, systems or work found deficient during tests.

Particular care shall be used in lubricating bearings to avoid damage by overfilling with lubricant and blowing out seals.

The Contractor shall repair, or replace with new equipment, any equipment damaged during shipment, after delivery, during installation and during testing.

The Contractor shall perform tests after installing the hoses to insure the lines are airtight. The test shall be conducted for a period of one hour at the design pressure. Defective work shall be repaired at the Contractor's expense.

Project completion tests - The Engineer shall be notified at least 3 calendar days in advance of starting these tests.

Upon completion of mechanical work and pre-test requirements, or at such time prior to completion as determined by the Engineer, the Contractor shall operate and test the installed mechanical systems for at least one 8 hour day to demonstrate satisfactory overall operation. Traveler shall cross at least one expansion joint in each direction during this test.

The Contractor shall furnish, install and remove all apparatus necessary for performing the tests.

MARINE GRADE EPOXY FINISH

Marine grade epoxy finish shall conform to the requirements of these special provisions.

Surfaces to be coated with marine grade epoxy shall be blast cleaned in accordance with the requirements in Section 59-2.03 "Blast Cleaning," of the Standard Specifications.

Marine grade epoxy shall be applied to two coats. The dry film thickness of the each coat shall not be less than 100 microns minimum nor more than 150 microns maximum.

The final coat color shall match Federal Standard No. 595B, No. 13432.

The target minimum total dry film thickness shall be 200 microns for smooth surfaces without major surface discontinuities. The target minimum total dry film thickness shall be 300 microns for mating surfaces.

WEIGHING OF SCAFFOLDS

Each traveler scaffold shall be weighed prior to installation on the bridge, with the method of weighing subject to approval by the Engineer. The weights for each traveler shall be taken and recorded at each trolley support; the total weight will be the sum of those individual weights.

MEASUREMENT AND PAYMENT

Traveler scaffold mechanical will be measured and paid on a lump sum basis.

The contract lump sum price paid for traveler scaffold mechanical shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing the traveler scaffold mechanical system, complete in place, including testing and weighing the traveler scaffolds, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ENGINEER'S ESTIMATE

04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	021678	TRANSPORTATION FOR THE ENGINEER	LS	LUMP SUM	LUMP SUM	
2	021679	ENGINEER'S FIELD OFFICE	LS	LUMP SUM	LUMP SUM	
3	021680	ELECTRONIC MOBILE DAILY DIARY COMPUTER SYSTEM DATA DELIVERY	LS	LUMP SUM	LUMP SUM	
4	021681	TEMPORARY FENCE (TYPE ESA)	M	200		
5	021682	PHOTOGRAPHY OF BUILDING	LS	LUMP SUM	LUMP SUM	
6	070010	PROGRESS SCHEDULE (CRITICAL PATH)	LS	LUMP SUM	LUMP SUM	
7	070018	TIME-RELATED OVERHEAD	WDAY	900		
8	048536	FURNISH TEMPORARY TOWER (LOCATION AE)	LS	LUMP SUM	LUMP SUM	
9	048537	FURNISH AND REMOVE TEMPORARY TOWER (LOCATION BE)	LS	LUMP SUM	LUMP SUM	
10	048538	FURNISH TEMPORARY TOWER (LOCATION CE)	LS	LUMP SUM	LUMP SUM	
11	048539	FURNISH TEMPORARY TOWER (LOCATION AW)	LS	LUMP SUM	LUMP SUM	
12	048540	FURNISH AND REMOVE TEMPORARY TOWER (LOCATION BW)	LS	LUMP SUM	LUMP SUM	
13	048541	FURNISH TEMPORARY TOWER (LOCATION CW)	LS	LUMP SUM	LUMP SUM	
14	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
15	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	LUMP SUM	
16	074020	WATER POLLUTION CONTROL	LS	LUMP SUM	LUMP SUM	
17	021683	TEMPORARY CONCRETE WASHOUT FACILITY	LS	LUMP SUM	LUMP SUM	
18	021684	TURBIDITY CONTROL	LS	LUMP SUM	LUMP SUM	
19 (S)	153225	PREPARE CONCRETE BRIDGE DECK SURFACE	M2	97 600		
20	048542	JACK SUPERSTRUCTURE (FRAME E1)	LS	LUMP SUM	LUMP SUM	

