HIGHWAY WORK PROPOSAL

Proposal Number: Ø 9

Wisconsin Department of Transportation
DT1502 10/2010 s.66.29(7) Wis. Stats.

COUNTY	STATE PROJECT ID	FEDERAL PROJECT ID	PROJECT DESCRIPTION	HIGHWAY
Winnebago	4065-15-71		Tayco Street Bridge, Tayco Street Bridge	STH 114
Brown	4180-07-71		Walnut Street Bridge, Walnut Street Bridge	STH 29
Brown	9210-14-71	WISC 2013 308	Mason Street Bridge, Mason Street Bridge	STH 54

This proposal, submitted by the undersigned bidder to the Wisconsin Department of Transportation, is in accordance with the advertised request for proposals. The bidder is to furnish and deliver all materials, and to perform all work for the improvement of the designated project in the time specified, in accordance with the appended Proposal Requirements and Conditions.

Proposal Guaranty Required, $ 100,000.00 Payable to: Wisconsin Department of Transportation	Attach Proposal Guaranty on back of this PAGE.
Bid Submittal Due Date: June 11, 2013 Time (Local Time): 9:00 AM	Firm Name, Address, City, State, Zip Code **SAMPLE** **NOT FOR BIDDING PURPOSES**
Contract Completion Time May 22, 2015	
Assigned Disadvantaged Business Enterprise Goal DISC %	This contract is exempt from federal oversight.

This certifies that the undersigned bidder, duly sworn, is an authorized representative of the firm named above; that the bidder has examined and carefully prepared the bid from the plans, Highway Work Proposal, and all addenda, and has checked the same in detail before submitting this proposal or bid; and that the bidder or agents, officer, or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal bid.

Do not sign, notarize, or submit this Highway Work Proposal when submitting an electronic bid on the Internet.

Subscribed and sworn to before me this date _____

(Signature, Notary Public, State of Wisconsin)

(Print or Type Name, Notary Public, State Wisconsin)

(Date Commission Expires)

Notary Seal

(Bidder Signature)

(Print or Type Bidder Name)

(Bidder Title)

For Department Use Only

Type of Work Bridge electrical work, bridge CCTV system, bridge machinery work, Structures B-05-134, B-05-269,and B-70-097.	
Notice of Award Dated	Date Guaranty Returned

PLEASE ATTACH
PROPOSAL GUARANTY HERE

Effective with November 2007 Letting

PROPOSAL REQUIREMENTS AND CONDITIONS

The bidder, signing and submitting this proposal, agrees and declares as a condition thereof, to be bound by the following conditions and requirements.

If the bidder has a corporate relationship with the proposal design engineering company, the bidder declares that it did not obtain any facts, data, or other information related to this proposal from the design engineering company that was not available to all bidders.

The bidder declares that they have carefully examined the site of, and the proposal, plans, specifications and contract forms for the work contemplated, and it is assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, special provisions and contract. It is mutually agreed that submission of a proposal shall be considered conclusive evidence that the bidder has made such examination.

The bidder submits herewith a proposal guaranty in proper form and amount payable to the party as designated in the advertisement inviting proposals, to be retained by and become the property of the owner of the work in the event the undersigned shall fail to execute the contract and contract bond and return the same to the office of the engineer within fourteen (14) days after having been notified in writing to do so; otherwise to be returned.

The bidder declares that they understand that the estimate of quantities in the attached schedule is approximate only and that the attached quantities may be greater or less in accordance with the specifications.

The bidder agrees to perform the said work, for and in consideration of the payment of the amount becoming due on account of work performed, according to the unit prices bid in the following schedule, and to accept such amounts in full payment of said work.

The bidder declares that all of the said work will be performed at their own proper cost and expense, that they will furnish all necessary materials, labor, tools, machinery, apparatus, and other means of construction in the manner provided in the applicable specifications and the approved plans for the work together with all standard and special designs that may be designed on such plans, and the special provisions in the contract of which this proposal will become a part, if and when accepted. The bidder further agrees that the applicable specifications and all plans and working drawings are made a part hereof, as fully and completely as if attached hereto.

The bidder, if awarded the contract, agrees to begin the work not later than ten (10) days after the date of written notification from the engineer to do so, unless otherwise stipulated in the special provisions.

The bidder declares that if they are awarded the contract, they will execute the contract agreement and begin and complete the work within the time named herein, and they will file a good and sufficient surety bond for the amount of the contract for performance and also for the full amount of the contract for payment.

The bidder, if awarded the contract, shall pay all claims as required by Section 779.14, Statutes of Wisconsin, and shall be subject to and discharge all liabilities for injuries pursuant to Chapter 102 of the Statutes of Wisconsin, and all acts amendatory thereto. They shall further be responsible for any damages to property or injury to persons occurring through their own negligence or that of their employees or agents, incident to the performance of work under this contract, pursuant to the Standard Specifications for Road and Bridge Construction applicable to this contract.

In connection with the performance of work under this contract, the contractor agrees to comply with all applicable state and federal statutes relating to non-discrimination in employment. No otherwise qualified person shall be excluded from employment or otherwise be subject to discrimination in employment in any manner on the basis of age, race, religion, color, gender, national origin or ancestry, disability, arrest or conviction record (in keeping with s.111.32), sexual orientation, marital status, membership in the military reserve, honesty testing, genetic testing, and outside use of lawful products. This provision shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship. The contractor further agrees to ensure equal opportunity in employment to all applicants and employees and to take affirmative action to attain a representative workforce.

The contractor agrees to post notices and posters setting forth the provisions of the nondiscrimination clause, in a conspicuous and easily accessible place, available for employees and applicants for employment.

If a state public official (section 19.42, Stats.) or an organization in which a state public official holds at least a 10% interest is a party to this agreement, this contract is voidable by the state unless appropriate disclosure is made to the State of Wisconsin Ethics Board.

Effective with August 2007 Letting

BID PREPARATION

Preparing the Proposal Schedule of Items

A General

(1) Obtain bidding proposals as specified in section 102 of the standard specifications prior to 11:45 AM of the last business day preceding the letting. Submit bidding proposals using one of the following methods:

1. Electronic bid on the internet.
2. Electronic bid on a printout with accompanying diskette or CD ROM.
3. Paper bid under a waiver of the electronic submittal requirements.

(2) Bids submitted on a printout with accompanying diskette or CD ROM or paper bids submitted under a waiver of the electronic submittal requirements govern over bids submitted on the internet.

(3) The department will provide bidding information through the department's web site at http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm. The contractor is responsible for reviewing this web site for general notices as well as information regarding proposals in each letting. The department will also post special notices of all addenda to each proposal through this web site no later than 4:00 P.M. local time on the Thursday before the letting. Check the department's web site after 5:00 P.M. local time on the Thursday before the letting to ensure all addenda have been accounted for before preparing the bid. When bidding using methods 1 and 2 above, check the Bid Express™ on-line bidding exchange at http://www.bidx.com/ after 5:00 P.M. local time on the Thursday before the letting to ensure that the latest schedule of items Expedite file (*.ebs or *.00x) is used to submit the final bid.

(4) Interested parties can subscribe to the Bid Express™ on-line bidding exchange by following the instructions provided at the www.bidx.com web site or by contacting:

Info Tech Inc.
5700 SW 34th Street, Suite 1235
Gainesville, FL 32608-5371
email: mailto:customer.support@bidx.com

(5) The department will address equipment and process failures, if the bidder can demonstrate that those failures were beyond their control.

(6) Contractors are responsible for checking on the issuance of addenda and for obtaining the addenda. Notice of issuance of addenda is posted on the department's web site at http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm or by calling the department at (608) 266-1631. Addenda can ONLY be obtained from the departments web site listed above or by picking up the addenda at the Bureau of Highway Construction, Room 601, 4802 Sheboygan Avenue, Madison, WI, during regular business hours.

B Submitting Electronic Bids

B.1 On the Internet

(1) Do the following before submitting the bid:

1. Have a properly executed annual bid bond on file with the department.
2. Have a digital ID on file with and enabled by Info Tech Inc. Using this digital ID will constitute the bidder's signature for proper execution of the bidding proposal.

(2) In lieu of preparing, delivering, and submitting the proposal as specified in 102.6 and 102.9 of the standard specifications, submit the proposal on the internet as follows:

1. Download the latest schedule of items reflecting all addenda from the Bid Express™ web site.
2. Use Expedite™ software to enter a unit price for every item in the schedule of items.
3. Submit the bid according to the requirements of Expedite™ software and the Bid Express™ web site. Do not submit a bid on a printout with accompanying diskette or CD ROM or a paper bid. If the bidder does submit a bid on a printout with accompanying diskette or a paper bid in addition to the internet submittal, the department will disregard the internet bid.
4. Submit the bid before the hour and date the Notice to Contractors designates.
5. Do not sign, notarize, and return the bidding proposal described in 102.2 of the standard specifications.

(3) The department will not consider the bid accepted until the hour and date the Notice to Contractors designates.

B.2 On a Printout with Accompanying Diskette or CD ROM

(1) Download the latest schedule of items from the Wisconsin pages of the Bid Express™ web site reflecting the latest addenda posted on the department's web site at **http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm**. Use Expedite ™ software to prepare and print the schedule of items. Provide a valid amount for all price fields. Follow instructions and review the help screens provided on the Bid Express™ web site to assure that the schedule of items is prepared properly.

(2) Staple an 8 1/2 by 11 inch printout of the Expedite™ generated schedule of items to the other proposal documents submitted to the department as a part of the bidder's sealed bid. As a separate submittal not in the sealed bid envelop but due at the same time and place as the sealed bid, also provide the Expedite™ generated schedule of items on a 3 1/2 inch computer diskette or CD ROM. Label each diskette or CD ROM with the bidder's name, the 4 character department-assigned bidder identification code from the top of the bidding proposal, and a list of the proposal numbers included on that diskette or CD ROM as indicated in the following example:

Bidder Name

BN00

Proposals: 1, 12, 14, & 22

(3) If bidding on more than one proposal in the letting, the bidder may include all proposals for that letting on one diskette or CD ROM. Include only submitted proposals with no incomplete or other files on the diskette or CD ROM.

(4) The bidder-submitted printout of the Expedite™ generated schedule of items is the governing contract document and must conform to the requirements of section 102 of the standard specifications. If a printout needs to be altered, cross out the printed information with ink or typewriter and enter the new information and initial it in ink. If there is a discrepancy between the printout and the diskette or CD ROM, the department will analyze the bid using the printout information.

(5) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:

1. The check code printed on the bottom of the printout of the Expedite™ generated schedule of items is not the same on each page.
2. The check code printed on the printout of the Expedite™ generated schedule of items is not the same as the check code for that proposal provided on the diskette or CD ROM.

3. The diskette or CD ROM is not submitted at the time and place the department designates.

C Waiver of Electronic Submittal

(1) The bidder may request a waiver of the electronic submittal requirements. Submit a written request for a waiver in lieu of bids submitted on the internet or on a printout with accompanying diskette or CD ROM. Use the waiver that was included with the paper bid document sent to the bidder or type up a waiver on the bidder's letterhead. The department will waive the electronic submittal requirements for a bidding entity (individual, partnership, joint venture, corporation, or limited liability company) for up to 4 individual proposals in a calendar year. The department may allow additional waivers for equipment malfunctions.

(2) Submit a schedule of items on paper conforming to section 102 of the standard specifications. The department charges the bidder a $75 administrative fee per proposal, payable at the time and place the department designates for receiving bids, to cover the costs of data entry. The department will accept a check or money order payable to: "Wisconsin, Dept. of Transportation."

(3) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:

1. The bidder fails to provide the written request for waiver of the electronic submittal requirements.
2. The bidder fails to pay the $75 administrative fee before the time the department designates for the opening of bids unless the bidder requests on the waiver that they be billed for the $75.
3. The bidder exceeds 4 waivers of electronic submittal requirements within a calendar year.

(4) In addition to the reasons specified in section 102 of the standard specifications, the department may refuse to issue bidding proposals for future contracts to a bidding entity that owes the department administrative fees for a waiver of electronic submittal requirements.

PROPOSAL BID BOND

Wisconsin Department of Transportation

DT1303 1/2006

Proposal Number	Project Number	Letting Date
Name of Principal		
Name of Surety	State in Which Surety is Organized	

We, the above-named Principal and the above-named Surety, are held and firmly bound unto the State of Wisconsin in the sum equal to the Proposal Guaranty for the total bid submitted for the payment to be made; we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. The condition of this obligation is that the Principal has submitted a bid proposal to the State of Wisconsin acting through the Department of Transportation for the improvement designated by the Proposal Number and Letting Date indicated above.

If the Principal is awarded the contract and, within the time and manner required by law after the prescribed forms are presented for signature, enters into a written contract in accordance with the bid, and files the bond with the Department of Transportation to guarantee faithful performance and payment for labor and materials, as required by law, or if the Department of Transportation shall reject all bids for the work described, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. In the event of failure of the Principal to enter into the contract or give the specified bond, the Principal shall pay to the Department of Transportation **within 10 business days of demand** a total equal to the Proposal Guaranty as liquidated damages; the liability of the Surety continues for the full amount of the obligation as stated until the obligation is paid in full.

The Surety, for value received, agrees that the obligations of it and its bond shall not be impaired or affected by any extension of time within which the Department of Transportation may accept the bid; and the Surety does waive notice of any such extension.

IN WITNESS, the Principal and Surety have agreed and have signed by their proper officers and have caused their corporate seals to be affixed this date: **(DATE MUST BE ENTERED)**

PRINCIPAL

(Company Name) **(Affix Corporate Seal)**

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

NOTARY FOR PRINCIPAL

(Date)

State of Wisconsin)
) ss.
_____ County)

On the above date, this instrument was acknowledged before me by the named person(s).

(Signature, Notary Public, State of Wisconsin)

(Print or Type Name, Notary Public, State of Wisconsin)

(Date Commission Expires)

Notary Seal

(Name of Surety) **(Affix Seal)**

(Signature of Attorney-in-Fact)

NOTARY FOR SURETY

(Date)

State of Wisconsin)
) ss.
_____ County)

On the above date, this instrument was acknowledged before me by the named person(s).

(Signature, Notary Public, State of Wisconsin)

(Print or Type Name, Notary Public, State of Wisconsin)

(Date Commission Expires)

Notary Seal

IMPORTANT: A certified copy of Power of Attorney of the signatory agent must be attached to the bid bond.

CERTIFICATE OF ANNUAL BID BOND

Wisconsin Department of Transportation

DT1305 8/2003

Time Period Valid (From/To)
Name of Surety
Name of Contractor
Certificate Holder Wisconsin Department of Transportation

This is to certify that an annual bid bond issued by the above-named Surety is currently on file with the Wisconsin Department of Transportation.

This certificate is issued as a matter of information and conveys no rights upon the certificate holder and does not amend, extend or alter the coverage of the annual bid bond.

Cancellation: Should the above policy be cancelled before the expiration date, the issuing surety will give thirty (30) days written notice to the certificate holder indicated above.

(Signature of Authorized Contractor Representative) (Date)

FEBRUARY 1999

LIST OF SUBCONTRACTORS

Section 66.29(7), Wisconsin Statutes, provides that a bidder, as a part of his proposal, shall submit a list of the subcontractors he proposes to contract with and the class of work to be performed by each, provided that to qualify for such listing each subcontractor must first submit his bid in writing to the general contractor at least 48 hours prior to the time of bid closing. It further provides that a proposal of a bidder shall not be invalid if any subcontractor, and the class of work to be performed by such subcontractor, has been omitted from a proposal.

No subcontract, whether listed herein or later proposed, may be entered into without the written consent of the Engineer as provided in Subsection 108.1 of the Standard Specifications.

Name of Subcontractor	Class of Work	Estimated Value
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DECEMBER 2000

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS

Instructions for Certification

1. By signing and submitting this proposal, the prospective contractor is providing the certification set out below.

2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective contractor shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective contractor to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department determined to enter into this transaction. If it is later determined that the contractor knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government the department may terminate this transaction for cause or default.

4. The prospective contractor shall provide immediate written notice to the department to whom this proposal is submitted if at any time the prospective contractor learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

6. The prospective contractor agrees by submitting this proposal that, should this contract be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department entering into this transaction.

7. The prospective contractor further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," which is included as an addendum to PR-1273 - "Required Contract Provisions Federal Aid Construction Contracts," without

modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. The contractor may rely upon a certification of a prospective subcontractor/materials supplier that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A contractor may decide the method and frequency by which it determines the eligibility of its principals. Each contractor may, but is not required to, check the Disapproval List (telephone # 608/266/1631).

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

10. Except for transactions authorized under paragraph 6 of these instructions, if a contractor in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

(1) The prospective contractor certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offense enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective contractor is unable to certify to any of the statements in this certification, such prospective contractor shall attach an explanation to this proposal.

Special Provisions

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 4065-15-71, Tayco Street Bridge, Tayco Street Bridge, STH 114, Winnebago County, Wisconsin; Project 4180-07-71, Walnut Street Bridge, Walnut Street Bridge, STH 29, Brown County, Wisconsin; Project 9210-14-71, Mason Street Bridge, Mason Street Bridge, STH 54, Brown County, Wisconsin, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2013 Edition, as published by the department, and these special provisions.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.
100-005 (20120615)

2. Scope of Work.

The work under this contract shall consist of rehabilitation of Structure B-05-134 including bridge electrical work, bridge CCTV system, and replacement of existing horizontal barrier gates with vertical resistance barrier gates on the structure; rehabilitation of Structure B-05-269 including bridge electrical work and bridge CCTV system; and rehabilitation of Structure B-70-097 including bridge electrical work, bridge CCTV system, removal of retractable roadway barriers, and replacement of existing vertical warning gates with vertical resistance barrier gates; asphaltic surface, concrete pavement, concrete sidewalk, concrete curb and gutter, traffic control, and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.
104-005 (20090901)

3. Prosecution and Progress.

Begin work within ten calendar days after the engineer issues a written notice to do so.

Provide the start date to the engineer in writing within a month after executing the contract but at least 14 calendar days before the preconstruction conference. Upon approval, the engineer will issue the notice to proceed within ten calendar days before the approved start date.

To revise the start date, submit a written request to the engineer at least two weeks before the intended start date. The engineer will approve or deny that request based on the conditions cited in the request and its effect on the department's scheduled resources.

Migratory Birds
Swallow and other migratory birds' nests have been observed on or under the Tayco Street bridge, the Walnut Street bridge, and the Mason Street bridge. No impacts are anticipated to the bird nests on the bridges.

All active nests (when eggs or young are present) of migratory birds are protected under the federal Migratory Bird Treaty Act.

The nesting season for swallows and other birds is usually between May 1 and August 30. Either prevent active nests from becoming established, or apply for a depredation permit from the US Fish and Wildlife Service for work that may disturb or destroy active nests. The need for a permit may be avoided by removing the existing bridge structure prior to nest occupation by birds, or clearing nests from all structures before the nests become active in early spring. As a last resort, prevent birds from nesting by installing a suitable netting device on the remaining structure prior to nesting activity. Include the cost for preventing nesting in the cost of other items under this contract. No separate payment will be made for netting.

U.S. Coast Guard Coordination
For all bridges in this contract, any impact or deviation from permanent bridge opening requirements or any impacts to navigation, are authorized by the U.S. Coast Guard.

Coordinate with the U.S. Coast Guard at least 30 calendar days prior to the start of any work that temporarily alters the navigational clearances, places equipment in the waterway, or could potentially affect navigation during the project at any of the bridge sites. The U.S. Coast Guard contact is as follows:

Mr. Lee Soule
Commander (DPB)
Ninth Coast Guard District
1240 East 9th Street
Cleveland, OH 44199-2060
Office: (216) 902-6085
Fax: (216) 902-6088
Email: Lee.D.Soule@uscg.mil

Keep the Coast Guard District informed of the schedule of work and be notified prior to any change to the schedule. In addition, the name of the person who may be contacted on a 24-hour basis to respond to an emergency at the work site shall be provided.

Full closure of the lift bridges to navigational vessels will only be allowed during the non-navigation season between January 1 and March 15 or as allowed by the U.S. Coast Guard.

Project 4065-15-71, STH 114/Tayco Street Bridge
Full bridge closure to waterway navigational traffic at the Tayco Street bridge is anticipated during a portion of the bridge work and will be allowed during the non-navigation window as approved by the department and U.S. Coast Guard. Outside of the full closure window, interruptions to the lift bridge operations are anticipated to be periodic and similar in nature to a normal bridge opening and closing operations.

Project 4180-07-71, STH 29/Walnut Street
Full closure of the Walnut Street bridge is not anticipated to complete bridge work items and interruptions to the lift bridge operations are anticipated to be periodic and similar in nature to a normal bridge opening and closing operations.

Project 9210-14-71, STH 54/Mason Street Bridge
Full bridge closure to waterway navigational traffic at the Mason Street bridge is anticipated during a portion of the bridge work and will be allowed during the non-navigation window as approved by the department and U.S. Coast Guard. Outside of the full closure window, interruptions to the lift bridge operations are anticipated to be periodic and similar in nature to a normal bridge opening and closing operations.

Supplement standard spec 108.11 as follows:

If the contractor fails to complete the work for the barrier gate installation and roadway approach modifications on the outside of STH 114/Tayco Street at B-70-097 which requires lane closures on STH 114/Tayco Street within 40 calendar days of implementing the first lane closure to begin the barrier gate work, the department will assess the contractor $1,000 in interim liquidated damages for each calendar day the barrier gate and roadway approach work remains incomplete and the lane closures remain in place. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM.

If the contractor fails to complete the parapet modifications and barrier gate installation on the median side and outside of B-05-134 which require lane closures on STH 54/Mason Street within 60 calendar days of implementing the first lane closure to begin the parapet work, the department will assess the contractor $1,000 in interim liquidated damages for each calendar day the parapet work remains incomplete and the lane closures remain in place. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM.

If the contractor fails to complete the work necessary to reopen STH 114/Tayco Street after a maximum of a 30-minute closure during field testing operations, the department will assess the contractor $2,000 in interim liquidated damages for the first 15 minutes, and $1,000 for each additional 15 minute time increment that STH 114/Tayco Street

remains closed to roadway traffic. The department will assess interim liquidated damages using the administrative item Failing to Open Road to Traffic.

If the contractor fails to complete the work necessary to reopen STH 29/Walnut Street after a maximum of a 30-minute closure during field testing operations, the department will assess the contractor $2,000 in interim liquidated damages for the first 15 minutes, and $1,000 for each additional 15 minute time increment that STH 29/Walnut Street remains closed to roadway traffic. The department will assess interim liquidated damages using the administrative item Failing to Open Road to Traffic.

If the contractor fails to complete the work necessary to reopen STH 54/Mason Street after a maximum of a 30-minute closure during field testing operations, the department will assess the contractor $2,000 in interim liquidated damages for the first 15 minutes, and $1,000 for each additional 15 minute time increment that STH 54/Mason Street remains closed to roadway traffic. The department will assess interim liquidated damages using the administrative item Failing to Open Road to Traffic.

In the event of a contractor caused event which prevents a requested bridge opening to allow waterway navigational traffic from passing, the department will assess the contractor $2,000 in interim liquidated damages for the first 15 minutes and $1,000 for each additional 15 minute time increment that the bridge remains closed to waterway navigational traffic beyond a 30 minute period in which the bridge opening was requested to allow waterway vessels to pass. This penalty will be assessed for each failure incident unless otherwise directed by the engineer. The department will assess interim liquidated damages using the administrative item Failing to Open Road to Traffic.