ENGINEER'S ESTIMATE

04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	048543	JACK SUPERSTRUCTURE (FRAME E2)	LS	LUMP SUM	LUMP SUM	
22	048544	JACK SUPERSTRUCTURE (FRAME E3)	LS	LUMP SUM	LUMP SUM	
23	048545	JACK SUPERSTRUCTURE (FRAME W1)	LS	LUMP SUM	LUMP SUM	
24	048546	JACK SUPERSTRUCTURE (FRAME W2)	LS	LUMP SUM	LUMP SUM	
25	048547	JACK SUPERSTRUCTURE (FRAME W3)	LS	LUMP SUM	LUMP SUM	
26 (F)	048548	STRUCTURE EXCAVATION (BRIDGE, UNDERWATER)	M3	65 000		
27	048549	FURNISH 2.5 M CAST-IN-STEEL SHELL CONCRETE PILING	M	15 260		
28 (S)	048550	DRIVE 2.5 M CAST-IN-STEEL SHELL CONCRETE PILE	EA	160		
29 (S-F)	048551	REDRIVE EXIST 2.438 M STEEL PIPE PILE	EA	3		
30 (S)	048552	PRESTRESSING, LONGITUDINAL (FRAME 1)	LS	LUMP SUM	LUMP SUM	
31 (S)	048553	PRESTRESSING, LONGITUDINAL (FRAME 2)	LS	LUMP SUM	LUMP SUM	
32 (S)	048554	PRESTRESSING, LONGITUDINAL (FRAME 3)	LS	LUMP SUM	LUMP SUM	
33 (S)	048555	PRESTRESSING, LONGITUDINAL (FRAME 4)	LS	LUMP SUM	LUMP SUM	
34 (S)	048556	PRESTRESSING, TRANSVERSE	LS	LUMP SUM	LUMP SUM	
35 (S)	048557	PRESTRESSING, HIGH STRENGTH BARS	LS	LUMP SUM	LUMP SUM	
36 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	M3	31 000		
37 (F)	048558	STRUCTURAL CONCRETE, BRIDGE FOOTING (LIGHTWEIGHT)	M3	23 000		
38 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	M3	31 400		
39 (F)	048559	STRUCTURAL CONCRETE, BRIDGE PIER	M3	28 350		
40 (F)	048560	FURNISH PRECAST CONCRETE PANEL (PRECAST SEGMENT, LIGHTWEIGHT)	M3	13 900		

ENGINEER'S ESTIMATE**04-012024**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41 (F)	048561	FURNISH PRECAST CONCRETE PANEL (PIER TABLE, LIGHTWEIGHT)	M3	2350		
42 (S-F)	048562	ERECT PRECAST CONCRETE PANEL (PIER TABLE, LIGHTWEIGHT)	M3	2350		
43 (F)	048563	FURNISH PRECAST CONCRETE WALL (BRIDGE FOOTING)	M3	3510		
44 (S-F)	048564	ERECT PRECAST CONCRETE WALL (BRIDGE FOOTING)	M3	3510		
45 (F)	048565	FURNISH PRECAST CONCRETE FENDER MODULES	M3	1820		
46 (S-F)	048566	ERECT PRECAST CONCRETE FENDER MODULES	M3	1820		
47 (F)	048567	FURNISH PRECAST CONCRETE SEGMENT	M3	85 000		
48 (S-F)	048568	ERECT PRECAST CONCRETE SEGMENT	M3	98 900		
49 (S-F)	048569	FURNISH POLYESTER CONCRETE OVERLAY (20 MM)	M3	1950		
50 (S-F)	048570	PLACE POLYESTER CONCRETE OVERLAY (20 MM)	M2	97 600		
51 (S-F)	048571	FURNISH POLYESTER CONCRETE OVERLAY (13 MM)	M3	138		
52 (S-F)	048572	PLACE POLYESTER CONCRETE OVERLAY (13 MM)	M2	10 580		
53 (S-F)	048573	CIRCULAR SEGMENTED BEARING	EA	80		
54 (S-F)	048574	NEOPRENE BUMPER	EA	12		
55 (S)	519121	JOINT SEAL (TYPE B - MR 30 MM)	M	790		
56 (S)	048575	MODULAR JOINT SEAL ASSEMBLY (HINGE BW)	M	25		
57 (S)	048576	MODULAR JOINT SEAL ASSEMBLY (HINGE BE)	M	25		
58 (S)	048577	MODULAR JOINT SEAL ASSEMBLY (HINGE CW)	M	25		
59 (S)	048578	MODULAR JOINT SEAL ASSEMBLY (HINGE CE)	M	25		
60 (S)	048579	MODULAR JOINT SEAL ASSEMBLY (HINGE DW)	M	25		

ENGINEER'S ESTIMATE

04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61 (S)	048580	MODULAR JOINT SEAL ASSEMBLY (HINGE DE)	M	25		
62 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	KG	16 490 000		
63 (S-F)	520110	BAR REINFORCING STEEL (EPOXY COATED) (BRIDGE)	KG	9 110 000		
64 (S-F)	048581	HEADED BAR REINFORCEMENT	EA	140 500		
65 (F)	048582	FURNISH STRUCTURAL STEEL (ORTHOTROPIC BOX GIRDER)	KG	2 600 000		
66 (S-F)	048583	ERECT STRUCTURAL STEEL (ORTHOTROPIC BOX GIRDER)	KG	2 600 000		
67 (F)	048584	FURNISH STRUCTURAL STEEL (BRIDGE FOOTING)	KG	25 000 000		
68 (S)	048585	ERECT STRUCTURAL STEEL (BRIDGE FOOTING)	KG	25 000 000		
69 (F)	048586	FURNISH STRUCTURAL STEEL (PIPE BEAM)	KG	1 347 000		
70 (S-F)	048587	ERECT STRUCTURAL STEEL (PIPE BEAM)	KG	1 347 000		
71 (S-F)	048588	FURNISH STRUCTURAL STEEL (PIPE BEAM FUSE)	EA	40		
72 (F)	048589	FURNISH STRUCTURAL STEEL (BRIDGE BIKEPATH)	KG	3 290 000		
73 (S-F)	048590	ERECT STRUCTURAL STEEL (BRIDGE BIKEPATH)	KG	3 290 000		
74 (S-F)	048591	TRAVELER SUPPORT RAILS	KG	192 000		
75 (S)	048592	TRAVELER SCAFFOLD	LS	LUMP SUM	LUMP SUM	
76 (S)	048593	TRAVELER SCAFFOLD MECHANICAL	LS	LUMP SUM	LUMP SUM	
77	021685	SERVICE PLATFORMS	EA	26		
78	560218	FURNISH SIGN STRUCTURE (TRUSS)	KG	29 000		
79	560219	INSTALL SIGN STRUCTURE (TRUSS)	KG	29 000		
80	562004	METAL (RAIL MOUNTED SIGN)	KG	1900		

ENGINEER'S ESTIMATE

04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
81 (S-F)	048594	FURNISH AND INSTALL REINFORCED, RECYCLED PLASTIC OR COMPOSITE PLASTIC LUMBER	M3	390		
82 (S-F)	048595	ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE PANEL (50 MM)	M2	2400		
83 (S)	048596	CLEAN AND PAINT STRUCTURAL STEEL (ORTHOTROPIC BOX GIRDER)	LS	LUMP SUM	LUMP SUM	
84 (S)	048597	CLEAN AND PAINT STRUCTURAL STEEL (PIPE BEAM)	LS	LUMP SUM	LUMP SUM	
85 (S)	048598	CLEAN AND PAINT STRUCTURAL STEEL (BRIDGE BIKEPATH)	LS	LUMP SUM	LUMP SUM	
86 (S-F)	750501	MISCELLANEOUS METAL (BRIDGE)	KG	260 000		
87	021286	WALKWAYS	LS	LUMP SUM	LUMP SUM	
88 (S)	750505	BRIDGE DECK DRAINAGE SYSTEM	LS	LUMP SUM	LUMP SUM	
89	021687	CONSTRUCTION SURVEYING	LS	LUMP SUM	LUMP SUM	
90 (F)	048599	CONCRETE BARRIER (TYPE 732 MODIFIED)	M	8121		
91 (S-F)	048600	STEEL BARRIER (TYPE 732 MODIFIED)	M	238		
92 (S-F)	048601	BIKEPATH RAILING	M	4161		
93	840561	100 MM THERMOPLASTIC TRAFFIC STRIPE	M	25 150		
94	021688	75MM PAINT TRAFFIC STRIPE (BLACK, 1-COAT)	M	8400		
95	840656	PAINT TRAFFIC STRIPE (2-COAT)	M	2030		
96	840666	PAINT PAVEMENT MARKING (2-COAT)	M2	26		
97	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	4600		
98	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	1450		
99	021689	PILE CORROSION MONITORING SYSTEM	LS	LUMP SUM	LUMP SUM	
100	021690	STRONG MOTION DETECTION SYSTEM	LS	LUMP SUM	LUMP SUM	