If the contractor fails to reopen closed travel lanes, as described during the periods defined in the articles for Traffic and Holiday Work Restrictions, the department will assess the contractor $2,000 in interim liquidated damages for the first 15 minutes, and $1,000 for each additional 15 minute time increment that the travel lane remains closed. The interim liquidated damages will be charged for any period of time starting one minute after the designated time for the roadway to be opened to two-lanes. The department will assess interim liquidated damages for failing to open the road to traffic using the administrative item Failing to Open Road to Traffic.

If contract time expires prior to completing all work specified in the contract, additional liquidated damages will be affixed according to standard spec 108.11.

Additionally, the contractor will be held responsible for any and all fines placed against the department by the U.S. Coast Guard for not meeting waterway navigation requirements as provided in this article, the article for Construction Over or Adjacent to Navigable Waters, or for any requirements as conditions to U.S. Coast Guard permits and approvals.

4. Traffic.

General

Traffic Control Contingency Plan

Submit a contingency plan to the engineer at the preconstruction meeting which addresses roadway traffic management and traffic control in the event of a bridge closure failure during a testing period or any other project work which may prevent roadway traffic from using the bridge longer for a period of longer than 30 minutes at each bridge location.

Roadway Traffic Barrier Requirements During Bridge Opening Operations

During any period in which the barrier gates or retractable bollards at Mason Street and Tayco Street are removed or any of the barrier gates or retractable bollards at any of the bridge sites are not electronically operational during any period when bridge openings could occur to accommodate navigational traffic, provide for a method to stop all roadway and pedestrian traffic and completely block roadway and pedestrian traffic from travelling beyond the closure point during bridge opening and closing operations.

This may consist of manual closure of barrier gates, a crashworthy temporary roadblock such as temporary attenuator trucks, or other department approved method which provides for a full and safe closure of the roadway approaches during bridge opening and closing operations.

During periods when the bridge openings may occur to accommodate navigational traffic and when traffic control devices are located on the movable bridge span, remove the traffic control devices from the span prior to opening the bridge. Following the bridge opening operation, replace the traffic control devices after the bridge closes before continuing work in the area or as directed by the engineer.

Portable Changeable Message Signs – Message Prior Approval

After coordinating with department construction field staff, notify the Northeast Region Traffic Section at (920) 492-5641 (secondary contact number is (920) 492-7719) three business days prior to deploying or changing a message on a PCMS to obtain approval of the proposed message. The Northeast Region Traffic Unit will review the proposed message and either approve the message or make necessary changes.

Install PCMS as shown in the plans, 7 calendar days prior to beginning any lane closures on Tayco Street or Mason Street.

Wisconsin Lane Closure System Advanced Notification

Provide the following minimum advance notification to the engineer for incorporation into the Wisconsin Lane Closure System.

Lane closures (without width, height or weight restriction)	3 business days
Service Ramp closures	3 business days
Extended closure hours	3 business days
System Ramp closures	7 calendar days
Local Street openings/closings	7 calendar days
Lane closures (with width, height or weight restriction)	14 calendar days
Project Start	14 calendar days
Full Freeway closures	14 calendar days
Construction stage changes	14 calendar days
Detours	14 calendar days

Notify the engineer if there are any changes in the schedule, early completions, or cancellations for scheduled work.

Project 4065-15-71, STH 114/Tayco Street Bridge
Notify the Wisconsin State Patrol, Winnebago County Highway Department, Winnebago County Sheriff Department, City of Menasha Department of Public Works, City of Menasha Police Department, City of Menasha Fire Department, Emergency Services, Local Postal Carriers, and Local School Districts at least 14 calendar days prior to the start of any work associated with this project.

Implement traffic control for this project in the sequence of stages as described below unless otherwise approved by the engineer:

Stage 1A
Maintain STH 114 open to traffic during construction. Maintain a minimum of one lane of traffic in southbound direction and a minimum of two lanes of traffic in the northbound direction at all times. Close the sidewalk along southbound STH 114 to pedestrian traffic. Detour the pedestrian traffic to the northbound sidewalk along STH 114 at the north crossing of STH 114 at Water Street and at the south crossing of STH 114 at River Street/Washington Street. Close Water Street at STH 114.

Complete the following construction activities during Stage 1A:
- Remove the existing warning gate system and footing
- Construct new barrier gate footing
- Install curb and gutter and sidewalk
- Install barrier gate system

Stage 2A
Maintain STH 114 open to traffic during construction. Maintain a minimum of one lane of traffic in northbound direction and a minimum of two lanes of traffic in the southbound direction at all times. Close the sidewalk along northbound STH 114 to pedestrian traffic. Detour the pedestrian traffic to the southbound sidewalk along STH 114 at the north crossing of STH 114 at Water Street and at the south crossing of STH 114 at River Street/Washington Street. Close Water Street at STH 114.

Complete the following construction activities during Stage 2A:

- Remove the existing warning gate system and footing
- Construct new barrier gate footing
- Install curb and gutter and sidewalk
- Install barrier gate system

Stage 1B and Stage 2B

It is anticipated the existing retractable bollards within the STH 114 roadway will be removed during the winter period when the bridge is closed to navigational traffic. Reinstall traffic control as shown for Stage 1 and Stage 2 or use another approved method to accommodate short-term closure of the traffic lanes to accommodate removal of the existing retractable bollard traffic barrier system on the northbound and southbound outside travel lanes of STH 114. Do not close more than one travel lane at a time. Maintain pedestrian traffic on both sides of STH 114.

Stage 3

Maintain STH 114 open to traffic during construction. Close the inside travel lane of traffic in each direction during off-peak weekday hours (8:00 PM to 5:00 AM, Monday through Friday) to complete removal of the existing retractable bollard traffic barrier system on the northbound and southbound inside travel lanes of STH 114. Maintain pedestrian traffic on both sides of STH 114. Maintain access to Water Street from Tayco Street.

Equipment Testing

Periodic closures of STH 114 will be permitted during weekday nighttime hours (10:00 PM to 5:00 AM, Monday through Friday) to open and close the bridge for field testing of the mechanical and electrical systems as set forth in the article for bridge electrical work and as approved by the department. Coordinate with the engineer 14 days prior to any scheduled closures.

During the equipment testing, the contractor shall provide sufficient traffic control devices on site to close the following roadways in accordance to standard detail drawings (SDD) “Barricades and Signs for Mainline Closures” Detail C and “Barricades and Signs for Sideroad Closures” Detail 1 in the event of an equipment failure anticipated to last more than 30 minutes:

- STH 114 at Nicolet Boulevard
- STH 114 at Garfield Avenue
- STH 114 at River Street/Washington Street
- STH 114 at Water Street
- STH 114 at Kaukauna Street/Main Street

Notify the engineer immediately if an equipment failure or if the equipment testing is anticipated to extend beyond 5:00 AM.

Payment to deliver, install, and remove traffic control devices for any equipment testing and any loading and unloading of materials and equipment shall be paid for under the bid

item Traffic Control (4065-15-71) and no additional payment will be made for traffic control items used for these activities.

Traffic control items delivered to the site for standby purposes during field testing will be considered part of the bid item Traffic Control (4065-15-71) and no additional payment will be made for the traffic control items for standby purposes during field testing.

Payment for installed traffic control devices for lane closures to make barrier gate installations, sidewalk modifications, and retractable bollard removals will be paid for under the associated traffic control bid items in the contract.

Project 4180-07-71, STH 29/Walnut Street Bridge

Notify the Wisconsin State Patrol, Brown County Highway Department, Brown County Sheriff Department, City of Green Bay Department of Public Works, City of Green Bay Police Department, City of Green Bay Fire Department, Bellin Hospital, Emergency Services, Local Postal Carriers, and Local School Districts at least 14 calendar days prior to the start of any work associated with this project.

Maintain STH 29 open to traffic during construction.

Closing lanes on STH 29 for operations other than those required for the loading and unloading of materials and equipment for B-05-269 will not be permitted unless approved by the engineer. Single lane closures will be permitted from the hours of 9:00 AM to 2:00 PM on weekdays to facilitate the loading and unloading of materials and equipment. Reopen the closed lane to through traffic immediately upon completion of unloading and loading activities. Lane closures will not be permitted during inclement weather and when plowing operations are required to clear snow from the roadway.

Payment to deliver, install, and remove traffic control devices for any loading and unloading of materials and equipment shall be paid for under the bid item Traffic Control (4180-07-71) and no additional payment will be made for traffic control items used on this project.

Equipment Testing

Periodic closures of STH 29 will be permitted during weekday nighttime hours (10:00 PM to 5:00 AM, Monday through Friday) to open and close the bridge for field testing of the mechanical and electrical systems as set forth in the article for bridge electrical work and as approved by the department. Coordinate with the engineer 14 days prior to any scheduled closures.

Do not complete equipment testing for B-05-269, STH 29 and B-05-134, STH 54 under Project 9210-14-71 at the same time.

During the equipment testing, the contractor shall have sufficient traffic control devices on site to close the following roadways in accordance to standard detail drawings (SDD) “Barricades and Signs for Mainline Closures” Detail C and Barricades and Signs for

Sideroad Closures" Detail 1 in the event of an equipment failure anticipated to last more than 30 minutes:

- STH 29 at Pearl Street
- STH 29 at Museum Place
- STH 29 at Washington Street

Notify the engineer immediately if an equipment failure or if the equipment testing is anticipated to extend beyond 5:00 AM. Payment to deliver, install, and remove traffic control devices for equipment testing shall be paid for under the bid item Traffic Control (4180-07-71) and no additional payment will be made for traffic control items used on this project.

Project 9210-14-71, STH 54/Mason Street Bridge

Notify the Wisconsin State Patrol, Brown County Highway Department, Brown County Sheriff Department, City of Green Bay Department of Public Works, City of Green Bay Police Department, City of Green Bay Fire Department, Bellin Hospital, Emergency Services, Local Postal Carriers, and Local School Districts at least 14 calendar days prior to the start of any work associated with this project.

Implement traffic control for this project in the sequence of stages as described below unless otherwise approved by the engineer:

Phase I

The parapet work described in Stage 2 may occur prior to Stage 1. The barrier gate testing shall occur with the second stage once the both the median parapet and outside bridge parapet modifications are completed and the barrier gates systems are fully installed. The work in Stage 1 and Stage 2 cannot occur simultaneously.

Stage 1

Maintain STH 54 open to traffic during construction. Maintain a minimum of two lanes of traffic in each direction at all times. Close the eastbound and westbound auxiliary lanes to through traffic. Maintain pedestrian traffic along the westbound roadway during construction. Short-term closures of the sidewalk may be permitted for delivery of materials as approved by the engineer. Maintain the STH 54 eastbound on-ramp from South Broadway Street and the STH 54 westbound on-ramp from Chicago Street/South Jefferson Street open to traffic. Nighttime closures (10:00 PM to 5:00 AM, Monday through Friday) of these ramps will be permitted for the installation and removal of temporary precast concrete barrier.

Complete the following construction activities during Stage 1:

- Install temporary precast barrier
- Remove the existing warning gate system
- Removal parapet and complete superstructure modifications
- Install barrier gate system
- Remove temporary precast barrier

Stage 2
Maintain STH 54 open to traffic during construction. Maintain a minimum of one lane of traffic in each direction at all times. Close the eastbound and westbound inside travel lane to through traffic during off-peak weekday hours (8:00 PM to 5:00 AM, Monday through Friday) to complete median parapet modifications. Maintain pedestrian traffic along the westbound roadway during construction. Maintain the STH 54 eastbound on-ramp from South Broadway Street and the STH 54 westbound on-ramp from Chicago Street/South Jefferson Street open to traffic.

Prior to completion of modifications to the median parapet to the finished elevation, temporarily cover the median parapet in accordance to plans to ensure safe operating conditions when the adjacent lane is reopened to traffic.

Complete the following construction activities during Stage 2:

- Modify the existing median parapet
- Install barrier gate receiving plate
- Test the barrier gate system

Within 60 calendar days of starting Phase I, complete the parapet work and barrier gate installations requiring lane closures as defined in Stage 1 and Stage 2. Lane closures as defined in Phase II and for equipment testing will be allowed outside the 60 calendar day period.

Phase II
Replace bridge control systems as shown on the plans.

Closing lanes on STH 54 for operations other than those required for the loading and unloading of materials and equipment for B-05-134 will not be permitted unless specifically authorized by the engineer. Single lane closures will be permitted from the hours of 9:00 AM to 2:00 PM on weekdays to facilitate the loading and unloading of materials and equipment. Reopen the closed lane to through traffic immediately upon completion of unloading and loading activities. Lane closures will not be permitted during inclement weather and when plowing operations are required to clear snow from the roadway.

Equipment Testing
Periodic closures of STH 54 will be permitted during weekday nighttime hours (10:00 PM to 5:00 AM, Monday through Friday) to open and close the bridge for field testing of the mechanical and electrical systems as set forth in the article for bridge electrical work and as approved by the department. Coordinate with the engineer 14 days prior to any scheduled closures.

Do not complete equipment testing for B-05-134, STH 54 and B-05-269, STH 29 under Project 4180-07-71 at the same time.

During the equipment testing, the contractor shall provide sufficient traffic control devices on site to close the following roadways in accordance to standard detail drawings (SDD) "Barricades and Signs for Mainline Closures" Detail C and "Barricades and Signs for Sideroad Closures" Detail 1 in the event of an equipment failure anticipated to last more than 30 minutes:

- STH 54 eastbound at 12th Avenue
- STH 54 eastbound at 11th Avenue
- STH 54 eastbound at 10th Avenue
- STH 54 eastbound on-ramp from South Ashland Avenue
- STH 54 eastbound on-ramp from South Broadway Street
- STH 54 westbound at South Webster Avenue
- STH 54 westbound on-ramp from Chicago/South Quincy Streets
- STH 54 westbound on-ramp from Chicago/South Jefferson Streets
- STH 54 westbound at 10th Avenue
- STH 54 westbound at 11th Avenue
- STH 54 westbound at 12th Avenue

Notify the engineer immediately if an equipment failure or if the equipment testing is anticipated to extend beyond 5:00 AM.

Payment to deliver, install, and remove traffic control devices for any equipment testing and any loading and unloading of materials and equipment shall be paid for under the bid item Traffic Control (9210-14-71) and no additional payment will be made for traffic control items used for these activities.

Traffic control items delivered to the site for standby purposes during field testing will be considered part of the bid item Traffic Control (9210-14-71) and no additional payment will be made for the traffic control items for standby purposes during field testing.

Payment for installed traffic control devices for lane closures to make median and outside parapet modifications will be paid for under the associated traffic control bid items in the contract.

5. Holiday Work Restrictions.

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 29, STH 54, and STH 114 traffic, and entirely clear the traveled way and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following holiday periods:

- From noon Friday, June 28, 2013 to 6:00 AM Monday, July 8, 2013 for Independence Day;
- From noon Friday, August 30, 2013, to 6:00 AM Tuesday, September 3, 2013 for Labor Day;
- From noon Wednesday, November 27, 2013 to 6:00 AM Monday, December 2, 2013 for Thanksgiving;
- From noon Friday, December 20, 2013 to 6:00 AM Thursday, January 2, 2014 for Christmas and New Year's Day;
- From noon Friday, May 23, 2014 to 6:00 AM Tuesday, May 27, 2014 for Memorial Day;
- From noon Thursday, July 3, 2014 to 6:00 AM Monday, July 7, 2014 for Independence Day;
- From noon Friday, August 29, 2014 to 6:00 AM Tuesday, September 2, 2014 for Labor Day;
- From noon Wednesday, November 26, 2014 to 6:00 AM Monday, December 1, 2014 for Thanksgiving;
- From noon Friday, December 19, 2014 to 6:00 AM Friday, January 2, 2015 for Christmas and New Year's Day.

107-005 (20050502)

6. Environmental Protection, No Instream Disturbance.

There shall be no instream or riverbed disturbance of the Fox River and the Fox River Government Canal as a result of any of the construction activities under or for this contract.

For the contractor's information:

- Fish spawning movements typically occur from February 15 to July 1 within the Fox River and the Fox River Government Canal.
- The Fox River and the Fox River Government Canal riverbed contain polychlorinated biphenyls (PCBs). There is ongoing effort by others to remove the PCBs within the riverbed. The Wisconsin DNR is monitoring the removal of the PCBs. The Wisconsin DNR contact for this effort is Gary Kincaid, (920) 662-5136.

Any proposed changes to these provisions will require submitting a written request by the contractor to the engineer, Wisconsin DNR, and US Army Corps of Engineers in the request. Submittal of a request does not constitute approval.

7. Environmental Protection, Aquatic Exotic Species Control.

Exotic invasive organisms such as VHS, zebra mussels, purple loosestrife, and Eurasian water milfoil are becoming more prolific in Wisconsin and pose adverse effects to waters of the state. Wisconsin State Statutes 30.07, "Transportation of Aquatic Plants and Animals; Placement of Objects in Navigable Waters", details the state law that requires

the removal of aquatic plants and zebra mussels each time equipment is put into state waters.

At construction sites that involve navigable water or wetlands, use the follow cleaning procedures to minimize the chance of exotic invasive species infestation. Use these procedures for all equipment that comes in contact with waters of the state and/or infested water or potentially infested water in other states.

Ensure that all equipment that has been in contact with waters of the state, or with infested or potentially infested waters, has been decontaminated for aquatic plant materials and zebra mussels prior to being used in other waters of the state. Before using equipment on this project, thoroughly disinfect all equipment that has come into contact with potentially infested waters. Use the following inspection and removal procedures (guidelines from the Wisconsin Department of Natural Resources http://dnr.wi.gov//fish/documents/disinfection_protocols.pdf) for disinfection:

1. Prior to leaving the contaminated site, wash machinery and ensure that the machinery is free of all soil and other substances that could possibly contain exotic invasive species;
2. Drain all water from boats, trailers, bilges, live wells, coolers, bait buckets, engine compartments, and any other area where water may be trapped;
3. Inspect boat hulls, propellers, trailers and other surfaces. Scrape off any attached mussels, remove any aquatic plant materials (fragments, stems, leaves, seeds, or roots), and dispose of removed mussels and plant materials in a garbage can prior to leaving the area or invested waters; and
4. Disinfect your boat, equipment and gear by either:
    a. Washing with ~212º F water (steam clean), or
    b. Drying thoroughly for five days after cleaning with soap and water and/or high pressure water, or
    c. Disinfecting with either 200 ppm (0.5 oz per gallon or 1 Tablespoon per gallon) Chlorine for 10-minute contact time or 1:100 solution (38 grams per gallon) of Virkon Aquatic for 20- to 30-minute contact time. Note: Virkon is not registered to kill zebra mussel veligers nor invertebrates like spiny water flea. Therefore this disinfect should be used in conjunction with a hot water (>104º F) application.

Complete the inspection and removal procedure before equipment is brought to the project site and before the equipment leaves the project site.
107-055 (20110615)

8. Construction Over or Adjacent to Navigable Waters.

Supplement standard spec 107.19 with the following:

The Fox River and the Fox River Government Canal are classified as navigable waterways.
107-060 (20040415)

Submit a contingency plan to the engineer prior to the start of construction. Include the names and telephone numbers of personnel and a list of equipment that will be available to correct any navigation problems that may arise during non-working hours.

Provide industry accepted measures and precautions to prevent accidental dropping of debris, sparks, flames, lighted or other damaging objects onto boats and water users passing beneath the bridge.

Ensure the rights and safety of the navigating public. Place appropriate warning signs and buoys upstream and downstream of the project site. In accordance to the U.S. Coast Guard Standards, place marker lights on all watercraft and equipment that will remain moored, anchored, or otherwise floating on the river between dusk and dawn. Sign, mark, or light all other potential navigation hazards associated with the project including, but not limited to, construction machinery, rigging, and temporary structures. Provide water space with horizontal and vertical clearances to allow for safe public navigation through the construction site at all times. Payment for this accommodation is considered incidental to the contract work.

9. Utilities.

This contract comes under the provision of Administrative Rule Trans 220.
107-065 (20080501)

Utility companies listed below each own system-wide facilities that are located at varying locations in the area of each bridge project. This article outlines the known locations of utility facilities in the area of each bridge project and is based upon the system mapping provided by each facility owner and coordination completed with each facility owner. In general, utility facilities were only field located at the Tayco Street bridge. Utility facilities are not shown on the plans at the Mason Street and Walnut Street bridges. Prior to beginning work, notify all utilities and complete utility locates in accordance to section 107 of the standard specs.

Project 4065-15-71, STH 114/Tayco Street Bridge
AT&T Wisconsin (Communications) has underground communication facilities present along the east side of STH 114/Tayco Street within the project limits. There are no conflicts anticipated.

The AT&T Wisconsin contact for this project is Vincent Lebrun, (920) 735-3076.

City of Menasha (Lighting) has existing lighting on and across the STH 114/Tayco Street Bridge over the Fox River Government Canal. There are underground electric facilities for the lighting are located along the east and west sides of STH 114/Tayco Street between Station 99'T'+80 to the north project limits with a crossing at approximately Station 99'T'+80.

The light pole at 99'T'+81, RT is in conflict with the project. The City of Menasha will relocate the light pole during construction to approximately Station 99'T'+94, RT. The City of Menasha will begin the relocation work upon removal of the sidewalk by the contractor. The conduit changes and electrical connections will be made after installation of the new barrier gates bases by the contractor to ensure there are no conflicts with the relocated light facilities and the new barrier gate bases.

Coordinate the anticipated schedule at the preconstruction meeting. Provide the City of Menasha at least ten business days of notice prior to needing the light pole relocated. The light pole relocation including removal of the existing concrete base is anticipated to take three working days.

The City of Menasha contact for this project is Tim Montour, (920) 967-3610.

City of Menasha (Sanitary Sewer) has underground sanitary sewer facilities located along the center of the roadway of Water Street and along STH 114/Tayco Street north of the bridge. There are no conflicts anticipated.

The City of Menasha contact for this project is Tim Montour, (920) 967-3610.

Menasha Electric & Water (Electric-Distribution) has overhead electric facilities located along the south side of Water Street crossing STH 114/Tayco Street at approximately Station 99'T'+73.

The overhead crossing at Station 99'T'+73 is in conflict with the new barrier gates. The pole near Station 99'T'+72, RT will be relocated approximately 37-feet north and the pole at 99'T'+72, LT will be removed. The overhead crossing will be relocated at a skew through the Water Street intersection across Tayco Street to remove the conflict with the barrier gate arms. Relocations are proposed to be completed prior to construction.

The Menasha Electric and Water contact for this project is Greg Schull, (920) 967-3422.

Menasha Electric & Water (Water) has underground water main facilities located along north side of Water Street and the west side of STH 114/Tayco Street north of the bridge. The water main crosses STH 114/Tayco Street at approximately Station 100'T'+10. There are no conflicts anticipated.

The Menasha Electric and Water contact for this project is Scott Maurer, (920) 967-3430.

TDS Metrocom (Communications) has underground communication facilities present within the AT&T duct system along the east side of STH 114/Tayco Street within the project limits. There are no conflicts anticipated.

The TDS Metrocom contact for this project is Steve Jakubiec, (920) 882-4166.

Time Warner Cable (Communications) has overhead communication facilities located along the south side of Water Street crossing STH 114/Tayco Street at approximately Station 99'T'+ 73 under built on Menasha Electric and Water poles. Underground communication services are located on the east side of STH 114/Tayco Street from approximately Station 99'T'+75 and continue to the east. There are no conflicts anticipated with the underground services.

The overhead crossing at Station 99'T'+73 is in conflict with the new barrier gates. The pole near Station 99'T'+72, RT will be relocated approximately 37-feet north and the pole at 99'T'+72, LT will be removed by Menasha Water and Electric. The overhead crossing will be relocated at a skew through the Water Street intersection across Tayco Street to remove the conflict with the barrier gate arms. Time Warner Cable will relocate their overhead facilities with Menasha Water and Electric prior to construction.

The Time Warner Cable contact for this project is Vince Albin, (920) 831-9249.

US Signal Company (Communications) has underground communication facilities located in the City of Menasha conduit along the east side of STH 114/Tayco Street within the project limits. There are no conflicts anticipated.

The US Signal Company contact for this project is Chris Lentine, (616) 988-7194.

We Energies (Gas) has underground gas facilities located along the north side of Water Street and along the west side of STH 114/Tayco Street crossing STH 114/Tayco Street at approximately Station 100'T'+15. Underground gas facilities are also located on the west side of STH 114/Tayco Street across the Fox River Government Canal. There are no conflicts anticipated.

The We Energies contact for this project is Kenneth Van Oss, (920) 380-3318.

Project 4180-07-71, STH 29/Walnut Street
ATC Management, Inc. (Electric-Transmission) has a double circuit 138kV/69kV overhead electric transmission facility which crosses STH 29/Walnut Street near the Pearl Street intersection. There are no conflicts anticipated.

The ATC Management, Inc. contact for this project is Mike Olsen, (920) 338-6582.

AT&T Wisconsin (Communications) owns underground communications facilities on the south side of STH 29/Walnut Street east of the Fox River. There are no conflicts anticipated.

The AT&T Wisconsin contact for this project is Eric Adair, (920) 433-4155.

City of Green Bay (Lighting) has existing lighting on and across the STH 29/Walnut Street bridge over the Fox River. There are no conflicts anticipated.

The City of Green Bay contact for this project is Kristin Romanowicz, (920) 448-3094.

City of Green Bay (Sanitary Sewer) has underground sanitary sewer facilities located along the south side of STH 29/Walnut Street on both the east and west approaches. Sanitary sewer service facilities are also located on the underside of the structure, between the control house and the east bridge abutment connecting to the sanitary sewer main along STH 29/Walnut Street. There are no conflicts anticipated.

The City of Green Bay contact for this project is Kristin Romanowicz, (920) 448-3094.

Green Bay Metro Sewer (Sanitary Sewer) has underground sanitary sewer facilities located on the west side of the Fox River along Pearl Street and along the west side of Adams Street. There are no conflicts anticipated.

The Green Bay Metro Sewer contact for this project is Robert Reinhart, (920) 438-1035.

Green Bay Water Utility (Water) has underground water main facilities located on the east and west bridge approaches. There are no conflicts anticipated.

The Green Bay Water Utility contact for this project is Brian Powell, (920) 448-3480.

Wisconsin Public Service Corporation (Electric-Distribution) has underground electric facilities located on the north side of STH 29/Walnut Street on the west bridge approach and along the south side of STH 29/Walnut Street on the east bridge approach. There are no conflicts anticipated.

The Wisconsin Public Service Corporation contact for this project is Randy Steier, (920) 617-5167.

Wisconsin Public Service Corporation (Gas)
Wisconsin Public Service has underground gas facilities which cross STH 29/Walnut Street approximately 400-feet west and 150-feet east of the bridge with services along the south side of the STH 29/Walnut Street bridge approach. There are no conflicts anticipated. If a conflict is determined during construction, the minimum time required to resolve an unforeseen direct conflict will be approximately four working days. More than four working days may be necessary to resolve it depending on the size, material and linear footage of the facility in direct conflict.

The Wisconsin Public Service Corporation contact for this project is Phil Mauermann, (920) 617-5092.

Project 9210-14-71, STH 54/Mason Street Bridge
ATC Management, Inc. (Electric-Transmission) has a double circuit 138kV/69kV overhead electric transmission facility which crosses STH 54/Mason Street near Station 33+00 just east of South Broadway Street. There are no conflicts anticipated.

The ATC Management, Inc. contact for this project is Mike Olsen, (920) 338-6582.

AT&T Wisconsin (Communications) owns underground communications facilities on the north side of STH 54/Mason Street east of the Fox River. There are no conflicts anticipated.

The AT&T Wisconsin contact for this project is Eric Adair, (920) 433-4155.

City of Green Bay (Lighting) has existing lighting on and across the STH 54/Mason Street Bridge over the Fox River.

The street lighting conduit and wiring within the bridge barrier is in conflict with the proposed bridge barrier changes. No light poles are in conflict with the bridge barrier modifications. The lighting modifications will be completed during construction by the contractor under the bridge electrical items provided for in the contract. Maintain temporary electrical connections to the lighting during construction as required to ensure lighting remains operational during bridge barrier modifications. Schedule any outages to make temporary and permanent connections during daylight hours.

Notify the City of Green Bay traffic engineer for coordination of any outages, re-energizing, and any temporary or permanent modifications required to the lighting system, a minimum of 7 calendar days prior to the work being performed. The City of Green Bay traffic engineer is Dave Hansen, (920) 448-3098.

The City of Green Bay contact for this project is Kristin Romanowicz, (920) 448-3094.

City of Green Bay (Sanitary Sewer) has underground sanitary sewer facilities located along the south side of STH 54/Mason Street on both the east and west approaches. There are no conflicts anticipated.

The City of Green Bay contact for this project is Kristin Romanowicz, (920) 448-3094.

Green Bay Metro Sewer (Sanitary Sewer) has underground sanitary sewer facilities and conduit located on the west side of the Fox River under the bridge crossing of STH 54/Mason Street at approximately Station 33+00 and along the west side of Adams Street crossing STH 54/Mason Street at approximately Station 50+00. There are no conflicts anticipated.

The Green Bay Metro Sewer contact for this project is Robert Reinhart, (920) 438-1035.

Green Bay Water Utility (Water) has underground water main facilities located along the south side of STH 54/Mason Street which crosses the Fox River along the south side of the bridge. Water main is also located along Broadway Street and Adams Street crossing under the STH 54/Mason Street Bridge. There are no conflicts anticipated.

The Green Bay Water Utility contact for this project is Brian Powell, (920) 448-3480.

Wisconsin Public Service Corporation (Electric-Distribution) has overhead electric facilities located on the south side of STH 54/Mason Street from approximately Station 32+00 to Station 38+00. Underground electric facilities cross STH 54/Mason Street under the bridge at approximately Station 32+50, Station 50+00, and Station 53+00. There are no conflicts anticipated.

The Wisconsin Public Service Corporation contact for this project is Randy Steier, (920) 617-5167.

Wisconsin Public Service Corporation (Gas) has underground gas facilities located on the west bridge approach and along the east side of Broadway Street crossing STH 54/Mason Street at approximately Station 32+50. There are no conflicts anticipated. If a conflict is determined during construction, the minimum time required to resolve an unforeseen direct conflict will be approximately four working days. More than four working days may be necessary to resolve it depending on the size, material and linear footage of the facility in direct conflict.

The Wisconsin Public Service Corporation contact for this project is Phil Mauermann, (920) 617-5092.

10. Abatement of Asbestos Containing Material B-05-134, Item 203.0210.S.01.

A Description

This special provision describes abating asbestos containing material on structures in accordance to the plans, the pertinent provisions of the standard specifications, and as hereinafter provided.

B (Vacant)

C Construction

James Gondek, License Number AII-108099, inspected Structure B-05-134 for asbestos on March 8, 2004. Regulated Asbestos Containing Material (RACM) was found on this structure in the following locations and quantities: gray caulk in the sidewalk expansion joints and on the guardrail.

The RACM on this structure must be abated by a licensed abatement contractor. A copy of the inspection report is available from Jason Lahm, (920) 492-5998. In accordance to NR447 and DHS159, ensure that DNR or DHS receives a completed Notification of Demolition and/or Renovation (DNR Form 4500-113 (R 4/11), or subsequent revision) via U.S. mail, hand-delivery, or using the online notification system at least 10 working days prior to beginning any construction or demolition. Pay all associated fees. Provide a copy of the completed 4500-113 form and the abatement report to Jason Lahm, (920) 492-5998 and DOT BTS-ESS attn: Hazardous Materials Specialist PO Box 7965, Madison, WI. 53707-7965. In addition, comply with all local or municipal asbestos requirements.

Use the following information to complete WisDNR form 4500-113 :

- Site Name: Structure B-05-134, STH 54 over Fox River
- Site Address: 3.3M E JCT USH 41 to S
- Ownership Information: WisDOT Northeast Region, 944 Vanderperren Way, Green Bay, WI 54304
- Contact: Jason Lahm
- Phone: (920) 492-5998
- Age: 20 years old. This structure was constructed in 1973.
- Area: 44,553 SF of deck

Insert the following paragraph in Section 6.g.:

- If asbestos not previously identified is found or previously non-friable asbestos becomes crumbled, pulverized, or reduced to a powder, stop work immediately, notify the engineer, and the engineer will notify the department's Bureau of Technical Services at (608) 266-1476 for an emergency response in accordance to standard spec 107.24. Keep material wet until it is abated or until it is determined to be non-asbestos containing material.

D Measurement

The department will measure Abatement of Asbestos Containing Material (Structure) as a single complete unit of work, completed in accordance to the contract and accepted.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
203.0210.S.01	Abatement of Asbestos Containing Material Structure B-05-134	LS

Payment is full compensation for submitting necessary forms; removing all asbestos; properly disposing of all waste materials; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

203-005 (20120615)

11. Removing Old Structure Over Waterway With Debris Capture System Station 42+50, Item 203.0700.S.01.

Conform to standard spec 203 as modified in this special provision.

Add the following to standard spec 203:

203.3.6 Removals Over Waterways and Wetlands

203.3.6.3 Removing Old Structure Over Waterway with Debris Capture System

(1) Remove the existing Structure B-05-134 over the Fox River in large sections and conforming to the contractor's approved structure removal plan. Due to the very

sensitive nature of the Fox River, provide a debris capture and containment system for superstructure removal that prevents all large pieces and virtually all other debris, including fine particles and slurry, from entering the waterway or wetland.

(2) Submit a structure removal plan as part of the erosion control implementation plan required under standard spec 107.20. Do not start work under the structure removal plan without the department's written approval of the plan. Include the following information in the structure removal plan:

- Methods and schedule to remove the structure.
- Methods to control potentially harmful environmental impacts.
- Methods to avoid or minimize the discharge of any pollutant to the waterway or wetland during superstructure removal.
- Details of the debris capture and containment system for superstructure removal including contingency plans to deal with potential failures.
- Methods to control dust and contain slurry.
- Methods for removing piers and abutments. If blasting in water, include restrictions that regulatory agencies and the contract require.

(3) If stockpiling spoil material, place it on an upland site an adequate distance from the waterway, wetland, or any open water created by excavation. Install silt fence between the spoil pile and the waterway, wetland, or excavation site.

Add the following Removing Old Structure bid item to standard spec 203.5.1 of the standard specifications:

ITEM NUMBER	DESCRIPTION	UNIT
203.0700.S.01	Removing Old Structure Over Waterway With Debris Capture System Station 42+50	LS

203-025 (20080902)

12. Removing Concrete Bases.

Complete removal of the concrete bases at the existing Tayco Street warning gates in accordance to standard spec 204.

The electrical disconnection of the warning gate system from the existing electrical control system, removal of the gates, and removal of the housing and attachments connected to the concrete base shall be performed in accordance to and paid for under Tayco Street Bridge Electrical Work, B-70-097.

13. Removing Stationary Bollards, Item 204.9060.S.01.

A Description

This special provision describes removing stationary bollards in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)

C (Vacant)

D Measurement
The department will measure Removing Stationary Bollard in by each individual unit, acceptably completed.

E Payment
Supplement standard spec 204.5 to include the following:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.01	Removing Stationary Bollards	Each

204-025 (20041005)

14. Grading, Shaping and Finishing Intersection Water Street, Item 205.9015.S.01.

A Description
This special provision describes excavating, filling, grading, shaping, compacting, and finishing as necessary to construct the intersection as shown on the plans and in accordance to the pertinent requirements of the standard specifications and as hereinafter provided.

B (Vacant)

C Construction
Dispose of all surplus and unsuitable material in accordance to standard spec 205.3.12.

D Measurement
The department will measure Grading, Shaping, and Finishing Intersection (Location) as a single complete unit of work.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
205.9015.S.01	Grading, Shaping, and Finishing Intersection Water Street	LS

Payment is full compensation for furnishing all excavating, grading, shaping, and compacting; and for providing and placing fill, topsoil, fertilizer, seed, and mulch.

The base course and surfacing items will be measured and paid for under the pertinent items provided in the contract.
205-015 (20060512)

15. QMP Base Aggregate.

A Description

A.1 General

(1) This special provision describes contractor quality control (QC) sampling and testing for base aggregates, documenting those test results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.

(2) Conform to standard spec 301, standard spec 305, and standard spec 310 as modified here in this special provision. Apply this special provision to material placed under all of the Base Aggregate Dense and Base Aggregate Open Graded bid items, except do not apply this special provision to material classified as reclaimed asphaltic pavement placed under the Base Aggregate Dense bid items.

(3) Do not apply this special provision to material placed under the Aggregate Detours, Salvaged Asphaltic Pavement Base, Breaker Run, Select Crushed, Pit Run, Subbase, or Riprap bid items.

(4) Provide and maintain a quality control program, defined as all activities related to and documentation of the following:

1. Production and placement control and inspection.
2. Material sampling and testing.

(5) Chapter 8 of the department's construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures. The contractor may obtain the CMM from the department's web site at:

http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm

A.2 Contractor Testing for Small Quantities

(1) The department defines a small quantity, for each individual Base Aggregate bid item, as a plan quantity of 9000 tons or less of material as shown in the schedule of items under that bid item.

(2) The requirements under this special provision apply equally to a small quantity for an individual bid item except as follows:

1. The contractor need not submit a full quality control plan but shall provide an organizational chart to the engineer including names, telephone numbers, and current certifications of all persons involved in the quality control program for material under affected bid items.

2. Divide the aggregate into uniformly sized sublots for testing as follows:

Plan Quantity	Minimum Required Testing
≤ 1500 tons	One test from production, load-out, or placement at the contractor's option[1]
> 1500 tons and ≤ 6000 tons	Two tests of the same type, either from production, load-out, or placement at the contractor's option[1]
> 6000 tons and ≤ 9000 tons	Three placement tests[2] [3]

[1] If using production tests for acceptance, submit test results to the engineer for review prior to incorporating the material into the work. Production test results are valid for a period of 3 years.

[2] For 3-inch material, obtain samples at load-out.

[3] If the actual quantity overruns 9000 tons, create overrun sublots to test at a rate of one additional placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

3. No control charts are required. Submit aggregate load-out and placement test results to the engineer within one business day of obtaining the sample. Assure that all properties are within the limits specified for each test.
4. Department verification testing is optional for quantities of 6000 tons or less.

(3) Material represented by a sublot with any property outside the specification limits is nonconforming. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B Materials

B.1 Quality Control Plan

(1) Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not place base before the engineer reviews and comments on the plan. Construct the project as that plan provides.

(2) Do not change the quality control plan without the engineer's review. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in each of the contractor's laboratories as changes are adopted. Ensure that the plan provides the following elements:

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.
3. A list of source and processing locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
4. Test results for wear, sodium sulfate soundness, freeze/thaw soundness, and plasticity index of all aggregates requiring QC testing. Obtain this information from the region materials unit or from the engineer.

5. Descriptions of stockpiling and hauling methods.
6. Locations of the QC laboratory, retained sample storage, and where control charts and other documentation is posted.
7. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.

B.2 Personnel

(1) Have personnel certified under the department's highway technician certification program (HTCP) perform sampling, testing, and documentation as follows:

Required Certification Level:	Sampling or Testing Roles:
Aggregate Technician IPP Aggregate Sampling Technician Aggregate Assistant Certified Technician (ACT-AGG)	Aggregate Sampling[1]
Aggregate Technician IPP Aggregate Assistant Certified Technician (ACT-AGG)	Aggregate Gradation Testing, Aggregate Fractured Particle Testing, Aggregate Liquid Limit and Plasticity Index Testing

[1] Plant personnel under the direct observation of an aggregate technician certified at level one or higher may operate equipment to obtain samples.

(2) A certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician ensure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

B.3 Laboratory

(1) Perform QC testing at a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:

Materials Management Section
3502 Kinsman Blvd.
Madison, WI 53704
Telephone: (608) 246-5388
http://www.dot.state.wi.us/business/engrserv/lab-qualification.htm

B.4 Quality Control Documentation

B.4.1 General

(1) Submit base aggregate placement documentation to the engineer within 10 business days after completing base placement. Ensure that the submittal is complete, neatly organized, and includes applicable project records and control charts.

B.4.2 Records

(1) Document all placement observations, inspection records, and control adjustments daily in a permanent field record. Also include all test results in the project records. Provide test results to the engineer within 6 hours after obtaining a sample. For 3-inch base, extend this 6-hour limit to 24 hours. Post or distribute tabulated results using a method mutually agreeable to the engineer and contractor.

B.4.3 Control Charts

(1) Plot gradation and fracture on the appropriate control chart as soon as test results are available. Format control charts according to CMM 8.30. Include the project number on base placement control charts. Maintain separate control charts for each base aggregate size, source or classification, and type.

(2) Provide control charts to the engineer within 6 hours after obtaining a sample. For 3-inch base, extend this 6-hour limit to 24 hours. Post or distribute charts using a method mutually agreeable to the engineer and contractor. Update control charts daily to include the following:

1. Contractor individual QC tests.
2. Department QV tests.
3. Department IA tests.
4. Four-point running average of the QC tests.

(3) Except as specified under B.8.2.1 for nonconforming QV tests, include only QC tests in the running average. The contractor may plot process control or informational tests on control charts, but do not include these tests, conforming QV tests, or IA tests in the running average.

B.5 Contractor Testing

(1) Test gradation, fracture, liquid limit and plasticity index during placement for each base aggregate size, source or classification, and type.

(2) Test gradation once per 3000 tons of material placed. Determine random sample locations and provide those sample locations to the engineer. Obtain samples after the material has been bladed, mixed, and shaped but before compacting; except collect 3-inch samples from the stockpile at load-out. Do not sample from material used to maintain local traffic or from areas of temporary base that will not have an overlying pavement. On days when placing only material used to maintain local traffic or only temporary base that will not have an overlying pavement, no placement testing is required.

(3) Split each contractor QC sample and identify it according to CMM 8.30. Retain the split for 7 calendar days in a dry, protected location. If requested for department comparison testing, deliver the split to the engineer within one business day.

(4) The engineer may require additional sampling and testing to evaluate suspect material or the technician’s sampling and testing procedures.

(5) Test fracture for each gradation test until the fracture running average is above the lower warning limit. Subsequently, the contractor may reduce the frequency to one test per 10 gradation tests if the fracture running average remains above the warning limit.

(6) Test the liquid limit and plasticity index for the first gradation test. Subsequently, test the liquid limit and plasticity index a minimum of once per 10 gradation tests.

B.6 Test Methods

B.6.1 Gradation

(1) Test gradation using a washed analysis conforming to the following as modified in CMM 8.60:

Gradation..... AASHTO T 27
Material finer than the No. 200 sieve..... AASHTO T 11

(2) For 3-inch base, if 3 consecutive running average points for the percent passing the No. 200 sieve are 8.5 percent or less, the contractor may use an unwashed analysis. Wash at least one sample out of 10. If a single running average for the percent passing the No. 200 sieve exceeds 8.5 percent, resume washed analyses until 3 consecutive running average points are again 8.5 percent passing or less.

(3) Maintain a separate control chart for each sieve size specified in standard spec 305 or standard spec 310 for each base aggregate size, source or classification, and type. Set control and warning limits based on the standard specification gradation limits as follows:

1. Control limits are at the upper and lower specification limits.
2. There are no upper warning limits for sieves allowing 100 percent passing and no lower control limits for sieves allowing 0 percent passing.
3. Dense graded warning limits, except for the No. 200 sieve, are 2 percent within the upper and lower control limits. Warning limits for the No. 200 sieve are set 0.5 percent within the upper and lower control limits.
4. Open graded warning limits for the 1-inch, 3/8-inch, and No. 4 sieves are 2 percent within the upper and lower control limits. Upper warning limits for the No. 10, No. 40, and No. 200 sieves are 1 percent inside the upper control limit.

B.6.2 Fracture

(1) Test fracture conforming to CMM 8.60. The engineer will waive fractured particle testing on quarried stone.

(2) Maintain a separate fracture control chart for each base aggregate size, source or classification, and type. Set the lower control limit at the contract specification limit, either specified in another special provision or in table 301-2 of standard spec 301.2.4.5. Set the lower warning limit 2 percent above the lower control limit. There are no upper limits.

B.6.3 Liquid Limit and Plasticity

(1) Test the liquid limit and plasticity according to AASHTO T 89 and T 90.

(2) Ensure the material conforms to the limits specified in standard spec table 301-2.

B.7 Corrective Action

B.7.1 General

(1) Consider corrective action when the running average trends toward a warning limit. Take corrective action if an individual test exceeds the contract specification limit. Document all corrective actions both in the project records and on the appropriate control chart.

B.7.2 Placement Corrective Action

(1) Do not blend additional material on the roadbed to correct gradation problems.

(2) Notify the engineer whenever the running average exceeds a warning limit. When 2 consecutive running averages exceed a warning limit, the engineer and contractor will discuss appropriate corrective action. Perform the engineer's recommended corrective action and increase the testing frequency as follows:

1. For gradation, increase the QC testing frequency to at least one randomly sampled test per 1000 tons placed.
2. For fracture, increase the QC testing frequency to at least one test per gradation test.

(3) If corrective action improves the property in question such that the running average after 4 additional tests is within the warning limits, the contractor may return to the testing frequency specified in B.5.3. If corrective action does not improve the property in question such that the running average after 4 additional individual tests is still in the warning band, repeat the steps outlined above starting with engineer notification.

(4) If the running average exceeds a control limit, material starting from the first running average exceeding the control limit and ending at the first subsequent running average inside the control limit is nonconforming and subject to pay reduction.

(5) For individual test results significantly outside the control limits, notify the engineer, stop placing base, and suspend other activities that may affect the area in question. The engineer and contractor will jointly review data, data reduction, and data analysis; evaluate sampling and testing procedures; and perform additional testing as required to determine the extent of potentially unacceptable material. The engineer may direct the contractor to remove and replace that material. Individual test results are significantly outside the control limits if meeting one or more of the following criteria:

1. A gradation control limit for the No. 200 sieve is exceeded by more than 3.0 percent.
2. A gradation control limit for any sieve, except the No. 200, is exceeded by more than 5.0 percent.
3. The fracture control limit is exceeded by more than 10.0 percent.

B.8 Department Testing

B.8.1 General

(1) The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all QV and IA personnel for the project, and provide test results to the contractor within 2 business days after the department obtains the sample.

B.8.2 Verification Testing

B.8.2.1 General

(1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in B.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.

(2) The department will conduct QV tests of each base aggregate size, source or classification, and type during placement conforming to the following:
1. One non-random test on the first day of placement.
2. At least one random test per 30,000 tons, or fraction of 30,000 tons, placed.

(3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will collect QV samples after the material has been bladed, mixed, and shaped but before compacting; except, for 3-inch aggregates, the department will collect samples from the stockpile at load-out. The department will split each sample, test half for QV, and retain half.