ENGINEER'S ESTIMATE**04-012024**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101 (S)	021691	TRAFFIC OPERATION SYSTEM	LS	LUMP SUM	LUMP SUM	
102 (S)	021692	CAMERA WITH HOUSING	EA	2		
103 (S)	021693	PAN AND TILT UNIT	EA	2		
104 (S)	021694	CAMERA CONTROL UNIT	EA	2		
105 (S)	021695	TRANSMITTER DUPLEX DATA	EA	2		
106 (S)	021696	PREFORMED LOOP DETECTOR STATION	EA	12		
107 (S)	021697	MICROWAVE VEHICLE DETECTION SENSOR SYSTEM	EA	10		
108 (S)	021698	FIBER OPTIC DATA MODEM	EA	25		
109 (S)	021699	FIBER OPTIC CABLE (72-FIBERS)	M	6900		
110 (S)	021700	FIBER OPTIC CABLE (12-FIBERS)	M	1200		
111 (S)	021701	FIBER OPTIC SPLICE CLOSURE	EA	28		
112 (S)	021702	SUBSTATION WESTBOUND	LS	LUMP SUM	LUMP SUM	
113 (S)	021703	SUBSTATION EASTBOUND	LS	LUMP SUM	LUMP SUM	
114 (S)	021704	ROADWAY LEVEL WESTBOUND	LS	LUMP SUM	LUMP SUM	
115 (S)	021705	GIRDER LEVEL WESTBOUND	LS	LUMP SUM	LUMP SUM	
116 (S)	021706	ROADWAY LEVEL EASTBOUND	LS	LUMP SUM	LUMP SUM	
117 (S)	021707	GIRDER LEVEL EASTBOUND	LS	LUMP SUM	LUMP SUM	
118 (S)	021708	NAVIGATION LIGHTING SYSTEM	LS	LUMP SUM	LUMP SUM	
119 (S)	021709	SUPERVISORY CONTROL AND DATA ACQUISITION REMOTE TERMINAL UNIT SYSTEM	LS	LUMP SUM	LUMP SUM	
120	021710	CCSF WATER MAIN (12 NPS)	M	2130		

ENGINEER'S ESTIMATE

04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
121	021711	CCSF SEWER FORCE MAIN (10 NPS)	M	2130		
122	021712	CCSF SEWER CASING PIPE (18 NPS)	M	2040		
123	021713	CCSF WATER CASING PIPE (20 NPS)	M	12		
124	021714	DOMESTIC WATER (2 1/2 NPS)	M	2110		
125	021715	COMPRESSED AIR (4 NPS)	M	2110		
126	021716	CCSF RECLAIMED WATER (6 NPS)	M	2130		
127	021717	CCSF RECLAIMED WATER CASING PIPE (10 NPS)	M	12		
128	021718	SUBSTATION ARCHITECTURAL EASTBOUND	LS	LUMP SUM	LUMP SUM	
129	021719	SUBSTATION ARCHITECTURAL WESTBOUND	LS	LUMP SUM	LUMP SUM	
130	BLANK					
131 (S-F)	048834	MARINE PILE DRIVING ENERGY ATTENUATOR	LS	LUMP SUM	LUMP SUM	
132	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: _____