(4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.

(5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to the specification, the department will take no further action. If QV test results are nonconforming, add the QV to the QC test results as if it were an additional QC test.

B.8.3 Independent Assurance

(1) Independence assurance is unbiased testing the department performs to evaluate the department's QV and the contractor's QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform an IA review

according to the department's independent assurance program. That review may include one or more of the following:

1. Split sample testing.
2. Proficiency sample testing.
3. Witnessing sampling and testing.
4. Test equipment calibration checks.
5. Reviewing required worksheets and control charts.
6. Requesting that testing personnel perform additional sampling and testing.

(2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in B.9.

B.9 Dispute Resolution

(1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.

(2) Production test results, and results from other process control testing, may be considered when resolving a dispute.

(3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C (Vacant)

D (Vacant)

E Payment

(1) Costs for all sampling, testing, and documentation required under this special provision are incidental to this work. If the contractor fails to perform the work required under this special provision, the department may reduce the contractor's pay. The department will administer pay reduction under the non-performance of QMP administrative item.

(2) For material represented by a running average exceeding a control limit, the department will reduce pay by 10 percent of the contract price for the affected Base Aggregate bid items listed in subsection A. The department will administer pay reduction under the Nonconforming QMP Base Aggregate Gradation or Nonconforming QMP Base Aggregate Fracture Administrative items. The department will determine the quantity of nonconforming material as specified in B.7.2.

301-010 (20100709)

16. Structure Repainting General.

A General

A.1 Inspection

On all structures in this contract, notify the engineer of any missing or broken bolts or nuts, any missing or broken rivets, or of any cracks or flaws in the steel members while cleaning or painting.

A.2 Date Painted

At the completion of all painting work, stencil in black paint or contrasting color paint the date of painting the bridge. The numbers shall be three inches (75 mm) in height and shall show the month and year in which the painting was completed: e.g., 11-95 (November 1995). On each bridge painted, stencil the date at two locations. On truss bridges, stencil the date on the cover plates of end posts near and above the top of the railings at the oncoming traffic end. On steel girder bridges, stencil the date on the **inside** of the outside stringers at the abutments. The date on grade separation bridges shall be readable when going under the structure or at some equally visible surface near the ends of the bridge, as designated by the engineer.

A.3 Graffiti Removal

Remove any graffiti on concrete abutments, piers, pier caps, parapet railings, slope paving or any other location at the direction of the engineer. Use a brush sandblast to remove graffiti.

The above work will not be measured and paid for separately, but will be considered incidental to other items in the contract.

B (Vacant)

C Construction

C.1 Repainting Methods

Do not perform blasting, cleaning and painting on days of high winds. Prevailing winds in excess of 15 mph (25 km/hr) shall be considered high winds.

Prior to final acceptance, completely clean and free from spent abrasive and other waste materials resulting from the contractor's operation the bridge deck surfaces, gutter lines, drains, curbs, bridge seats, pier caps, slope paving, roadway below, and all structural members and assemblies.

Place the final field coat of paint on the exterior of the exterior beams as a continuous painting operation. Stop at splices, vertical stiffeners or other appropriate locations so that lap marks are not evident or noticeable.

C.2 Inspection
Supplement standard spec 105.9 as follows:

Furnish, erect and move scaffolding and other appropriate equipment to permit the inspector the opportunity to closely observe all affected surfaces. The scaffolding, with appropriate safety devices, shall meet the approval of the engineer.
517-005 (20030820)

17. Painting Epoxy System B-05-134.

A Description
This special provision describes work that shall be in accordance to standard spec 517 and as hereinafter provided:

B Materials
B.1 Coating System
Furnish a complete coating system from the department's approved list. The color of epoxy shall be white and the urethane coating material shall match the color number shown on the plans in accordance to Federal Standard Number 595B, as printed in 1989. Supply the engineer with the product data sheets before any coating is applied. The product data sheets shall indicate the mixing and thinning directions, the recommended spray nozzles and pressures, the minimum drying time for shop applied coats, and the recommended procedures for coating galvanized bolts, nuts, and washers.

C Construction
Modify the fourth paragraph of standard spec 517.3.1.7.2 to read:

On all other areas including the outside surfaces of splice plates, the minimum dry film thickness above the surface profile for the primer coat shall be 3.0 mils (0.076 mm).
517-041 (20040820)

18. Fence Safety, Item 616.0700.S.

A Description
This special provision describes furnishing and installing a plastic fence at locations shown on the plans and as hereinafter provided.

B Materials
Furnish notched conventional metal "T" or "U" shaped fence posts.

Furnish fence fabric meeting the following requirements.

Color:	International orange (UV stabilized)
Roll Height:	4 feet
Mesh Opening:	1 inch min to 3 inch max
Resin/Construction:	High density polyethylene mesh
Service Temperature:	-60° F to 200° (ASTM D648)
Tensile Yield:	Avg. 2000 lb per 4 ft. width (ASTM D638)
Ultimate Tensile Strength:	Avg. 3000 lb per 4 ft. width (ASTM D638)
Elongation at Break (%):	Greater than 100% (ASTM D638)
Chemical Resistance:	Inert to most chemicals and acids

C Construction
Drive posts into the ground 12 to 18 inches. Space posts at 7 feet.

Use a minimum of three wire ties to secure the fence at each post. Weave tension wire through the top row of strands to provide a top stringer that prevents sagging.

Overlap two rolls at a post and secure with wire ties.

D Measurement
The department will measure Fence Safety by the linear foot along the base of the fence, center-to-center of posts.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
616.0700.S	Fence Safety	LF

Payment is full compensation for furnishing and installing fence and posts; maintaining the fence and posts in satisfactory condition; and for removing and disposing of fence and posts at project completion.
616-030 (20070510)

19. Traffic Control.

Perform this work in accordance to the requirements of standard spec 643, and as shown on the plans or as approved by the engineer, except as hereinafter modified.

Submit to engineer for approval a detailed traffic control plan for any changes to the proposed traffic control detail as shown on the plans. Submit this plan at least ten days prior to the preconstruction conference.

Provide 24 hours-a-day availability of equipment and forces to expeditiously restore lights, signs, or other traffic control devices that are damaged or disturbed. The cost to maintain and restore the above items shall be considered incidental to the item as bid and no additional payment will be made therefore.

Supply the name and telephone number of a local contact person for traffic control repair before starting work.

Have available at all times sufficient experienced personnel to promptly install, remove and reinstall the required traffic control devices to route traffic during the construction operations.

The turning of traffic control devices when not in use to obscure the message will not be allowed under this contract.

Obtain prior approval from the engineer for the location of egress and ingress for construction vehicles to prosecute the work.

Cover existing signs which conflict with traffic control as directed by the engineer.

Conduct operations in such a manner that causes the least interference and inconvenience to the free flow of vehicles on the roadways. This includes the following:

a. Do not park or store any vehicle, piece of equipment, or construction materials on the right-of-way without approval of the engineer.

b. All construction vehicles and equipment entering or leaving live traffic lanes shall yield to through traffic.

c. Equip all vehicles and equipment entering or leaving the live traffic lanes with a hazard identification beam (flashing yellow signal) capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1000 feet. Activate the beam when merging into or exiting a live traffic lane.

Do not disturb, remove or obliterate any traffic control signs, advisory signs, shoulder delineators or beam guard in place along the traveled roadways without the approval of the engineer. Immediately repair or replace any damage done to the above during the construction operations at contractor expense.

The traffic requirements are subject to change at the direction of the engineer in the event of an emergency.

20. Nighttime Work Lighting-Stationary.

A Description

Provide portable lighting as necessary to complete nighttime work. Nighttime operations consist of work specifically scheduled to occur after sunset and before sunrise.

B (Vacant)

C Construction

C.1 General

This provision shall apply when providing, maintaining, moving, and removing portable light towers and equipment-mounted lighting fixtures for nighttime stationary work operations, for the duration of nighttime work on the contract.

At least 14 days prior to the nighttime work, furnish a lighting plan to the engineer for review and acceptance. Address the following in the plan:

1. Layout, including location of portable lighting – lateral placement, height, and spacing. Clearly show on the layout the location of all lights necessary for every aspect of work to be done at night.

2. Specifications, brochures, and technical data of all lighting equipment to be used.

3. The details on how the luminaires will be attached.

4. Electrical power source information.

5. Details on the louvers, shields, or methods to be employed to reduce glare.

6. Lighting calculations. Provide illumination with average to minimum uniformity ratio of 5:1 or less throughout the work area.

7. Detail information on any other auxiliary equipment.

C.2 Portable Lighting

Provide portable lighting that is sturdy and free standing and does not require any guy wires, braces, or any other attachments. Furnish portable lighting capable of being moved as necessary to keep up with the construction project. Position the portable lighting and trailers to minimize the risk of being impacted by traffic on the roadway or by construction traffic or equipment. Provide lightning protection for the portable lighting. Portable lighting shall withstand up to 60 mph wind velocity.

If portable generators are used as a power source, furnish adequate power to operate all required lighting equipment without any interruption during the nighttime work. Provide wiring that is weatherproof and installed according to local, state, federal (NECA and OSHA) requirements. Equip all power sources with a ground-fault circuit interrupter to prevent electrical shock.

C.3 Light Level and Uniformity

Position (spacing and mounting height) the luminaires to provide illumination with an average to minimum uniformity ratio of 5:1 or less throughout the work area.

Illuminate the area as necessary to incorporate construction vehicles, equipment, and personnel activities.

C.4 Glare Control
Design, install, and operate all lighting supplied under these specifications to minimize or avoid glare that interferes with all traffic on the roadway or that causes annoyance or discomfort for properties adjoining the roadway. Locate, aim, and adjust the luminaires to provide the adequate level of illumination and the specified uniformity in the work area without the creation of objectionable glare.

Provide louvers, shields, or visors, as needed, to reduce any objectionable levels of glare. As a minimum, ensure the following requirements are met to avoid objectionable glare on the roadways open to traffic in either direction or for adjoining properties:

1. Aim tower-mounted luminaires, either parallel or perpendicular to the roadway, so as to minimize light aimed toward approaching traffic.

2. Aim all luminaires such that the center of beam axis is no greater than 60 degrees above vertical (straight down).

If lighting does not meet above-mentioned criteria, adjust the lighting within 24 hours.

C.5 Continuous Operation
Provide and have available sufficient fuel, spare lamps, generators, and qualified personnel to ensure that the lights will operate continuously during nighttime operation. In the event of any failure of the lighting system, discontinue the operation until the adequate level of illumination is restored. Move and remove lighting as necessary.

D (Vacant)

E Payment
Costs for furnishing a lighting plan, and for providing, maintaining, moving, and removing portable lighting, tower mounted lighting, and equipment-mounted lighting required under this special provision are incidental to the contract.
643-010 (20100709)

21. Barrier Gate Base, Item SPV.0060.01.

A Description
This special provision describes constructing concrete footings for supporting barrier gates.

B Materials
Provide materials meeting standard spec 636.2.

Provide anchor bolts meeting in accordance to the barrier gate manufacturer's requirements.

C Construction
Complete construction in accordance to standard spec 636.3.

Install the anchor bolts for the barrier gate as shown on the plans and in accordance to the barrier gate manufacturer's requirements.

D Measurement
The department will measure Barrier Gate Base by each individual unit acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.01	Barrier Gate Base	Each

Payment is full compensation for providing, transporting, placing and curing the concrete; for providing and removing casing if applicable; for furnishing all required excavating; for providing and placing anchor bolts; for providing and placing electrical conduit, if required; for providing and installation of all reinforcement steel; for cleaning-up, repairing damage, and for disposing of excavation and surplus materials; and for furnishing all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

22. Bollard Posts, Item SPV.0060.02.

A Description
This special provision describes furnishing and installing bollard posts.

B Materials
Furnish galvanized steel pipe, standard weight, meeting ASTM A53. The pipe shall be 6-inch outside diameter by minimum 8-foot length.

Furnish grade A, A-FA, A-S, A-T, A-IS, or A-IP concrete conforming to standard spec 501.2.

Furnish paint in accordance to standard spec 517.

C Construction
Construct bollards as shown in the plan detail and as specified in standard spec 501 and in accordance to any manufacturer's instructions. Install the bollards plumb. Fill the pipe flush to the top with concrete. Provide the surface finish specified in standard spec 502.3.7.2.

Grind down to an approximate rolled edge any sharp points or edges at the top of the pipe. Repair all scratches, nicks, and bare spots on the pipe with galvanizing paint.

Paint bollards with an alternating red and white strip diagonal pattern or with a bright yellow color unless otherwise approved by the engineer.

D Measurement

The department will measure Bollard Posts as each individual unit, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.02	Bollard Posts	Each

Payment is full compensation for providing and installing all materials; for excavating and backfilling; and for furnishing all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

23. Mason Street Bridge Electrical Work, B-05-134, Item SPV.0105.01; Walnut Street Bridge Electrical Work, B-05-269, Item SPV.0105.02; Tayco Street Bridge Electrical Work, B-70-097, Item SPV.0105.03.

A Description

A.1 General

This special provision describes removing existing electrical system components and furnishing, installing, and placing in satisfactory operating condition new components for the electrical systems. These bridge electrical systems are for the permanent operation of three movable bridges and auxiliaries as indicated on the plans, called for in these special provisions, and as required for complete functioning systems.

The major pieces of equipment or systems covered include, but are not limited to, the span drive motors and brakes, limit switches, programmable logic controller (PLC), power distribution and motor control equipment, service lights, navigation lights, vector motor drives, complete raceway and conductor systems, and monitoring equipment. In addition to furnishing and installing the new bridge electrical systems, the work also includes demolition of the existing electrical systems including disconnection and removal of existing warning gate systems.

For specifics to each of the three bridges, refer to sections A.2, A.3 and A.4.

A.2 Mason Street Bridge Electrical Work, B-05-134

At Mason Street, the work includes complete removal of the electrical system except those items specifically noted to remain and installation of a new power distribution system, PLC based control system, vector motor drives, new span motors and brakes, new limit switches and a complete conduit and raceway system for a new fully functioning electrical system.

A.3 Walnut Street Bridge Electrical Work, B-05-269

At Walnut Street, the work includes installation of new drives within the existing drive cabinets. The work will also include migration of the existing PLC using the Allen Bradley migration system to convert PLC 5 to ControlLogix.

A.4 Tayco Street Bridge Electrical Work, B-70-097

At Tayco Street, the work includes removal of the existing relay logic system, remote control system and control desk and installation of a new PLC based control system and new control desk. The work also includes removal of the electrical equipment for operating the hydraulic bollards. Any equipment designated by the department for salvage is to be carefully removed and placed where the department can easily remove it from the project by truck. All other removal and demolished equipment and materials shall be removed from the site and properly disposed of by the contractor.

A.5 Conformance

Electrical equipment and its installation shall conform to the requirements of the latest revision of the American Association of State Highway Transportation Officials (AASHTO), except as may be otherwise provided herein. In addition, it shall conform to the requirements of the current National Electrical Code (NEC), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratory (UL), Institute of Electrical and Electronics Engineers (IEEE) and to any applicable local rules and ordinances. Obtain any required permits and approvals of all departments or agencies having jurisdiction.

B Materials

B.1 Working Drawings and Samples

Provide shop drawings and operation and maintenance manuals as specified herein.

Prepare and submit for review working drawings in accordance to the approved project schedule. Provide the following working drawings in accordance to the provisions of the Contract:

- Certified dimension prints of all motors, span brakes, brake wheels, limit switches, and other electrical apparatus external to the control panels.
- Complete schematic wiring diagrams, including all power, control, and lighting connections. Identify electrical devices and each wire between devices by an individual designation of letters, numbers, or a combination of both; and use such designations wherever the devices or wires appear on other drawings. Include a complete set of catalog cuts for materials furnished for review at time of schematic submittal.
- Layout drawings and internal connection diagrams of the control panels.
- A schedule of electrical apparatus which lists each electrical device by its designation as shown on the schematic wiring diagram and states for each device its rating, number of poles or contacts, function, catalog number, and location.

- Complete interconnection diagrams for all electrical apparatus and equipment used in the operation of the spans and their auxiliaries. The diagrams shall be of the point-to-point type and shall show the external connections of all devices and equipment. The control system vendors shop drawings shall include complete drawings of terminal block layouts to allow the contractor to properly develop interconnect drawings. Computer-generated interconnection lists will not be acceptable in lieu of a true interconnection diagram.
- A complete schematic conduit and cable diagram or diagrams showing the interconnection of all devices and equipment, including ducts and junction boxes, and showing all multi conductor cables. Show the size of each conduit, and the wire number of each conductor in multi conductor cables on the diagrams. Suitably number or letter each conduit and multi conductor cable, and show percent wire fill. As built the final installed length.
- A complete set of layout and installation drawings for the electrical work showing the location and installation, including support and mounting details, of all electrical apparatus and equipment. Make these drawings to scale and show the exact location of all conduits, cables, wiring ducts, boxes, motors, brakes, limit switches, disconnect switches, and other electrical equipment and the method of supporting them on the structure.
- Outline drawings and mounting details of all navigation lights and air horns.
- Detail drawings showing the construction and mounting details of all wiring troughs and raceways.
- A complete list of all spare parts furnished as part of the Contract.
- Material listing and specifications for programmable controller, including input/output units, programming terminal, and equipment for interfacing.
- The programmable controller program listings in ladder-rung formats. Describe circuit functions; identify all contacts and outputs by word description and by number designation. Number ladder rungs sequentially for reference. Fully document and comment the ladder diagram, and identify and list internal ladder logic relay contacts usage in other rungs. Reference inputs and outputs to locations of signals on interconnection diagram. Include a full cross-reference report.
- Detail drawings showing the construction of cabinets, brackets, and special supports required for the installation of the flexible cable between the fixed pier terminal cabinets and the movable bascule leaf terminal cabinets.
- Any other drawings, which may, in the opinion of the engineer, be necessary to show the electrical work.

Where specific manufacturers catalog numbers and/or class/type/form are noted on the contract document, these items need not be submitted for review, so long as these exact devices are utilized. For contactors, starters, pilot devices, circuit breakers, disconnect switches and control relays, any NEMA rated device that meets the required ratings from Square D, Allen-Bradley, Cutler-Hammer, or General Electric may be utilized without submitting for review, save that the engineer reserves the right to reject as unsuitable, during the shop inspection or in the field, devices or equipment that in his sole opinion do not meet the requirements of the contract documents. Any rejected equipment or device shall be replaced with engineer approved equipment or device at no additional cost to the

department or impact with the construction schedule. In addition, using the pre-approved equipment and material does not relieve the contractor of the requirements to properly integrate this equipment into a complete, fully operational system.

On certified dimension prints of the apparatus, state in the certification the name of the job, the application of the apparatus, device designation, number required, right-hand or left-hand assembly, electrical rating, number of poles or contacts, material, finish, and any other pertinent data to show that the apparatus meets the specified requirements.

Upon completion of the work, correct all electrical shop or working drawings to show the work as constructed and provide one set of reproducible Mylar drawings. In addition, submit in computerized file form in Adobe Acrobat (pdf) Format all electrical schematics, ladder diagrams, internal ladder logic diagrams, systems documentation, dimension drawings of equipment, and devices submitted by the electrical systems vendor.

Submit for inspection and test, if directed by the engineer, samples of any apparatus or device, which is proposed for use as a part of the electrical installation.

B.2 Instruction Books and Drawings Books

Furnish to the engineer for each bridge seven bound copies and a CD, one of which remains with the design consultant engineer, of an instruction manual with the title "Operation and Maintenance Manual, Volume 1, Operation of Electrical Equipment," containing the following:

- Table of Contents.
- Detailed, technical operating instructions, which cover span operation, manual operation, span operation with PLC disabled, etc.
- Detailed description of all control equipment including instructions to achieve optimum settings of all limit switches, detectors, etc.
- Description of control, which shall describe in full the functions of all protective devices, limit switches, contactors, relays, PLC and associated equipment and all other electrical equipment used, both in the power service and in the control system, in connection with each step in the operating sequence. Use wire and apparatus numbers appearing on the wiring diagrams in this description for identifying the various devices and circuits.

To augment the description of control and operations, include reference drawings showing locations of equipment. Include a layout of control apparatus in the machinery rooms. Cross-reference all descriptions with reference drawings.

Furnish to the engineer for each bridge seven bound copies and a CD, one of which remains with the design consulting engineer, of a book with the title "Operation and Maintenance Manual, Volume 2, Maintenance of Electrical Equipment," containing the following:

- Table of Contents.
- Maintenance instructions for the electrical equipment, including warnings and precautions to be observed during maintenance actions. All preventive maintenance procedures are to be outlined and a chart listing all maintenance procedures in chronological order shall be provided.
- Set of descriptive leaflets, bulletins, maintenance instructions, and drawings covering all approved items of equipment furnished and installed under the item "Bridge Electrical Work."
- A troubleshooting flow chart for troubleshooting the bridge electrical system shall be provided to facilitate the diagnosing and correcting of malfunctions.
- Instructions for diagnosing malfunctions of the programmable control system and for detecting failures in the external controls connected thereto.
- Reduced size prints of working drawings, including all schematic wiring diagrams, control console and control panel layouts and connection diagrams.
- PLC schematic wiring, relay logic, PLC input/output hardwire diagram, PLC logic and PLC ladder diagrams.
- Control console and control panel layouts and wiring diagrams.
- Composite schedule of electrical apparatus.
- Complete spare parts list.
- Test data, equipment, criteria, and performance curves for all span drive motors.
- Conduit layout and installation drawings.
- Names, addresses and telephone numbers of vendors and suppliers.
- PLC software program.

Assemble the material for the operation and maintenance manuals to form a booklet for each volume with heavy plastic covers. Assemble each booklet in a three-ring binder, approximately 9 inch by 12 inch with 3-inch "D" rings, with a vinyl cover to allow insertable Title Sheets. Neatly entitle each booklet with a descriptive title, the name of the bridge, the department, the location, year of installation, contractor, and designer. Include easily legible copies of drawings in black on a white background. Submit the arrangements of the booklets, the method of binding, material to be included, and the text to the engineer for approval. Complete the final bound volumes of the instruction books and make them available at the bridge site for use during the field-testing period hereinafter specified for the electrical work.

Number and list by section in the Table of Contents all literature and descriptive materials included in any manual.

Separate each section/subsection with tabbed divider sheets. Suitably title each tab.

Use 20 pound, 3 hole pre-punched loose leaf paper and reinforced with plastic or cloth tape.

B.3 Equipment and Material Provisions

Provide all new equipment and materials. Provide equipment, materials, and workmanship that is first-class in every particular and that is manufactured and erected to the satisfaction of the engineer. Provide a warrantee for the in-service working of the electrical installations for one year following project acceptance. If the contractor has any objection to any feature of the electrical equipment as designed and laid out, he must state his objection at once in writing to the engineer, otherwise his objection will be ignored if offered as an excuse for malfunctioning of the equipment or for defective or broken apparatus.

Provide each piece of electrical equipment and apparatus with a corrosion-resisting metal nameplate on which is stamped the name of the manufacturer and the rating or capacity of the equipment or apparatus.

Use corrosion-resisting material, such as aluminum, bronze, or stainless steel, for all metal parts of the installation, except parts that are specified to be structural steel. Use cast-iron, malleable iron, or steel with a hot-dip galvanized finish where specified herein. Provide structural steel incidental to the electrical work conforming to the requirements given under Structural Steel – General Requirements.

Provide vibration proof mounting hardware, wire and cable terminals.

Submit for approval, as soon as possible, details of any departures from the plans or the specifications that are deemed necessary and reasons therefore on. No such departures shall be made nor work started without approval of the engineer.

B.4 Bridge Control System Vendor

Use a single, qualified control system vendor for the manufacture and/or furnishing and assembly of all apparatus and equipment comprising the bridge control systems, including, but not limited to, drives, motors, brakes, limit switches, motor controls, control cabinets, special control panels, programmable controllers, interfacing equipment, laptop hardware for local troubleshooting, and other apparatus required to provide a complete functioning system. The vendor shall assemble the control panels and console at an Underwriters Laboratory approved Facility in accordance to UL 508.

The control system vendor is required to have experience in providing electrical control systems for movable bridges of various types, including bascule, vertical-lift, swing bridges, and control systems, including AC vector motor drives, DC drives and programmable controllers. Identify a minimum of five movable bridges for which the system vendor has provided complete systems, including solid-state drive motor control and programmable controller logic within the past 10 years.

The following applies to the control system vendor:

- Assume complete system responsibility for the integrated functioning of all components to provide a satisfactory assembled system operating in accordance to specified requirements.
- Assume responsibility for the integration of new controls with the existing equipment at both Walnut Street and Tayco Street.
- Assume responsibility for the detailed schematics and fabrication of the total control systems to ensure compatibility of equipment and suitability for the intended system functioning.
- Assume responsibility for developing the program for the Programmable Logic Controller (PLC) based on the performance specification for operation of the bridges.
- Assume responsibility for developing and integrating PanelView operator display and diagnostic screens.
- In addition to the provision of a new control system, the vendor shall assume responsibility for remotely controlling the Tayco Street Bridge from the existing remote control console.
- Provide supervisory assistance in the installation of equipment to ensure maximum reliability and ease of maintenance.
- During testing of the electrical systems, it may be found that deviations from the performance specifications are required for optimum bridge operation. Include all hardware and software required for these modifications in the control system vendor scope of work at no additional cost to the department.
- Provide a field service staff having the capability of providing services for field coordination of construction and final adjustments to the drive system. Upon final acceptance of the bridges, provide on-call warranty service for a period of 1 year. Field staff shall be capable of responding to an emergency within 6 hours.

Provide written certification of compliance with specified requirements for the control system vendor. Include this certification in the bid documents. The certification shall be subject to approval by the engineer.

B.5 Factory Inspection and Testing

The control cabinets and other apparatus fabricated or assembled by the control system vendor shall be subjected to shop inspection to demonstrate compliance with all specified requirements. The inspection is intended as a means of facilitating the work and avoiding errors, and it is expressly understood that it will not relieve the contractor of responsibility for imperfect material or workmanship.

For Mason Street, assemble and temporarily interconnect for operational testing at the plant of the control system vendor the power and control cabinets and drives with programmable controllers with all required interfacing equipment. Limit switches shall be simulated with temporary switches, and reduced horsepower motors shall be connected to the drives. The testing is intended to demonstrate proper programmed operation of all bridge drives and auxiliary equipment in accordance to specified requirements for system functioning, including the programmable controllers, vector drives, and all control relays and motor starters.

For Tayco Street, the control console and PLC shall be interconnected and the field devices simulated with temporary switches and pilot lights.

Special testing shall include complete verification, adjustment, and testing of the regulator circuits and equipment using regulator simulators as necessary.

Perform all tests required herein in the presence of the engineer or his authorized representative. Do not ship any equipment from the factory until it has been released for shipment by the engineer. Provide notification sufficiently in advance of the date of the tests so that arrangements can be made for the engineer to be present at the tests.

During the witnessed inspection, the engineer will check nameplate legends, conductor identifications, instrument scales, escutcheon plate engraving, and all other details of construction for conformity with specified requirements.

B.6 Mason Street Span Drive Motors

The drive motors shall be vector duty motors. They shall be built in strict accordance with NEMA publication MG-1 and designed for use with an Insulated Gate Bipolar Transistor AC closed loop vector control. They shall be 3 phase 60 Hz, with moisture resistance insulation, 50 degree C temperature rise, and capable of reversing. Motor frame shall be constructed of cast iron.

The span drive motors shall be 100 hp, 900 rpm, 480 VAC, 60 Hz, with a full load amp rating of 171 amperes with a 445T frame. If the drive motor exceeds this full load ampere rating, the contractor shall be responsible for the increase in size of all power distribution equipment, drives, cabling, etc. at no additional cost to the department.

The motors shall be totally enclosed non-ventilated construction, with re-greaseable ball bearings, moisture resistant insulation and internal space heater sized by manufacturer. The motors shall have special extended shafts to complement the new motor brakes and new motor grid coupling components as indicated on the plans and in the special provisions. The motor shafts shall be Cadmium plated. A drain hole shall be provided at the bottom of the motor.

All windings shall be copper. The motor shall be capable of having a minimum breakdown torque of 300%. Motor must have a speed range of 1000:1 and be capable of having full torque at zero speed. Motor design shall be low inertia and slip design. An N/O temperature sensor shall be installed in the windings.

The conduit boxes shall be liberally sized and located to avoid interference with the machinery. The conduit boxes shall be sized in accordance to the requirements of the NEMA MG 1-1987 PART 11. The conduit boxes shall be provided with suitable terminal blocks for the motor power connections.

Provide motors with a heavy mill duty modular magnetic encoder. They shall be of stainless steel and designed for washdown and marine duty. They shall be provided with magnetic sensors that are fully potted, to withstand dirt and liquids, with no moving or wearing parts. They shall have built in diagnostics, with a green light to confirm proper operation and adjustment, and in the event of failure the light changes to red and a remote alarm contact activates. They shall operate at 5 - 24 VDC, 100 mA no load. The output format shall be A Quad B with Marker (A, A–, B, B–, Z, Z–). It shall provide a maximum instantaneous current output of 3000 mA. Provide 1024 PPR output or as recommended by the drive manufacturer. The electronics shall be fully encapsulated and rated IP67. They shall operate at a temperature range of -40° C to 100° C (150° C rotor). They shall be provided with a polyurethane enamel paint to protect against salt spray, mild acids, and bases.

Provide motors designed and manufactured in the United States of America. All motors must be manufactured to the following standards:

- IEEE Marine Standards No. 45.
- American Bureau of Shipping (A.B.S.).
- U.S. Coast Guard Inspection Service.

Modifications needed to meet the requirements of these specifications are as follows:

- Cadmium plate shaft and hardware (FED-QQ-P-416).
- Double Sealed ball bearings.
- Seal all joints and eye bolt holes.
- Sealed leads in terminal box
- Shaft seals
- Removable drain plugs
- Final coat of epoxy paint
- Corrosion resistant coating - rotor and stator laminations.
- Stainless steel and/or Mylar nameplate.
- Class H insulation. Includes protection against fungus growth per MIL-V173B.

The motor frames shall be finished with a corrosion-resistant paint or coating. Exposed unpainted metal surfaces shall be of a corrosion-resistant material.

Motors must be designed to operate at carrier frequencies up to 20 kHz.

All motors must be dynamically balanced.

Subject each motor to a complete test consisting of a full-load heat run and the determination of efficiency and power factor at 50, 75, 100, and 150 percent of full load. In addition to the complete testing, test the motor to determine the power input in kilowatt versus the output torque in foot-pounds for intervals from no-load to full-load torque (0, 25, 50, 75, and 100 percent).

Prepare a complete set of speed-torque-current curves for the motors and submit to the engineer for approval. Provide curves corresponding to full speed and low speed. The

curves shall cover the interval from 150 percent braking torque to breakdown driving torque, referred to full-load motor torque.
Subject all motors to an insulation resistance test per NEMA standard MG-1, Section Nos. 12.02 and 12.03 or IEEE 4. Include insulation resistance values and test voltage on the test reports.

Report tests on the standard forms for induction motors of the National Electrical Manufacturers Association. Have all test reports and curve sheets certified by the manufacturer, and submit seven copies of each. Do not ship motors from the plant of the manufacturer until the test reports have been approved by the engineer.

Test each drive motor with one of the span drives. The tests shall be conducted using a four quadrant dynamometer that will provide 150% overhauling load to 150% motoring load at 5%, 25%, 50% and 100% full load speed. The use of one motor/drive combination turning another motor/drive combination shall not be acceptable in lieu of a true dynamometer test with calibrated load cells. The facility performing the testing shall be submitted for approval of the engineer along with a written test procedure. These tests shall be witnessed by the engineer and three weeks' notice shall be provided prior to the testing.

After entire motor, brake and control system installation, perform a speed/current/power vs. position test to demonstrate that the motors function properly and provide the specified operating characteristics as called out in the testing section of this specification. The data shall be recorded on a PC based data acquisition system, streamed to disk at a rate not less than 10 Hz and shall include acceleration, deceleration, full speed, reduced speed and creep speed.

Provide motors manufactured by Marathon, Reuland, Toshiba or as approved by the engineer.

B.7 Mason Street Span Lock Motor
Provide a 10 hp, 3 phase, 60 Hz, 900 RPM, crane and hoist duty NEMA design D motor, built in strict accordance with NEMA publication MG-1 and designed for service code H.

The motor shall be totally enclosed non-ventilated cast iron construction, with re-greaseable ball bearings, moisture resistant insulation and internal space heater sized by manufacturer. The motor shall have a special double extended shaft as required to accommodate the motor coupling on one end and the hand drive square shaft extension on the other. The hand drive extension shall be provided with a cover that shall activate a limit switch for a manual operation interlock when removed. The motor shafts shall be cadmium plated. A drain hole with removable plug shall be provided at the bottom of the motor.

All winding shall be copper. The motor shall be capable of having a minimum locked rotor torque of 260%.

The conduit boxes shall be liberally sized and located to avoid interference with the machinery. The conduit boxes shall be sized in accordance to the requirements of the NEMA MG 1-1987 PART 11. The box shall be provided with a suitably sized terminal block for the motor power and space heater connections.

Provide a span lock motor designed and manufactured in the United States of America. The span lock motor must be manufactured to IEEE Marine Standards No. 45.

Modifications needed to meet the requirements of these specifications include:

- Cadmium plate shaft and hardware (FED-QQ-P-416).
- Double Sealed ball bearings.
- Seal all joints and eye bolt holes.
- Sealed leads in terminal box
- Shaft seals
- Removable drain plugs
- Final coat of epoxy paint
- Corrosion resistant coating - rotor and stator laminations.
- Stainless steel and/or Mylar nameplate.
- Super 'H' insulation. Includes protection against fungus growth per MIL-V-173B.

The motor frame shall be finished with a corrosion-resistant paint or coating. Exposed unpainted metal surfaces shall be of a corrosion-resistant material.

The motor shall be furnished with rear (opposite drive end) mounted brake. The brake shall be of the disc type. It shall be energized by 460/1/60 input power. Brake shall be sized by the manufacturer according to the rated output torque of the motor.

The motor shall be subjected to a full load heat run test in accordance to the current requirements of the NEMA MG 1-1987 PART 12, and IEEE STD 112-1984. The data, including speed/torque/power curves, shall be certified and submitted to the engineer on the IEEE forms. The engineer shall be notified of the time and place of the testing at least three weeks in advance of the testing.

Provide a span lock motor manufactured by Marathon, Reuland, Toshiba or as approved by the engineer.

B.8 Mason Street Vector Motor Drives

The drives shall be Powerflex 700 20BD180F0AYNAED1 with manufacturer's provided Ethernet communication as manufactured by Allen Bradley. Since the state has numerous bridges and experience with these drives no other drives shall be accepted. The drives shall be properly sized based on the full load ampere rating of the motors and shall allow for 150% motor overload for 90 seconds. The catalog numbers and ratings of the drives listed on the drawings are approximate and shall be confirmed with the drive motor approved shop drawings. The correctly sized drive, meeting all the requirements, shall be provided at no additional cost to the department.

The drive modules shall be IP54, NEMA/UL Type 12 – Flange mount drives with an IP00, NEMA/UL Type Open front

Each vector drive shall be mounted in a single NEMA 4X enclosure. The enclosure shall be equipped with a 'through-the-door' disconnect switch to de-energize the drive incoming service. Fluorescent enclosure lights shall come on when the enclosure door is opened. A fused duplex 120 VAC GFCI receptacle shall be mounted in the enclosure for any operator auxiliary equipment, powered from an internal control transformer. External reactors, filters or other components shall not be accepted. Only the dynamic braking resistors and line isolation transformers shall be located outside of the enclosure.

Vector drives must be four quadrant drives and shall be capable to run in speed and torque mode with adjustable torque limits in all four quadrants.

To minimize electrical and acoustical noise, and to eliminate low speed cogging, a minimum switching frequency of 15 kHz shall be used. The drive shall not "cog" at any frequencies with a 1,000:1 speed regulation. There shall be no sudden frequency shifts and associated acoustical noise shifts as the output frequency is varied between 0 and 60 Hz.

The drive's input displacement power factor shall be 0.98 or better over the entire operating frequency and load range. Efficiency shall be measured 96% minimum at rated load. Provide manufacturers typical test results or calculations with submittal to verify efficiency and power factor.

The drives shall be provided with line isolation transformers as specified by the drive manufacturer.

Output reactors shall be supplied as required per drive and motor manufacturer recommendations.

The vector drives shall have, but not be limited to the following features:

- Manufacturer provided ethernet communications module to allow transfer of all commands and operational data/faults to the PLC network
- High speed analog inputs
- Allow for smooth and instantaneous connection into rotating loads, regardless of commanded direction, without the need for any speed feedback
- Inertia Ride-Through to allow for tripless operation during a prolonged power outage by using the rotating energy stored in high inertia, low-friction loads
- Provide a torque proving circuit to ensure proper control of the load when transferring control between the drive and a mechanical brake
- Slip Compensation to provide a minimum 0.5% speed regulation without feedback hardware
- Encoder Feedback provides up to 0.001% speed regulation
- Open Loop torque regulation to provide ±5% regulation

- Encoder Feedback to provide ±2% regulation and the ability to hold full load at zero speed
- Solid state output ground fault protection shall be provided
- Adaptive electronic motor overload protection shall be provided, which shall protect both the motor and the drives at all frequencies. This overload must be UL approved. Electronic thermal overload circuits which only protect the motor at full speed shall not be acceptable. The drive shall sense the load and speed and shall recalibrate the thermal trip curve to ensure low speed motor protection. The initial trip point shall be adjustable from at least 40% of the drive continuous rating to account for motor magnetizing current.
- Input surge protection
- Input and output phase loss detection
- Output short circuit protection
- Eight programmable digital inputs for Raise, Lower, Fast Speed, Reduced Speed, Creep Speed, Reduced Torque, and Spare
- Four programmable digital dry contact outputs for Drive Trouble, Drive Running, Drive Ready, Spare
- Programmable current limit
- Remote drive reset contact
- Minimum of 1,000:1 controllable constant torque speed range when in closed loop mode. Speed regulation shall be 0.01% or better over the entire speed range
- Minimum of 2 second power loss ride-through capability. In the event of a loss of three-phase power lasting 2 seconds or less, the drive must maintain operation and prevent nuisance trips upon return of power.
- 2 each 4 – 20 mA programmable analog outputs. They shall be preprogrammed to provide drive output kilowatts and motor RPM.

The ‘Drive Trouble’ fault condition shall cause the drives to shut off and shall be annunciated to the PLC control system through the Ethernet connection. All faults shall be transmitted to the PLC. The conditions that shall cause a drive shutdown fault are as follows:

- Blown fuse
- Instantaneous overcurrent trip
- DC bus overvoltage
- DC bus undervoltage
- Excessive ambient drive heat sink over temperature.
- External fault input
- Internally diagnosed, control failure
- Motor thermal overload
- Drive thermal overload

The drives shall employ modular PC board design for ease of troubleshooting. All connectors must be polarized type and clearly marked on both the connector and PC board to ensure proper connection.

Each drive shall be provided with a door-mounted LCD Human Interface module station with the following minimum features:

- Remote versions for panel mount application
- Large and easy to read 7 line x 21 character backlit display
- Alternate function keys for shortcuts to common tasks
- "Calculator-like" number pad for fast and easy data entry
- Control keys for local start, stop, speed, and direction

All drive functions shall be programmable from the door-mounted keypad. The keypad shall be equipped with EEPROM and be removable so that the parameters can be downloaded into another drive.

The drives shall be provided with heavy duty dynamic braking resistors capable of providing 100% braking on a continuous basis and 150% dynamic braking for 60 seconds. The resistors shall be provided with NEMA 3R enclosures.

The drives shall be provided with line isolation transformers sized as per the manufacturer's requirements.

B.9 DC Drives for Walnut Street

New DC drives shall be installed within the existing drive cabinets and shall be connected to the existing motors. The DC drives shall be PowerFlex 20, part no. 20P41AD100RA0NNN with remote LCD/HMI and PowerFlex Architecture Class EtherNet/IP to DPI Communication Adapter by Allen Bradley – no other manufacturer shall be permitted. The drives shall be properly sized based on the full load ampere rating of the motors and shall allow for 150% overload for 90 seconds. The catalog numbers and ratings of the drives listed on the drawings are approximate and shall be confirmed with the drive motor approved shop drawings. The correctly sized drive, meeting all the requirements, shall be provided at no additional cost to the department.

The digital DC drives shall provide digital control for precise speed and current regulation, easy programmability, extensive diagnostics, regenerative operation, and shall be easily interfaced for integration into larger drive systems. The DC drives shall be well suited to a variety of applications including extruding operations, finishing, drawing, and coating processes, applications exhibiting shock loads, high inertia, rapid accel/decel or continuous regeneration. The design of the drive shall include a fully contained power module and a common control structure for the entire range of horsepower. The DC drive shall provide a standard DPI interface that is compatible with all PowerFlex DPI communication products. The drive shall consist of an open type enclosure, armature converter, regulated field converter for field weakening or economy applications, an advanced regulator with integrated DPI functionality and DC tachometer feedback. Provide EtherNet/IP™ Communications adapter for configuration into the PLC system.

The drive shall be provided with an LCD Human Interface Module (HIM) and PC-based configuration tools. The LCD HIM shall provide:

- Large 7 line x 21 character, backlit display
- Alternate function keys for shortcuts to common tasks
- “Calculator-like” number pad for fast and easy data entry (Full Numeric version only)
- Control keys for local start, stop, speed, and direction
- Remote versions for panel mount applications

The drives shall have the following features at minimum:

- Fast-acting Current Limit and Voltage Regulation result in maximum accel/decel without tripping
- High speed analog inputs improve drive response to torque or speed commands
- Programming flexibility allows parameters to be linked within the drive
- Field flashable firmware through DPI interface
- Flying Start delivers smooth and instantaneous connection into rotating loads, regardless of commanded direction, without the need for any speed feedback
- Single Phase Regulated Field supply (10, 14, and 20 A) standard on all frames
- Integral Process PI Control can eliminate the need for a separate process loop controller
- Speed Regulation - Open Loop or Closed Loop
- DC Tachometer Feedback provides up to 0.1% speed regulation
- Open Loop torque regulation provides ±5% regulation.
- Full Wave Regenerative, 6 Pulse, Regulated Field Supply
- Over temperature heat sink thermistor monitored by microprocessor
- Software Overcurrent Trip shall allow for 200% of rated current (typical)
- Hardware Overcurrent Trip shall allow for 220-300% of rated current
- The drive shall be capable of absorbing Line transients of Up to 2000 volts peak per IEC 6100-4-5
- The drive shall allow a Power loss Ride-Through of 15 milliseconds at full load
- The drive shall allow a Logic Control power loss Ride-Through of 0.5 seconds minimum, 2 seconds typical
- The drive shall be provided with Ground Fault and short circuit trip Phase-to-ground on drive output
- Environmental: The drive shall be rated for an Altitude of 3300 feet max. without de-rating. The drives shall operate at a temperature range of 32…122° F, typical with a Relative Humidity while operating of 5 to 85% non-condensing
- The drives shall be rated at 480 VAC +/- 10%, 3 Phase, 50/60 Hz ± 5%
- The drives shall be rated for 100% rated continuous current, 150% rated current for one minute then fault, and 200% rated current for three seconds then fault
- Maximum field output voltage is 0.85 x AC input line voltage.
- Max. Short Circuit Rating: 100,000 A
- Control Speed Regulation using a DC Analog Tachometer in its operating range shall be better than 1000:1 rpm. It shall allow for DC Analog Tachometer Input Voltages of: 22.7, 45.4, 90.7, 181.6, and 302.9 V max.

The drives shall have the following I/O at minimum:

- Three configurable, isolated, differential ±10 V, 0-10 V, 0-20 mA or 4-20 mA
- Eight configurable digital inputs
- Two standard configurable analog outputs with a sampling rate 2 ms± 10V, 5mA, bipolar (current is not bipolar) Resolution: 11 Bit + sign
- Four standard configurable digital outputs
- Two configurable normally open relay outputs

B.10 Mason Street Span Brakes

Furnish and install four 14-inch electro-hydraulic thrustor type motor brakes and four 19-inch electrohydraulic thrustor type machinery brakes as shown on the plans. The new motor and machinery brakes shall replace in kind the existing brakes and act upon new brake wheels press fit onto the shafts of the new motors and existing differential reducer, respectively as called out on the drawings. Furnish all brake wheels and brakes by a single brake manufacturer. Install and align the new brakes and new brake wheels is accordance with Mason Street Bridge Machinery Work.

Provide spring-set, thrustor-released, shoe-type, open brakes with corrosion-resisting fittings. Brake shall have the drum size and torque requirements as listed on the plans, with permanent torque setting limited as required. Provide type MBT/E brakes by Mondel Engineering, Mississauga, Ontario, Canada, configured for “drop in” replacement of the existing General Electric brakes.

Equip each brake with a hand release, which will not change the torque setting or require removable levers or wrenches. Locate the hand release mechanism on the side of the brake away from the main reducer. (Right hand and left hand units are required.) Provide each hand release with a lever type limit switch for interlocking purposes as described under "Interlocking." It shall not be possible to set the hand release of the brakes without tripping these switches.

Switches shall be industrial lever limit switch rated NEMA 6P+ with epoxy potted cord sets as manufactured by Square D, Allen Bradley, Cutler Hammer or approved equal.

In addition to the hand release limit switch, mount two lever type limit switches on each brake. One shall indicate that the brake is fully set, the other that the brake is fully released. Assure that the brake released limit switch (which shall have two normally open contacts) trips when the brake is electrically released or hand released. The brake set limit switch shall have one normally open and one normally closed contact and shall trip when the brake is fully set.

Switches shall be industrial lever limit switch rated NEMA 6P+ with epoxy potted cord sets as manufactured by Square D, Allen Bradley, Cutler Hammer or approved equal.

Each thrustor actuator shall be provided with a time delay valve adjustable between 0 and 5 seconds for setting the brake. Only an internal time delay valve constructed of stainless steel is acceptable. Adjustment must be infinitely adjustable between the minimum and

maximum settings. These adjustments must be allowable with the brake in full service. Set the down-stroke time delays of the thrustors in such a manner that the brakes will not be applied simultaneously should electric power fail while the span is in motion. Adjust the intervals between the setting of the brakes to obtain smooth stopping of the span in the shortest possible time.

Provide the oil used in the thrustor operating chambers of the brakes to be of a grade as recommended by the manufacturer and approved by the engineer. It shall have a free operating temperature range between -40° C and 66° C.

Provide 480-volt, 3-phase, 60 Hz, totally enclosed, squirrel cage motors controlled by magnetic contactors with manual-reset thermal overload relays to actuate the thrustors. The rated stalled thrust of each thrustor shall be not less than 135 percent of the thrust actually required to release the brake with the torque adjusted to the continuous rated value.

All exposed ferrous material shall be treated with a nitro-carburizing process. This process shall improve wear resistance, lower the coefficient of friction and greatly reduce the tendency to weld or seize with a metallic counterpart. It shall also vastly improve corrosion resistance properties. The nitriting process shall produce a thick E-Nitrite layer of at least 12μm. Painting and other finishes are not an acceptable replacement for Nitriting.

Equip each brake with a NEMA 3R enclosure, which encloses the entire brake assembly, including the brake thrustor unit and brake wheel. The enclosures shall not prevent brake hand release operation.

B.11 Programmable Logic Controller System (PLC)

B.11.1 General

Bridge control logic functions shall be performed by a Programmable Automation Controller system, which shall provide for operation of the bridge and its auxiliaries in accordance to the system functioning specified herein and the control logic shown on the plans.

The Programmable Automation Controller shall be an Allen Bradley (AB) ControlLogix brand PLC with components, hardware and remote input/output drops. No substitutions shall be accepted. The PLC shall be of modular construction, provide high-speed peer-to-peer networking, and be programmable with ladder logic.

The PLC system will consist of redundant 1756-L55M23 CPU's. Only one CPU will be in use at a time, and the other CPU will be offline and de-energized. A selector switch mounted on the door of the control cabinet will select the CPU in use.

Modules are defined herein as devices that plug into a chassis and are keyed to allow installation in only one direction. The design must prohibit upside down insertion of the modules as well as safeguard against the insertion of a module into the wrong slot or

chassis via an electronic method for identifying a module. Electronic keying performs an electronic check to ensure that the physical module is consistent with what was configured. The Programmable Automation Controller shall have downward compatibility whereby all new module designs can be interchanged with all similar modules in an effort to reduce obsolescence. The Programmable Automation Controller shall have the ability to be updated electronically to interface with new modules.

All hardware of the Programmable Automation Controller shall operate at an ambient temperature of 32° F to 140° F, with an ambient temperature rating for storage of - 40° F to 185° F. The Programmable Automation Controller hardware shall function continuously in the relative humidity range of 5% to 95% with no condensation. The Programmable Automation Controller system shall be described and tested to operate in a high electrical noise environment.

The Programmable Automation Controller shall have the capability of addressing over 100,000 discrete points or 4000 analog points. It shall also have the ability to communicate with up to 500 connections that contain I/O. Each input and output module shall be self-contained and housed within a chassis. These chassis, with their respective modules, shall contain up to 512 (16 modules x 32 pts/module, using a 17 slot chassis) unique points. The Programmable Automation Controller shall include as an optional feature the capability of addressing remote input and output modules on ControlNet, DeviceNet, EtherNet/IP, “RIO”, HART and Foundation Field Bus.

The Programmable Automation Controller shall use multiple independent, asynchronous scans. These concurrent scans shall be designated for processing of input and output information, program logic, and background processing of other controller functions. Input and output devices located in the same backplane (local I/O) as the CPU will produce at the rate of the configured RPI (Requested Packet Interval), and for discrete input modules enabled for Change of State (COS), at the time any point changes state.

The Programmable Automation Controller shall have the ability to communicate with multiple remote I/O racks or devices configured with multiple I/O modules. Networks that allow remote I/O include “Remote I/O”, ControlNet, EtherNet/IP, DeviceNet, HART, and Foundation Field Bus. It shall be possible to communicate with remote I/O racks or other PACs via fiber optic cable by inserting fiber optic converters into the links. The fiber link must support distances up to 82,000 cable feet. Redundant fiber optic cabling shall be an option.

The Programmable Automation Controller shall have the ability to support multiple data communications networks in the same chassis by using DH+, DH-485, HART, ControlNet, DeviceNet, Ethernet/IP, Programmable Multi-Vendor Interface (RS232) modules, as well as other commonly used networks.

The Programmable Automation Controller shall have one dedicated 9-Pin D-shell serial port, which supports RS-232-C signals at baud rates from 110bps to 38.4Kbps or a Universal Serial Bus Type B port (USB 2.0) communicating at 12mb/sec The 9-Pin serial

port shall be accessible in control logic and provide support for DF1 Master, DF1 Point to point, DF1 Slave, DF1 Radio Modem, Modbus Master/Slave, DH-485 (messaging only) and ASCII Read/Write communication protocols. The USB port is a device only programming port. Both RS-232 and USB ports must be usable for programming and data monitoring purposes.

B.11.2 Controller Hardware

The CPU shall be a self-contained unit, and will provide control program execution and support remote or local programming. This device will also supply I/O scanning and inter-controller and peripheral communication functions. The operating system firmware shall be contained in non-volatile memory. An option shall be possible to store both the user program and system firmware in a removable non-volatile memory for backup/restore purposes. The operating system firmware can be updated via a separate software update tool to allow for easy field updates. The controllers shall allow the operating system to be updated using a suitably configured removable non-volatile memory card. The controller shall contain a minimum of 4 Mbytes of user memory.

In a single chassis system all system and signal power to the controller and support modules shall be distributed on a single backplane. No interconnecting wiring between these modules via plug-terminated jumpers shall be acceptable.

The CPU within the system shall perform internal diagnostic checking and give visual indication to the user by illuminating a “green” (OK) indicator when no fault is detected and a “red” (OK) indicator (Blinking or Solid) when a fault is detected or by way of a display screen scrolling an error code and message. The front panel on the Controller shall include color LED indicators or 4-digit display showing the following status information:

- Program or Run mode of the controller
- The fault status of the controller.
- I/O status
- RS-232 or Secure Digital (SD) activity
- Battery or Energy storage module (ESM) status
- Force LED

The front panel of the Controller shall include a mounted keyswitch. The key shall select the following Controller modes: RUN – No control logic edits possible, program always executing; PROGRAM – Programming allowed, program execution disabled; and REMOTE – Programming terminal can make edits and change controller mode, including test mode, whereby the logic executes and inputs are monitored, but edits are not permanently active unless assembled. The front panel of the Controller shall include a holder and a connector for a lithium battery or an energy storage module to provide power backup for user programs and data when the main power supply is not available. The front panel of the Controller shall include a 9-pin D-shell serial RS232 port or USB port, to support upload and download, online edits, firmware upgrades, and bridging to other modules in the same chassis.

All system modules, local and remote chassis shall be designed to provide for free airflow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be permitted. All system modules including the controller may be removed from the chassis or inserted in to the chassis while power is being supplied to the chassis without faulting the controller or damaging the modules. This is known as Removal and Insertion Under Power (RIUP). Alternately a software configurable option shall exist to fault the controller if required.

B.11.3 Power Supplies

The Programmable Automation Controller shall operate in compliance with an electrical service of 85 to 265 VAC (120 to 220 VAC nominal), single phase, in the frequency range from 47 to 63 Hz, or 18-32 VDC (24 VDC nominal).

A single main power supply shall have the capability of supplying power to the CPU and local input/output modules. Other power supplies shall provide power to remotely located racks. The power supply shall automatically shut down the Programmable Automation Controller system whenever its output power is detected as exceeding 125% of its rated power. The power supply shall monitor the incoming line voltage for proper levels. When the power supply is wired to utilize AC input, the system shall function properly within the range of 85 to 265 VAC. When the power supply is wired to utilize DC input, the system shall function properly within the range of 18 to 32 VDC. The power supply shall provide surge protection, isolation, and outage carry-over of up to 6 cycles of the AC line (120-240 VAC, 50/60 Hz) or 40 ms @ 24 VDC. Design features of the Programmable Automation Controller power supply shall include a diagnostic indicator mounted in a position to be easily viewed by the user. This indicator shall provide the operator with the status of the DC power applied to the backplane. In addition, a means of disabling power to the CPU shall be possible from a power disconnect switch mounted in a position easily accessible by the operator. At the time of power-up, the power supply shall inhibit operation of the controller and I/O modules until the DC voltages of the backplane are within specifications. In addition to the electronic protection described above the power supply shall offer a failsafe fuse that is not accessible by the user.

B.11.4 Program Creation and Storage

Memory state shall be selectable to allow for the most economical match to the intended application. It shall be possible to upgrade to a controller with a larger memory size simply by saving the program, upgrading the controller and downloading the program to the new system without having to make any program changes. Memory shall be backed up by either battery or energy storage module and are capable of retaining all stored program data through a power cycle. A low battery condition must be detectable in ladder logic, but shall not automatically generate a major fault. A low energy condition will generate a minor fault and will be detectable in ladder logic.

The controller will write all variable data to internal nonvolatile memory storage (Flash) during the power down cycle. The controller shall provide the capability to use commercially available, removable nonvolatile memory storage. The card shall be available from the supplier as an industrial rated device suitable for use in the same environment as the controller.

The controller will have the ability to store the user program, controller firmware and firmware for all other modules residing in the same chassis to the removable nonvolatile memory card. Additionally when memory is restored a user selectable option to be restored in Run mode or Program mode shall be provided. The controller shall have the capability to ensure, that if required modules in the chassis are flashed using the firmware files stored on the removable nonvolatile memory card, to the correct revision level for the project. The removable nonvolatile memory card shall support a Windows file system allowing multiple files to be stored on the card. The user can manually trigger the controller to save or load from the card and also configure the controller to load from the card on power up. The operator should be able to backup volatile memory, including data and program logic onto a personal computer storage device.

All user memory in the controller not used for program storage shall be allocable from main memory for the purpose of data storage. The Programmable Automation Controller system shall be capable of storing 4 data types:

- Predefined
- User-defined
- Module-defined
- Add-on defined

Pre-defined data types include the following: alarm, axis, bool, cam, cam-profile, control, coordinate system, counter, etc. User-defined data is limited to structures. Each structure contains one or more data definitions called members. Object includes a structure for each I/O module and system or module specific information (hidden from user). Add-on defined data type includes the Local and Parameter tags of the add-on instruction. It does not include the logic. Any data can be displayed in ASCII, Binary, Octal, Hexadecimal, or Decimal radices. Function-specific data types such as PID, Axis, Axis Group or Message shall have dedicated displays available annotating the meaning of specific control bits and words within them and allowing for selective control where appropriate.
If instructions or entire rungs are intentionally deleted from an existing logic program, the remaining program shall be automatically repositioned to fill this void. Whenever contacts or entire rungs are intentionally inserted into an existing program, the original program shall automatically be repositioned to accommodate the enlarged program. All rung comments shall maintain their original links.

The number of times a normally open (N.O.) and/or normally closed (N.C.) contact of an internal output can be programmed shall be limited only by the memory state to store these instructions. The number of times a timer or counter can be programmed shall be limited only by the memory state to store these instructions. Controller programs shall have immediate access to the sub elements of control structures by address and sub

element mnemonic, such as timer accumulator value, timer done bit, or PID Process Variable value.

B.11.5 Interfacing and Peripherals

The programming software shall be on a Windows 7 based workstation. The workstation shall have the capability to be remotely located a maximum of 10,000 cable feet from the controller over DH+ at 57.6 K-Baud or a maximum of 3280 cable feet from the controller over ControlNet. The workstation shall also be able to connect via Ethernet or RS232 for remote access.

The Programmable Controller system shall be able to interface with a data terminal, which is RS-232-C compatible (up to 38400 baud) or via USB 2.0 @ 12 mb/s to generate hard copy messages. The system shall have the capability to interface to a floppy disk, CD-ROM, DVD and/or a hard disk for loading a user program into, or recording the contents of, the controller's memory. It shall be possible to load or record the entire contents of memory.

B.11.6 Communication Interfaces

The Programmable Automation Controller shall have communication interface modules for Ethernet/IP, ControlNet, DeviceNet, DH+, DH-485, Remote I/O (RIO), and RS232, HART and foundation field bus.

The Ethernet/IP interface shall support the following:

- Standard TCP/IP communications
- Standard Ethernet media (10base2, 10base5, 10baseT, 100baseT, fiber)
- CSMA/CD access method
- Subnet masking
- Standard repeaters, bridges, routers, host computers, peer PLCs.
- RJ-45
- Bootp client
- Manual configuration using RSLogix5000, RSLinx, or BootP/DHCP Servers.
- Programmable controller messaging to peer controllers and workstations
- I/O Control
- Device Level Ring (DLR)
- CIP Motion (Motion over Ethernet/ IP)

The Ethernet/IP interface shall support bridging between Ethernet/IP links within a ControlLogix chassis. The Ethernet/IP interface shall support bridging to ControlNet, DH+, DH-485, DeviceNet, and other controllers. Bridging allows for configuration (program up/download) and data collection.

The DH/RIO interface shall support the following:

- Two channels of communications
- Each channel independently configurable for DH+ or RIO
- DH+ baud rate shall be 57.6, 115, 230 Kbaud
- DH+ will support routing tables
- RIO baud rates shall be 57.6, 115.2, 230.4 KBaud
- Message error checking
- Retries of unacknowledged messages
- Diagnostic checks on other stations

The DH+ interface shall support bridging to/from ControlNet, EtherNet and DeviceNet.

B.11.7 Programming

The programming format shall be IEC 1131-3 compliant Ladder Diagram (LD), Function Block Diagram (FBD), Sequential Function Chart (SFC), and Structured Text (ST) languages. The controller shall organize user applications as Tasks, which can be specified as continuous, periodic, or event based.

Periodic tasks shall run via an interrupt at a user-defined interval in one microsecond increments from 1 millisecond to 2000 seconds. The interrupt mechanism of periodic and event tasks shall adhere to the IEC 1131-3 definition of pre-emptive multitasking. The controller shall be able to accommodate a maximum of 32 individual tasks of which one can be continuous. The periodic and event tasks shall have an associated, user assignable priority from one to fifteen (one being the highest priority), which specifies that task's relative execution priority in the multitasking hierarchy. The event task can be triggered by hardware events (an input point) or software events (event instruction). Each task shall have a user settable watchdog timeout which is unique to that task. Each task can include a maximum of 100 programs, which can be prioritized for execution within the task. Each program can include routines programmed in LD, FBD, SFC, or ST languages. One of the routines can be specified as the main routine and one can be specified as an optional fault routine. All routines shall be capable of being edited when on-line. The number of routines which can be contained in a program is limited only by memory.

Variables within the controller shall be referenced as unique, default or user defined tags. Tag naming convention shall adhere to specifications in IEC 1131-2. Tags may be created off-line, on-line and at the same time the routine logic is entered. The system shall have the capability to store user tags names in the controller. Tags shall be available to all tasks in the controller (Controller Scoped) or limited in scope to the routines within a single program (Program Scoped) as defined by the user. Any tag shall have the ability to be aliased by another tag, which is defined and has meaning to the user. The ability to program control logic via tags of the Programmable Automation Controller shall exist.
It shall be possible to program ladder diagram rungs with the following restrictions:

- Series instruction count limited only by user memory
- Branch extensions limited only by user memory
- Branch nesting to six levels

The capability shall exist to interleave input and output instruction types on the same contiguous rung in the ladder diagram rungs. The capability shall exist to change a contact from normally open to normally closed, add instructions, change referenced tags, etc. It shall not be necessary to delete and reprogram the entire ladder diagram rung. It shall be possible to insert ladder diagram rungs anywhere in the program, even between existing rungs, insofar as there is sufficient memory to accommodate these additions. A single program command or instruction shall suffice to delete an individual ladder diagram rung from memory. It shall not be necessary to delete the rung contact by contact. A clock/calendar feature shall be included within the CPU. Access to the time and date shall be from the programming terminal or user program.

Latch functions shall be internal and programmable. The system shall have the capability to address software timers and software counters in any combination and quantity up to the limit of available memory. All management of these instructions into memory shall be handled by the CPU. Instructions shall permit programming timers in the "ON" or "OFF" delay modes. Timer programming shall also include the capability to interrupt timing without resetting the timers. Counters shall be programmable using up-increment and down-increment. Timer instructions shall have a time base of 1.0 ms. The timing range of each timer shall be from 0 to 2,147,483,648 increments. It shall be possible to program and display separately the timer's preset and accumulated values.

The Programmable Automation Controller shall use a signed double integer format ranging from -2,147,483,648 to +2,147,483,648 for data storage of the counter preset and accumulated values. The Programmable Automation Controller shall store data in the following formats:

- Boolean values (0 or 1).
- Short Integer Numbers ranging from -128 to +127.
- Integer Numbers ranging from -32,768 to +32,767.
- Double Integer Numbers ranging from –2,147,483,648 to +2,147,483,647.
- Floating Point Numbers consisting of eight significant digits. For numbers larger than eight digits, the CPU shall convert the number into exponential form with a range of plus/minus 1.1754944 E -38 to plus/minus 3.402823 E +38.
- Long Integer Numbers consisting of 64 bits.

The capability shall exist to organize data in the form of User Defined Data Structures. All aforementioned data types, as well as others, can be used in such structures along with embedded arrays and other User Defined Structures.

The Programmable Automation Controller shall have support for integer and floating point signed math functions consisting of addition, subtraction, multiplication, division, square root, negation, modulus, and absolute value. Trigonometric instructions supported must include Sine, Cosine, Tangent, Inverse Sine, Inverse Cosine, and Inverse Tangent. These instructions must fully support floating-point math. Additional floating point instructions supported must include Log 10, Natural Log, and Exponential. It shall be possible to complete complex, combined calculations in a single instruction, such as flow totalizing or equations of the format ((A+((B-C)*D))/E).

File function instructions supported shall also include Sort, Average and Standard Deviation. Value arrays shall be limited in size only by the amount of available memory. Arrays shall be configurable with one, two or three dimensions. The CPU shall support indexed addressing of array elements. Array element manipulation instructions such "array copy" (COP), “array copy with data integrity” (CSP) and "array fill" (FLL), "array to array" (MOV), "element to array" (FAL), "array to element" (FAL), and "first in-first out" (FIFO) shall be supported by the system. The four function and math instructions and instructions for performing "logical OR", "logical AND", "exclusive OR", and comparison instructions such as "less than", "greater than", and "equal to" shall be included within the system. All instructions shall execute on either single words or array elements.

For any module specifically associated with the Programmable Automation Controller, it shall be possible to configure operation and query the current status of all channels through controller scoped tags without any programming.

The system shall contain instructions, which will construct word shift registers (SQI, SQO, and SQL). Additional instructions shall be provided to construct synchronous bit shift registers (BSR and BSL).

The Programmable Automation Controller shall have a jump instruction which will allow the programmer to jump over portions of the user program to a portion marked by a matching label instruction.

The Programmable Automation Controller shall have an embedded motion planner capable of doing coarse motion planning for up to 100 axes. This planner must be the highest priority task of the controller.

The Programmable Automation Controller shall have a ladder diagram instruction interface to the motion planner which allows the user to request that the motion planner create and execute a specific motion profile. The profile can be changed dynamically through the ladder diagram program.

The Programmable Automation Controller shall have the ability to provide a master system clock and the 1588 PTP v2 CIP Sync object to allow time synchronization and transport and routing of a system clock to the control system and motion axes in a local chassis or on an Ethernet/IP network.

It shall be a function of the CPU to automatically manage all data types. For example, if a word stored in an Integer tag is transferred into a Floating Point tag, the CPU shall convert the integer value into floating point prior to executing the transfer.
In applications requiring repeatable logic it shall be possible to place such logic in a subroutine section. Instructions which call the subroutine and return to the main program shall be included within the system. It shall be possible to program several subroutines and define each subroutine by a unique program file designator. The controller will

support nesting of subroutines up to available stack at the moment of the call. It shall be possible to pass selected values (parameters) to a subroutine before its execution. The number of these parameters is limited only by available memory. This allows the subroutine to perform mathematical or logical operations on the data and return the results to the main program upon completion. These subroutines will be accessed by jump-to-subroutine instructions.

The system shall have the capability to enter rung comments above ladder diagram rungs. These comments may be entered at the same time the ladder logic is entered. The program shall be fully commented.

The capability shall exist for adding, removing, or modifying logic during program execution in routines of LD, FBD, SFC, and ST languages. When changes to logic are made or new logic is added it shall be possible to test the edits of such logic before removal of the prior logic occurs. It shall be possible to manually set (force) either on or off all hardwired discrete input or output points from the programming panel. It shall also be possible to manually set (force) an analog input or output to a user specified value. Removal of these forced I/O points shall be achieved either individually or totally through selected keystrokes. The programming terminal shall be able to display forced I/O points.

A means to program a fault recovery routine shall exist. When a major system fault (Controller Fault) occurs in the system, the controller fault recovery routine shall be executed and then the system shall determine if the fault has been eliminated. If the fault is eliminated, program execution resumes. If the fault still exists, the system will shut down. The capability shall exist for each program to have its own fault routine for program fault recovery. Each having the same features as the controller based fault routine. An instruction shall be available to give the control program diagnostic information, state control, and sequencing of a process simultaneously, while allowing the capability of user-friendly state programming techniques.

An instruction shall be supported to incorporate closed loop control systems. The "proportional", "integral", and "derivative" elements shall be accessible to the user in order to tune a closed loop system. This instruction must fully support floating-point math.

The system shall support both bit and word level diagnostic instructions.

To facilitate conditional event detection programming, output instructions shall include "one shot" instructions, which may be triggered on either low-to-high (rising) or high-to-low (falling) rung conditions. To facilitate debugging, an "always false" instruction shall exist which may be utilized to temporarily inhibit the execution of control logic.

The controller shall support Master Control Reset (Relay) type functionality to selectively disable sections of logic.

The controller shall include direct support of FOR-NEXT loop constructions.

Controller files will have the ability to be exported and edited in L5k, (text) format or XML format.

UPS: Furnish and install fourUPS units. The UPS shall be rated for 5 KVA (minimum). The UPS shall be rated to provide power for 20 minutes at half load and 10 minutes at full load. Provide UPS sizing calculations for engineer approval. The UPS shall be rated for 120 VAC input and 120 VAC output. The UPS output shall be a sine wave with less than 3% distortion. The UPS unit shall provide automatic bypass and an audible alarm upon UPS failure. The UPS shall have provisions for hardwired connections.

B.12 Human Machine Interface (HMI) Display

Furnish and install HMI display screens for all three bridges. They shall be equivalent to the PanelView Plus 1500 as manufactured by Allen Bradley or engineer approved equal. They shall be provided with touch screen interfaces to allow for switching between screens, and Ethernet interfaces to allow for seemless connection into the bridge PLC networks.

The control system vendor shall be responsible for the development of the various display screens. The existing remote operations station for the Tayco Street Bridge has a computer display with various screens; these shall be used as a basis for developing the new screens with input from the engineer and the department. At a minimum, the following screens are anticipated:

- A general display with position, motor power and brake status
- A drive diagnostics screen
- A fault history screen.
- Any additional screen requested by the department or as required.

B.13 Noise Filter

Furnish and install one active tracking noise filter on the input of each PLC rack. The noise filter shall be a series connected high frequency noise filter with transient protection. It shall offer hard wired connection to all critical loads and rated for an industrial environment and equipment. It shall reduce mode transient to +/- 2 volts, have a surge capacity of 45,000 amps, provide transient protection in all modes (line to neutral, line to ground, and neutral to ground), have an LED power indication, and be UL approved. The 120 VAC MCOV shall be rated 150 VRMS. The line frequency response time shall be less than 0.5 nano-seconds. The operating temperature shall be –40° F to 115° F at full load. The unit shall be capable of protecting against a peak surge current of 15,000 amps in all modes.

The noise filter shall be manufactured by Emerson Electric, Sola, Control Concepts, or engineer approved equal.

B.14 Ethernet Radio Modems

The Ethernet radio modems shall be a high-speed wireless Ethernet radio, with PoE and Serial Encapsulation. They shall operate at high speed (54 Mbps), low latency communications, using the IEEE 802.11b/g (2.4 GHz band) and 802.11a (5 GHz band) standards. They shall conform to IEEE 802.11a/b/g. They shall be open standard/nonproprietary. They shall utilize Radio-based IGMP snooping/querying to filter multicast industrial Ethernet maximizing bandwidth. They shall be provided with metal enclosures, rated for industrial operating temperatures, and shall be vibration and shock resistant. They shall be certification approved for use in hazardous locations and explosive atmosphere (ISA 12.12.01 Class I Div 2, ATEX Zone 2 Category 3).

They shall provide data and cryptographic strength security with WPA2 -802.11i with 128 bit AES encryption and CCM integrity check. They shall limit access to approved device MAC IDs

They shall be provided with a built-in web server for browser-based configuration and remote diagnostics Included OPC Server for HMI-based wireless network diagnostics. They shall be provided with PC based software to properly configure the wireless network. The software shall allow a PC to view the network topology, assign IP addresses to radios for configuration, monitor network diagnostics, update radio firmware and detect the presence of other vendors' 802.11 radios on the network.

The radio modems shall have the following specifications:

- Frequency Band 802.11b/g 2.412 GHz to 2.462 GHz (FCC) GHz 802.11a5.725 GHz to 5.850 GHz (FCC) Wireless Standards 802.11a, 802.11b, 802.11g, 802.11i
- Transmit Power (Programmable) Up to 50 mW without amplifier
- Channel data rates (Modulation)
- 802.11b: 11, 5.5, 2, 1 Mbps(DSSS -BPSK, QPSK, CCK)
- 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps (OFDM)
- 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps (OFDM)
- Receiver Sensitivity (Typical)
- -90 dBm @ 1 Mbps
- -85 dBm @ 11 Mbps
- -82 dBm @ 24 Mbps
- -75 dBm @ 54 Mbps
- Security WPA2 -802.11i with 128 bit AES-CCM
- Legacy WPA TKIP, WEP support
- MAC ID filter
- Admin password
- Enclosure Extruded aluminum with DIN and panel mount
- Shock IEC 60068 2-6 (20 g, 3-Axis)
- Vibration IEC 60068 2-27 (5 g, 10 Hz to 150 Hz)
- Ethernet Ports One 10/100 Base-T connector, shielded RJ45
- IEEE 802.3, 802.3u, 802.3x
- Antenna Ports (2) RP-SMA connectors

They shall operate at an operating temperature range of -40° F to +167° F and humidity up to 100% RH non-condensing.

They shall require an external power supply of 10 VDC to 24 VDC and have an average power draw of less than 6 watts.

The radio modems shall be provided with directional antennas and associated cabling as recommended by the manufacturer. A radio survey company approved by the manufacturer shall conduct a site survey to determine optimum frequency for the system and determine the correct antennas. This site survey shall be included in the bid price.

The radio modems shall be manufactured by ProSoft, Phoenix Contact, D-Link or engineer approved equal.

B.15 Remote Monitoring Laptop Computers

Four laptop computers shall be provided to allow the PLC, HMI and vector drive programs to be modified as required in the future. The computers shall be manufactured by Hewlett Packard, Dell, Toshiba or engineer approved equal. They shall have the following features at a minimum:

- 3rd gen Intel® Core™ i7-3630QM Processor (2.4 GHz, 6M L3 cache)
- Windows 8 Professional, 64-bit, English or Windows 7 Professional, 64 bit
- 17.0" HD (1920x1080) Anti Glare LED-backlit
- NVIDA® Geforce® GT 650M Graphics with 2048MB of dedicated video
- 16 GB DDR3 SDRAM (2 Dimm)
- 500 GB 7200 RPM Hard Drive
- Blu-ray writer and DVD burner
- Backlit Keyboard
- Bluetooth Mouse
- Microsoft Office – Includes Word, Excel and Access (Latest version)
- Norton Utilities (Latest version)
- Nero 12 Platinum (Latest version)
- Backpack carrying case for 17” Notebook
- 1 Year Basic Hardware Service
- 1 Year Limited Hardware Warranty

The unit shall be an intelligent terminal, functioning both as a programming and a data terminal. It shall permit PLC programming, including loading, editing, and monitoring ladder diagram programs in memory by entering through the keyboard and monitoring on the display. Program instructions shall be in the form of standard symbols similar to those used for electromagnetic control equipment.

In addition to the Laptops, the following software shall be provided. Licenses and install discs shall be provided with all software:

- 3 copies, Windows® XP Professional OEM CDs
- 2 copies, Windows® 7 Professional, 64bit OEM CD
- 4 copies, VMware Workstation (Latest version)
- Allen Bradley software- RSLinx (Latest version)
- Allen Bradley software- RSLogix 5000 (Latest version)
- Allen Bradley software- RSLogix Micro (Latest version)
- Allen Bradley software- FactoryTalk ME (Latest version)
- Allen Bradley Training software- EtherNet/IP Bundle (9393-RSTENETAENE - Latest version)
- Allen Bradley Training software- ControlLogix Fundamentals (9393-RSTCLX - Latest version)

Include all CD-ROM's, manuals and other materials. Provide all licenses and original CD-ROM or Disk copies with the computer for all software installed.

B.16 Inclinometers

The inclinometers shall be liquid capacitive gravity based sensors with integrated sensor and excitation electronics. The thermal drift of the primary sensor shall be further compensated by an electronic equalization of the temperature. They shall have internal integrated highly stable voltage regulators making it possible to supply the inclinometer from any unregulated supply or battery as low as + 8 V and up to +30 V DC. The power shall be obtained from the measurement current loop, enabling operation with a two wire connection. The measuring principle shall assure a linear angle output with 4…20 mAs calibrated to equal the measuring range of the sensor.

The inclinometers shall be suited for industrial use where high accuracy and long-term stability are required in a noisy environment and where high temperature changes occur and non-stable supply voltages are present such as bridges, mining, construction equipment and process machinery.

Provide inclinometers with the following characteristics:

- Temperature compensated
- 4…20 mA output
- Non-regulated +8…+30 V power supply
- Integrated sensor electronics with 4…20 mA excitation
- Linear output characteristics
- 2 wire connection – sensor power obtained from the current loop
- High measurement accuracy
- Very low relative linearity errors
- High long-term stability
- EMC protected
- Vibration and shock insensitive due to non-mechanical internal parts
- Hermetically sealed housing to IP67
- Sensor galvanically isolated from housing

- Sensor zero mechanically adjusted with mounting ring
- Current loop limitation
- Hysteresis free measuring signal
- Measuring Range: ±80°
- Resolution: < 0.01 °
- Sensitivity: 0.1mA/ °
- Max. Non-Linearity: < 1*10-3 FS
- Transverse Sensitivity: < 1% at 45° tilt
- Response Time: < 0.3 s
- Temperature Drift of Sensitivity: < -0.01% / °C
- Temperature Drift of Zero: < ±10-3 °/°C
- Zero Offset: 12 mA
- Power Supply: 8…30 VDC non-regulated (either polarity)
- Current Consumption: Approx. 10 mA
- Housing: 30% Glass Filled PBT Plastic
- Environmental Protection: IP65
- Mounting: Flat Vertical Surface with Supplied Mounting Ring
- Operating Temperature: -40° F to +185° F
- Storage Temperature: -49° F to +194° F

The inclinometers shall be manufactured by Reiker, Turck, Shavetz or as approved by the engineer.

B.17 Limit Switches

B.17.1 Rotary Type Limit Switches

Furnish and install rotary cam limit switches on the machinery enclosures where indicated on the plans. Each limit switch shall be a rotary, cam-operated limit switch in a NEMA 4X enclosure and shall be coupled to the operating machinery as shown on the drawings, which shall rotate the input shaft.

The switch contacts shall have a minimum AC inductive continuous current carrying rating of 15 A and a minimum DC resistive continuous current carrying rating of 15 A. They shall be UL and CSA listed.

The limit switches shall have circuits individually micro-adjustable and provisions for internal vernier adjustments. The number of contacts shall be as shown on the plans. The limit switch shall allow for a + or - 1/4 degree contact operation repeatability. Each contact of the limit switch shall be SPDT precision-type, snap-action switches.

Provide cam switches with adjustable input coupling and NEMA 4X stainless steel enclosure manufactured by Gemco, Kamco, Hubbell or as approved by the engineer, which shall be driven as shown on the plans and furnished with the operating machinery.

B.17.2 Over-travel Lever Type Limit Switches

The over-travel limit switches shall be lever-operated, spring-return, two-circuit cam operated harsh environment naval duty limit switches in bronze, watertight enclosures that shall have 6-inch straight bronze levers with 2 ¼-inch rollers. The contacts shall be of the double break sliding type in accordance to MIL-S-901. The over-travel switch trips when the span has opened beyond the fully open point. The switch shall be Namco Controls Corporation type EA780-20000 with EL060-58925 arm or engineer approved equal manufactured by Cutler-Hammer Products or General Electric.

B.17.3 Motor Brake and Machinery Brake Lever Type Limit Switches

Each limit switch shall be a heavy-duty, lever-operated, submersible, two-circuit, snap-action limit switch in a watertight, NEMA 6P, epoxy-sealed enclosure with epoxy sealed SOOW cord set. The switches shall be manufactured by Square D, Allen Bradley, Cutler Hammer or approved equal.

B.17.4 Span Seated Proximity Type Limit Switches

Proximity lever-less limit switches shall be provided for span seated indication and interlocking. They shall be enclosed in a stainless steel housing rated NEMA 4X and 6P. They shall be provided with single pole, double throw, end sensing contacts rated for 10 amperes. The contacts shall be silver cadmium oxide, gold flashed, and shall have a temperature rating of -40 to 221 degrees F. They shall have a repeatability of 0.002”, and a response time of 8ms. They shall be provided with six foot epoxy potted cordsets. They shall have a nominal sensing distance of ¼”, and shall be provided with a magnetic sensor that will provide for a ¾” sensing distance. The lever-less limit switches shall be Model 81 GO switch with model AMP3 magnetic target as manufactured by Topworx or engineer approved equal.

B.18 Encoder Buffers

The encoder buffer shall accept 4-26 VDC signals and provide two independent and completely isolated line driver outputs of 5-26 VDC based on user defined voltage levels. It shall be provided with optically isolated inputs that accept quadrature or single channel inputs, with or without their complements, from differential line drivers, open collector, or from proximity probes. The encoder buffer shall also have the ability to repeat and amplify signals. Each output of the encoder buffer shall be user definable from 5 to 26 VDC. In addition to having short circuit protection, outputs shall be ESD protected according to MIL-STD-883. Each connector of the encoder buffer shall be equipped with two positions for +VCC and common, as well as two extra field accessible tie points. The encoder buffer shall be capable of driving the output signal up to 26 VDC, and will function with either output disconnected.

Provide encoder buffers as manufactured by Dynapar, AMS Controls, Allen Bradley or engineer approved equal with the following standard operating characteristics:

- Input Signal: 2 or 3 channel quadrature signal, sine or square wave, open collector, differential, or single ended line driver.
- Input Signal Current: 2.2 mA minimum, 3.5 mA typical
- Input Impedance: Optically isolated, 1 kOhm at 4 V, 6.8 kOhms at 24 V typical. Current limited.
- Frequency Range: 0 - 120 kHz
- Output Signal: Two independent, isolated line driver output sets (A/A, B/B)
- Supply Voltage: 5 - 26 VDC
- Output Current: 150 mA (maximum per channel)
- Wire Gauge Accepted: 26 -16 AWG
- Environmental range: 32° F to 122° F at 98% RH non-condensing

B.19 Deceleration Check Speed Switches

The electronic speed switches shall be rotation monitoring systems with two adjustable set points designed to detect unwanted over speed, under speed or stoppage in motors. In the event of rotational failure, the relays can be used for equipment shutdown and to provide an alarm. The sensor receives a pulse output from a motor encoder buffer and measures this frequency signal to determine shaft speed, and compares this to the pre-adjusted set point. The relay output can then be used for equipment shutdown or to provide an alarm, assuring machine protection and process integrity. The sensor shall be fail-safe; any malfunction during operation will de-energize the control circuit.

Provide sensors specifically ordered with no start delay loss of feedback as manufactured by Electro-Sensors, Torq, Maxiguard or engineer approved equal with the following characteristics:

- Housing and Cover NEMA1, Approved to UL 508 and CSAC 22.2 #14-95 Standards
- Stand-Alone Mounting
- Input Power 115 VAC, 60 Hz
- Sensor Input Signal Type NPN Open Collector, Amplitude 5 VDC, Pull-Up 4.7 KOhms, max Frequency Range 0-666.67 Hz
- Under or Over Speed Set Point Relays Two form C, SPDT isolated 5 A 115 V AC resistive
- Set Point Adjustment Rotary Switches: (1) tens and (1) ones digit

B.20 Control Apparatus and Miscellaneous Equipment

B.20.1 General

Control apparatus shall conform to the applicable requirements of NEMA Publication No. ICS, latest revision, Industrial Control and Systems, rated as shown on the plans or as required herein. Where specific manufacturers part numbers are called out it is to specify a type of device, equivalents by Allen Bradley, Square D, Siemens, Cutler Hammer, General Electric or engineer approved equal are all acceptable.

B.20.2 Circuit Breakers

All branch circuits from the power buses shall be protected by molded-case circuit breakers mounted on the control panels. All breakers shall have quick-make and quick-

break contacts, and the mechanism shall be trip-free and trip indicating. All circuit breakers and motor circuit protectors shall be provided with at least two form C auxiliary contacts for PLC input and status indication. Frame sizes shall not be less than 100 amperes. The breakers shall be equipped with thermal-magnetic trips or adjustable, instantaneous, magnetic trip units, with trip rating as shown on the plans or as required. Molded-case circuit breakers shall meet the requirements of the latest revision of NEMA Publication No. AB1. The service entrance circuit breakers are to be 600 volt rated, frame size as indicated on the plans and shall be provided with electronic trip unit with independently adjustable short time pick-up and time delay, set to trip as per the plans and motor operators with internal limit switches to provide for service isolation. Interrupting capacity shall be no less than 100,000 AIC. Circuit breakers shall be Westinghouse Series C, Type LD with LS trip unit, Type TA or engineer approved equal manufactured by General Electric or Square D Company.

B.20.3 Motor Starters and Magnetic Contactors

The continuous current rating of contactors and starters shall be adequate for the connected loads, and no starters shall be smaller than NEMA Size 1 unless otherwise noted. All starters shall be full voltage types, 600 VAC, 60 Hz, rated with 120 VAC operating coils. All contact poles shall be provided with arc chutes, and contactors rated 150 amperes and above shall be equipped with magnetic blowouts. Three-element manual reset overload relays shall be provided to protect gate and lock motors and wiring against overheating due to excessive current. Heater elements are to be selected based on motor full-load running current. Each overload relay shall be provided with a set of auxiliary form C contacts for PLC interfacing and indication. Reversing contactors shall be electrically and magnetically interlocked.

Starters for the brakes and gearbox lubrication pumps shall be IEC devices rated 12 amperes minimum and provided with manual motor starters to provide for isolation and overcurrent protection sized for the motor FLA and auxiliary contacts for PLC interfacing and indication. They shall be Allen Bradley Bulletin 103S or equal by Square D or ABB.

B.20.4 Service Disconnect Switches

Unfused safety switches, for use as disconnects, shall be installed where shown on the plans. The switches shall be nonfusible, heavy-duty, 600 VAC safety switches in watertight and dust-tight NEMA 4X, stainless-steel enclosures. Each disconnect shall be furnished with two N.O. auxiliary contacts and phenolic nameplate to identify the switch. The rating shall be as required and/or shown on the plans.

B.20.5 Motor Disconnect Switches

Unfused safety switches for use as disconnects, where required, shall be installed within the range of view of its respective motor, brake, or span lock. The switches for the main motors and span lock motor shall be tag out lockable, non-fusible, heavy-duty, safety switches, rated as shown on the plans, in waterproof, NEMA 4X, stainless steel enclosures. Each disconnect shall be furnished with a N.O./N.C. auxiliary contact and phenolic nameplate to identify corresponding motor.

B.20.6 Brake and lubrication pump motor disconnect switches
The disconnects shall be three pole manual motor starting switches rated 30 amperes. They shall be provided with a weatherproof housing and shall be engineer approved equal to the Square D class 2520 type KW2.

B.20.7 Control Relays
Auxiliary control relays shall be multi contact magnetic relays with contacts rated at 10 amperes, 600 volts, on a continuous basis. Relays known to meet the specified requirements are the Square D class 8501 type X or approved equal.

B.20.8 Phase Failure and Reversal Relay
This relay shall prevent energizing operating the span in the event of reversed phase sequence, loss of one phase, or low voltage. The phase failure and reversal relay shall be the Square D Class 8430 Type MPD or approved equal.

B.20.9 Selector Switches and Pushbuttons
Pushbuttons and control switches shall be heavy-duty, oil-tight, contact blocks operated by glove handle selector knobs, key switches and push-button operators as indicated on the plans. Contacts shall be fine silver, capable of interrupting 6 amperes at 120 volts AC, and of continuously carrying 10 amperes. Switches and pushbuttons shall be Square D class 9001, type K, NEMA 4 or approved equal.

B.20.10 Indicating Lights
Indicating shall be heavy-duty, oil-tight pilot lights with one or two fields as required as per the plans. They shall be provided with LED lamps the color of the lamp lens and shall be rated at 120 VAC. Where group testing cannot be accomplished through the PLC the lights shall be provided with a push to test feature. All lenses shall be glass, with color and marking as shown on the plans.

B.20.11 Terminal Blocks
Terminal blocks for conductors of Size No. 8 AWG and smaller shall be stud and nut type one-piece blocks of phenolic or 257 ºF material recognized under the UL Component Recognition Program. Barriers shall be not less than 1/2-inch high and 1/8-inch thick and shall be spaced 5/8 -inch center-to-center. Straps, studs and nuts shall be of brass, nickel plated for use in highly corrosive atmospheres, and shall be rated for 50 amperes for a terminated conductor. The blocks shall provide a withstand voltage rating of 600 V per IEEE switchgear standards. The terminal blocks shall provide studs and nuts suitable for use with flanged fork wire connectors. Corrosion resistant marking strips shall be provided for conductor identification. At least ten- percent spare terminals shall be provided. Terminal blocks shall be Buchanan Type 2B112, General Electric Series CR 151B or Marathon 1500 Series or engineer approved equal.

B.20.12 Terminal Connectors
Terminal connectors shall be seamless, heavy duty compression locking fork terminals manufactured from pure electrolytic copper tubing. Terminals shall be tin plated and

provided with a double-thick tongue and insulation grip. Terminals and compression tools must be approved by the engineer.

B.20.13 Power Distribution Blocks

Power distribution blocks for all conductors larger than No. 8 AWG, shall be finger-safe, fabricated from copper sized as required. Finger-safe fully insulated block shall ensure that no one can touch live parts. They shall be provided with recessed termination screws and wire openings providing IP20 grade protection and qualify as "finger-safe" per IEC 529, integral DIN rail adaptors allowing for quick and easy installations on 35mm DIN rail, and captive termination screws. Provide end anchors for rigid end stops.

B.20.14 Nameplates

Nameplates shall be provided for all aforementioned devices and shall be made of laminated phenolic plastic with white front and back and black core and shall be not less than 0.09-inch thick. The lettering shall be etched through the front layer to show black engraved letters on a white background. Lettering shall be not less than 0.24-inch high, unless otherwise detailed on the plans. Nameplates shall be securely fastened to the equipment with stainless steel screws.

B.21 Step Down Transformers

Provide ventilated dry type transformers designed according to the latest revision of NEMA ST-20. Ratings for the transformers shall be as shown on the plans. Provide transformers designed for continuous operation at rated KVA, 24 hours a day, 365 days a year. Required performance must be obtained without exceeding 150° C average temperature rise by resistance or 180° C hot spot temperature rise in a 40° C maximum ambient and 30° C average ambient. Maximum coil hot spot temperature shall not exceed 220° C. Transformers shall be equipped with solid copper cores.

B.22 Bridge Control Cabinets

Control panels enclosed in freestanding cabinets shall be furnished and installed in the operator house and machinery spaces where shown on the plans. All circuit breakers, UPS, PLC racks, switches, contactors, relays, regulating equipment, and other apparatus for control of the span and its auxiliaries shall be mounted on these enclosed panels. The arrangement and line-up of the individual control cabinets shall be as shown on the plans.

All equipment in each control cabinet shall be mounted on sheet-steel bases, and each device shall be front-connected, front-wired, and removable from the front. The equipment in all cabinets shall be arranged for ease of access and for safety and convenience of operation. Special care shall be taken to obtain a systematic and neat arrangement of the equipment. Each device shall be suitably named and plainly marked by a laminated nameplate mounted near the device on the panel. Each nameplate shall show an approved descriptive title for the apparatus, together with the device designation appearing on the schematic wiring diagrams.

Each indoor control cabinet shall be a NEMA Type 12 enclosure constructed of No. 12 gauge sheet-steel and shall be reinforced with steel angles or channels to provide a rigid, freestanding structure. Exterior control cabinets shall be NEMA 4X or NEMA 12 stainless steel. The control cabinets shall be provided with hinged doors on the front of each panel section. Door panels shall be gasketed and shall be provided with three-point, vault-type latches. Drive and control panels shall be provided with fan and filter ventilation. All hardware shall be corrosion resistant. Thermostatically controlled strip heaters shall be provided in each cabinet to prevent build-up of excess moisture. Each panel shall be provided with suitable interior light fixtures and a duplex receptacle.

Each control panel enclosure shall be as shown on the plans. If the final cabinet dimensions, as established by the manufacturer, should necessitate rearrangement or modification of the equipment in order to fit in the available space, such rearrangement or modifications shall be made and at no extra cost. The final arrangement of all equipment in the operator house shall be subject to the approval of the engineer.

The indoor control panel enclosures and all metal reinforcing shall be painted inside with two coats and outside with three coats, consisting of one coat of primer followed by one coat of gray enamel on the inside surfaces and two coats of gray enamel outside. The finish coat shall be ANSI 61 light gray enamel.
All contactors, relays, and other devices shall be of required current carrying and interrupting capacity. All apparatus shall be of substantial construction and shall conform to the requirements of NEMA Standards Publications ICS 1 and 2, 2000, for industrial control devices.
All wire shall be flame-retardant, ethylene-propylene insulated, switchboard wire, Type SIS. Conductors shall be stranded copper not smaller than No. 14 American Wire Gauge.

For each assembled control panel, all outgoing wire, No. 8 AWG or smaller, shall be connected to terminal blocks installed at the sides of the cabinet. The control panels shall also provide sufficient extra terminals to allow connection of all wires coming from limit switches and other devices that go on to the bridge control console and other locations as required, even though these wires do not connect to apparatus on the control panels. Spare terminals totaling at least 10 percent of those actually used shall be provided. Each terminal shall be identified per wire number shown on the contractor's schematic wiring diagrams.

All panel wiring shall be arranged systematically so that circuits can be readily traced. The wiring shall be installed in a network of troughs consisting of horizontal and vertical sections securely bolted to the panels. The troughs shall be fabricated from heavy duty Noryl plastic shaped into a channel cross-section. After installation of the wiring, an insulated, flanged cover shall be snapped over the open side of each trough section.

B.23 Raceways
Except for multi conductor, jacketed cables, all wiring shall be installed in conduit or stainless steel wireway as shown in the plans.

All conduits shall be standard weight, threaded, rigid steel conduit conforming to the requirements of ANSI Standard C80.1. All conduits shall be hot-dip galvanized, inside and out, to meet the requirements of the above standard for protective coating. Conduit couplings and fittings shall be made of malleable iron or steel, hot-dip galvanized.

All conduits to be installed in outdoor locations shall be plastic coated as hereinafter specified. Conduit fittings, including couplings, unions, elbows, expansion and deflection fittings, and other items, shall also be plastic coated. Conduits and fittings, which are to be plastic coated, shall be provided with a factory-applied polyvinyl chloride (PVC) coating in the following manner. The exterior of the galvanized rigid steel conduit or fitting shall be coated with an epoxy acrylic, heat-polymerizing adhesive not to exceed 0.004 inch. A PVC plastic coating, 0.8mm to 1mm thick shall be bonded to the outside metal surface the full length of the pipe, except for the threads. The plastic coating shall have an 85+Shore A Durometer rating and conform to NEMA RNI-1998 (Type A), ASTM D746, and Federal Specifications LP406b, Method 2051, Amendment 1 or 25 September, 1952. A two-part red urethane, chemically cured coat shall be applied to the interior of all conduit and fittings. This internal coating shall be at the nominal 2-mil thickness and shall be sufficiently flexible to permit field bending without cracking or flaking. The Plasti-bond, PVC coated, hot-dip galvanized steel conduit shall be UL labeled and listed.

All hollow conduit and fittings, which serve as part of the raceway, shall be coated with the same exterior PVC coating and red interior urethane coating. The plastic exterior coating and the red interior urethane coating shall be factory applied by the same manufacturer who produces the hot-dip galvanized conduit. PVC coated conduit shall be installed in accordance to the manufacturer's installation manual.

Unions to connect sections of conduit that cannot be joined to each other or to boxes in the regular manner shall be of malleable iron or steel, hot-dip galvanized, PVC coated.

Conduits shall not be less than ¾ inch in diameter. The interior surfaces shall have a smooth finish and be free of burrs or projections, which might cause injury to the cables. All conduits shall be free from blisters, cracks, or injurious defects and shall be reamed at each end after being threaded. Sections shall be connected to each other with screw couplings made up so that the ends of both conduits will butt squarely against each other inside of the coupling. Conduits shall be installed to be continuous and watertight between boxes and equipment. Conduits shall be protected at all times from the entrance of water or other foreign matter by being well-plugged overnight or when the work is temporarily suspended.

Conduit bends and offsets shall be made by cold bending using approved methods and equipment. The use of a pipe tee or vise for bending conduit will not be permitted. Conduit, which has been crushed or in any way deformed, shall be discarded. All bends shall be long sweep, free from kinks, and of such easy curvatures as to permit the drawing of conductors without injury. Conduit runs shall be made with as few couplings as standard lengths will permit, and the total angle of all bends between any two boxes or

cabinets shall not exceed 90 degrees, unless otherwise approved by the engineer. The radius of curvature of pipe bends shall not be less than eight times the inside diameter of said conduit. Long running threads will not be permitted. Pull boxes shall be used whenever necessary to facilitate the installation of the wire.

Except for installation indoors or where specifically permitted by the engineer, condulets or conduit bodies shall not be used for pulling conductors or for making turns in conduit runs or for branching conductors. Condulets or conduit bodies, where permitted, shall consist of malleable iron castings with gasketed covers of the same material and fastened with brass cover screws. The bodies shall be hot-dip galvanized, and PVC coated when used with PVC coated conduit.

Where conduits pass through the floors or walls of the houses, they shall be provided with PVC pipe sleeves for free passage of the conduits. After the conduits are installed, the openings shall be caulked with an elastic compound and escutcheon plates provided on the interior walls, ceilings, and floors.

Conduits and wireway shall be securely clamped and supported at intervals not exceeding five feet in length.

Conduit and wireway runs exposed on the steel structure shall be securely clamped to the steelwork. The conduit clamps, in general, shall consist of U-bolts attached to structural steel supports bolted to the members. The wireway clamps, in general, shall consist of manufacturer recommended stainless steel bracket hangers attached to structural steel supports bolted to the members. The wireway cover shall be on the top or on the side of the wireway and be clear of opening obstructions. The minimum thickness of the structural supports shall be 3/8 inch. Supports shall be arranged so that conduits and wireway rest on top of the support and conduit U-bolts rest on top of the conduits. The use of J-bolts to fasten structural supports or to clamp conduits will not be permitted.

All U-bolts and bracket hangers shall be provided with medium-series lock washers and hexagonal nuts. The bolts, nuts, and washers shall be of stainless steel conforming to the requirements of the Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes, ASTM Designation A276, Type 316.

Where conduits and wireways are to be mounted exposed on non-steel surfaces, they shall be securely clamped to the surface using bent plate pipe supports with back spacers held by not less than two bolts. The stock size for the bent steel plate supports shall be ¼ inch thick by 2 inches wide. Back plates shall be of 3/8 inch thick steel. Supports and spacers shall be hot-dip galvanized. Bolts shall be not less than ½ inch diameter and shall be of stainless steel conforming to the requirements specified for U-bolts.

At any point where a conduit crosses an expansion joint longitudinally or where movement between adjacent sections of conduit can be expected, conduit expansion fittings shall be installed. The fittings shall be bronze expansion fittings and shall be provided with flexible bonding jumpers to maintain the electrical continuity across the

joints. The fittings shall permit a total conduit movement of 8 inches and shall be engineer approved equal to the O.Z./Gedney Type EX, Spring City Type EF, or the Crouse-Hinds Type XJ.

At any point where a conduit crosses a joint laterally or where an offsetting type movement between adjacent sections of conduit can be expected, expansion and deflection fittings shall be installed. The fittings shall permit a movement of ¾ inch from the normal in any direction. The fittings shall be the O.Z./Gedney Type DX, Spring City Type EDF, Adalet Type STX, or engineer approved equal.

Flexible conduits for the connections between the rigid conduit system, all motors, and limit switches shall be made with sections of PVC coated, flexible, metallic, liquid tight conduit. Each section shall not exceed 18 inches without prior approval of the engineer.

All conduit embedded in concrete, insofar as possible, shall be completely encased by concrete of not less than 3 inches, measured in any direction, and shall be securely held in place during pouring and construction operations. A group of conduits terminating together shall be held in place by a template.

All conduit, wireway, and fittings shall be carefully examined before being installed, and all pieces having defects shall be set aside and removed from the site. All conduit bends shall be made with standard size conduit elbows. Conduit shall be assembled hand tight and then using strap wrenches tightened two more turns. Wrench marks or chuck marks shall be touched up with the appropriate touch-up compound. All cuttings and threading shall be performed as recommended by the conduit manufacturer. All conduit, enclosures, and fittings shall be mechanically joined together to form a continuous electrical conductor to provide effective electrical continuity.
Ends of abandoned conduits, spare conduits/wireway, and empty conduits/wireway and stubs shall be capped during and after construction, and care shall be taken to ensure that no moisture or other matter is in or enters the conduits.

All conduits shall be pitched not less than 1 inch in ten feet (except by special permission). Where conduits cannot be drained to pull boxes, a drain "T" with drain fitting shall be installed at the low point and drained to a dry well of broken stone. Drain fittings shall be of stainless steel and shall be capable of passing 1 oz of water per minute.

The ends of all conduits projecting into boxes and equipment enclosures shall be provided with bronze insulated grounding bushings. The insulated portion shall be of molded phenolic compound, and each fitting shall have a screw type combination lug for bonding. Insulated bushings shall be the O.Z./Gedney Type RBLG, Spring City Type GB, or engineer approved equal manufactured by Appleton. All bushings in any box or enclosure shall be bonded together with No. 8 AWG bare copper wire. Where conduit hubs are provided use locking nuts with grounding terminals.

All conduits and wireway shall be carefully cleaned both before and after installation. Upon completion of the conduit and box installation, clear each conduit by snaking with a steel band, to which shall be attached an approved tube cleaner equipped with a mandrel of a diameter not less than 85 of the nominal inside diameter of the conduit and with a wire brush of the same diameter as the conduit, and shall then draw in the cables.

Both ends of each conduit or wireway run shall be provided with a brass tag having the same number stamped thereon in accordance to the conduit diagrams, and these tags shall be securely fastened to the conduit ends with No. 20 AWG brass wire.

Separate conduits or wireways shall be furnished and installed to carry the circuit wiring to all span driving motors.

All wireways shall be 16 gauge 304 stainless steel bodies with covers and oil-resistant gasket and adhesive. The flanges shall be 10-gauge stainless steel. Wireway fittings, nipples, and elbows shall be 304 stainless steel. A solid oil-resistant gasket shall be positioned between flanges when sections and fittings are bolted together.

Wireways shall not be less than 6 x 6 inches. The seams shall be continuously welded and ground smooth. There shall be no holes or knockouts. The edges on all sections and fittings shall be smooth and rounded to prevent damage to cable and conductor insulation.

The wire way covers shall have heavy butt hinges and external screw clamps to assure complete seal between covers, gaskets, and bodies.

When wireway enters an enclosure, a box connector shall be used on the inside of the enclosure to ensure a tight and stable seal. Closure plates shall seal the end of wireway sections or runs.

At any point where a wireway crosses a joint, where an offsetting type movement between adjacent sections of conduit can be expected, or where movement between adjacent sections of conduit can be expected flexible wireway fittings shall be installed. The fittings shall be the wireway manufacturer’s recommended fitting.

All conduits projecting into boxes and equipment enclosures shall be provided with water tight, weather proof, insulated throat conduit hubs. The conduit hubs shall be approved equal to Meyers Watertight Rigid Conduit Hubs except for PVC coated conduit which shall be provided with PVC hubs of the same manufacture as the conduits.

B.24 Boxes

All surface mounted pull, junction, and terminal boxes shall be of type 316 stainless steel, and shall be provided with full length hinged gasketed, covers held with stainless steel fast operating clamps to provide NEMA 4X watertight construction. They shall be manufactured by Hoffman, Weiggman, Hammond or engineer approved equal.

Interior and exterior boxes shall be provided with external mounting lugs and shall be fastened in position with stainless steel through bolts. Conduit entries shall be means of galvanized malleable iron hubs. PVC coated conduit shall use PVC coated hubs. No box shall be drilled for more conduits or cables than actually enter it. Exterior boxes shall be provided with drain fittings of the same type as specified for conduit drains.

All boxes shall be sized in accordance to the requirements of the National Electrical Code and the dimensions as shown on the plans.

Terminal boxes shall be of sufficient size to provide ample room for the terminal blocks and interior wiring and for the installation of conduit terminations and multi conductor cable fittings. Interior mounting backpanels with tapped holes shall be provided for mounting the terminal blocks.

B.25 Hardware and Supports

Supports for conduits, wireways, cables, boxes, cabinets, disconnect switches, small limit switches, and other separately mounted items of electrical equipment shall be fabricated from stainless steel not less than 1/4-inch thick. All supporting members shall be included under the electrical work.

Structural steel brackets, boxes, and other equipment mounted on concrete surfaces shall be provided with a full neoprene gasket not less than 1/8 inch thick between the equipment and the surface of the concrete.

Expansion anchors for fastening equipment or brackets to concrete surfaces shall be wedge type anchor bolts, which shall be locked in place by an expansion wedge as the nut is tightened. All parts of the expansion anchors shall be of Type 303 stainless steel. Holes for the anchors shall be drilled to the size and depth recommended by the manufacturer using carbide tipped masonry drills.

Mounting bolts, nuts, washers, and other detail parts used for fastening boxes, disconnect switches, small limit switches, conduit clamps, cable supports, brackets, and other electrical equipment shall be of stainless steel conforming to the requirements of ASTM Designation A276, Type 316. Bolt heads and nuts shall be hexagonal and shall be provided with medium-series lock washers. Bolts smaller than ½ inch in diameter shall not be used, except as may be necessary to fit the mounting holes in small limit switches, boxes, and similar standard devices.

Usage of beam clamps for supporting conduits, boxes, or other equipment shall not be acceptable without prior approval of the engineer.

Preformed metal framing channels, such as Kindorf, Unistrut, Superstrut, etc., will not be acceptable for mounting or supporting electrical equipment, conduits, or boxes except where specifically approved by the engineer.

B.26 Wiring and Cables

B.26.1 General

Except where otherwise noted, wiring in conduits shall be single-conductor.

All wires and their insulation and covering shall be of a nationally recognized brand, acceptable to the engineer, and shall have marks always used on the particular brand for identifying it.

All wiring and cables shall conform to the requirements of NEMA Publication No. WC70-2000. Before wire and cable orders are placed with any manufacturer, submit for approval typical published test data for the type of insulation proposed, showing that it meets the requirements of NEMA Publication No. WC7. All materials used to fabricate insulated wiring and cables shall be certified to be from stock not more than 1 year old.

All conductors shall be of stranded copper large enough to carry safely the maximum currents required without injurious heating or serious voltage drop. Conductors shall not be smaller than No. 12 AWG, except as approved for control panel and console wiring or for lighting fixtures. All conductors shall be soft-annealed copper wire conforming to the requirements of NEMA Publication No. WC70. All conductors shall have Class B concentric stranding, except for conductors in flexible cables.

The insulation shall be a chemically cross-linked, polyethylene compound conforming to the requirements of Part 3.7 of NEMA Publication No. WC70. The thickness of insulation shall be that required for 600 volts rated circuit voltage listed under Column A of Table 3-1. Insulation type shall be Type XHHW-2.

Equipment ground conductors shall be bare, stranded, coated copper conforming to the requirements of NEMA Publication No. WC70, Part 2.

Single conductor wiring, including the insulating material, shall be tested to demonstrate that it meets specified requirements. The testing shall be done as stipulated in NEMA Publication No. WC70, Part 6. Wiring and cables shall not be shipped from the plant of the manufacturer until certified test reports on the cable properties have been approved by the engineer.

The conductor sizes and number of wires shown on the plans are the minimum permissible. Provide wiring and cables of sufficient size and number as may be required for the installation in accordance to the wiring diagrams on his approved working drawings. In each conduit and multi conductor cable containing ten or more conductors, at least one spare wire shall be provided for every ten conductors actually used.

Wiring shall not be installed in any conduit before all joints are made up tightly and the conduits rigidly secured in place. The drawing of cables into conduits shall be done without injury to the wires or their insulation or covering. No lubricant of any kind shall be used for the pulling of wires, unless specifically authorized by the engineer. Sufficient

slack shall be left in all cables to permit proper connections in boxes, cabinets, and enclosures.

Both ends of every single length of conductor shall be permanently and clearly tagged in accordance to the same numbers or designations appearing on the approved wiring diagrams. Wire tags for marking the conductors shall be heavy duty, heat shrink, waterproof, permanently marked, and resistant to ultraviolet light deterioration. Numbers and letters shall be black or blue on a white background. Submit the proposed wire marking system and a sample of the wire markers to be installed to the engineer for approval. Each conductor, except for control and instrument conductors, shall be color coded with colored insulation. Color coding for 120/208 volt conductors shall be black for phase A or 1, red for phase B or 2, blue for phase C or 3, white for neutral, and green for equipment ground. Color coding for three phase 480 volt conductors shall be brown for phase A or 1, purple for phase B or 2, yellow for phase C or 3, gray for neutral, and green for equipment ground. Each conductor shall be marked at panelboard gutters, pull boxes, outlet and junction boxes and each load connection and shall include each branch circuit or feeder and control wire.

Conductors inside terminal boxes, the control console, and control panels shall be neatly formed into cables and laced with approved cable ties, with the individual conductors leaving the cable at their respective terminal points. These conductors shall be looped to allow not less than 76mm of free conductor when disconnected. The formed cables shall be held securely away from the terminals and from contact with the enclosure by means of approved insulating supports.

All outgoing wires, No. 8 AWG or smaller, in the control console and control panels and in terminal boxes shall be connected to stud and nut style terminal blocks of molded phenolic compound. Terminals shall be suitable for use with solderless, locking fork, wire connectors. Connectors which extend beyond the ends of terminal block barriers, shall be furnished with an insulating sleeve covering the metal part of the connector. Taping of extended terminals will not be permitted.

Each terminal of all terminal blocks shall be permanently marked to show the same number or designation as appears on the wire connected thereto.
Splicing of wires will not be permitted, except for wiring to service lighting fixtures and receptacles. Wherever it becomes necessary to joint or branch conductors, terminal blocks shall be used, and wires shall be clearly tagged.

Multi conductor cables supported on the steelwork shall be secured thereto by bent plate cable clamps spaced not more than 3 feet on centers. The cable clamps shall be fabricated from stainless steel plates bent to suit the cables' outside diameters. In general, the clamps shall be fastened to structural brackets bolted to the steelwork.

Where multi conductor cables enter the control console or any cabinets or boxes, they shall be provided with watertight cable terminators. Each cable terminator shall provide a watertight seal by compressing a tapered neoprene-sealing ring around the outer jacket of

the cable. Cable terminator parts shall be made of bronze and shall be manufactured by OZ Gedney, Appleton, Crouse Hinds or engineer approved equal.

Take insulation resistance readings on all circuits installed, with electronic equipment disconnected, and furnish to the engineer a complete record of the results obtained. These circuits shall include connected motors when tested. Conductors rated 600 volts, or more, shall be 1 Mohm, or more. Defective circuits shall be replaced at the contractor's expense.

Flexible cable for specified connections shall be rubber-insulated, multiple-conductor portable cords conforming to the requirements of NEMA Pub. No. WC3, Part 7.7 or NEMA Pub. No. WC8, Part 7.4 for hard service. Each cable shall be provided with a heavy-duty neoprene jacket conforming to the requirements NEMA Pub. No. WC3, Part 7.7.5.1 or NEMA Pub. No. WC8, Part 7.4.5.1. Flexible cables shall conform to the National Electrical Code, Article 400 for hard service. Flexible cables shall be provided with strain relief fittings and basket weave cable grips at each end. Strain relief fittings shall be malleable iron, liquid tight strain relief fittings. The cable grips shall be stainless steel, heavy long, closed wire mesh, single weave with a double eye support. All mounting hardware shall be stainless steel.

B.27 Barrier Gates for Mason Street and Tayco Street

Provide barrier gates designed for use as a penetration resistance barrier and suitable for use as a warning barrier for wide spans. The barrier shall be explicitly designed for traffic control on movable bridges, as required by AASHTO's current Standard Specifications for Movable Highway Bridges, and shall be suitable for similar applications as well.

The operating mechanism and main control components shall be contained in a weatherproof housing. The housing shall be constructed of .375 inch carbon steel, hot dip galvanized after fabrication. Exterior surfaces shall be painted aluminum. All external fasteners ½ inch and under shall be stainless steel. Fasteners over ½ inch in diameter shall be stainless steel, hot dip galvanized or mechanically galvanized. Arm shaft openings shall incorporate O-ring seals.

The barrier arm shall pivot in the vertical plane via a mechanical 4-bar linkage. The linkage shall utilize cranks keyed to the main arm shaft and transmission shaft and an adjustable connecting rod between a pair of self-aligning spherical rod ends. The connecting rod shall be of AISI 4150. An auxiliary crank shall be used, paired with the transmission crank, to reduce the load on the transmission and to better balance and stabilize the load on the housing and mounting structure. The auxiliary crank shall be mounted in a permanently lubricated bronze bearing. The velocity of the arm shall follow a sinusoidal pattern to provide smooth operation. The arm shall begin and end its full motion path with zero velocity and accelerate smoothly to maximum velocity at mid-travel.

The mechanism linkage shall be driven by a fully enclosed, heavy duty worm gear, double reduction speed reducer. The transmission shall have a rated capacity of not less than 23,000 inch-pounds, continuous duty, with an occasional momentary peak load rating of not less than 69,000 inch-pounds. The output shaft shall be 2½ inch in diameter. Gear ratio used shall produce an operation time of approximately 16 seconds.

For installations requiring heavy arms and/or high winds, a heavy duty torque limiter shall be provided to limit the torque transmitted to the operating mechanism due to excessive wind loads, physical obstruction to the arm or instant reversing of heavy arm assemblies. The torque limiter shall be capable of being set anywhere within a range of 10,000 to 75,000 in-lbs torque. Each torque limiter shall be factory set for the load recommended by the manufacturer, based on installation requirements. Each torque limiter shall be adjusted and tested at the factory, under over-load conditions, for a minimum of 5 minutes to verify the setting. The gate limit switch assembly shall be driven from the output side of the torque limiter so that slippage of the torque limiter will have no effect on the limit settings.

The motors shall be 480 VAC, 3-phase, 60 Hz. The motor horsepower shall be as recommended by the barrier manufacturer to suit the installation, between 1 and 2 hp. The motor shall be a C-face design and shall be mounted directly to the transmission. The motor shall be instantly reversing and overload protected.

The barrier limit switch assembly shall be a self-contained unit. The assembly shall provide 8 independent SPDT control switches. Switches shall be rated for 15 amps, 480 VAC. Switches shall be controlled by individually adjustable cams. The limit switch assembly design shall permit adjustment of all cams with the barrier in any position. The limit switch assembly shall have a removable cover to help prevent accidental contact with switch terminals. Shaft, cams, bushings and housing pieces shall be of non-ferrous corrosion resistant materials.

The motor shall be equipped with a solenoid-release, automatic brake. The brake shall have a manual release lever to permit manual operation of the barrier during emergencies or setup.

The main arm shaft shall be of 2.5 inch diameter AISI 4150 with a minimum tensile strength of 140,000 psi. The shaft shall be mounted with heavy duty ball bearings which can be re-lubricated. [Option: Arm shaft shall be chrome plated, when specified.]

Front and rear access doors shall be mounted on full cross straps. Hinges shall be of the slip-off type and shall have stainless steel pins. A stop shall be mounted inside the door to secure the door from being raised off the hinges in the closed position. Door latches, two per door, shall use a vise action to compress a neoprene bulb-type gasket to seal the door openings. [Option: Door latches shall be of stainless steel and shall be tamper-resistant.] [Option: A stainless steel strap shall extend across each door and fit over a heavy hasp to permit use of a padlock. Strap and hasp shall be designed to fit both standard style heavy-

duty padlocks and high security shackleless (“hockey puck” style) padlocks. Padlocks shall be provided by others, keyed alike.]

A pair of carbon steel rectangular tubes, hot dip galvanized, painted aluminum, shall be rigidly affixed to the ends of the main arm shaft. The tubes shall be offset to locate the arm centerline at the height specified above the housing base. The channels and a steel cross-member shall provide a sturdy mount for the arm and counterweights.
At the rear end of the side arm tubes, hot dip galvanized counterweights shall be mounted to balance the arm. Counterweights shall be sectional and shall be balanced at the factory.

The barrier arm design shall be double rail aluminum. The arm length shall be measured from the centerline of the housing and shall be determined by the contractor. Stainless steel truss cables and a damping type bumper rod shall be furnished with longer arms at the discretion of the manufacturer. Front and rear arm surfaces shall be covered with pre-striped alternating red and white diamond grade reflective sheeting. Stripes shall be 6 inch wide and shall slope at 45 degrees down toward the arm tip. Remaining exposed surfaces shall be painted white.

The arms shall be provided with alternately flashing 12 VDC LED lamps in heavy duty cast aluminum encloses and wired with four conductor 12 AWG type SOOW cord. The housing shall be of cast aluminum and shall have a base and upper housing. Upper housing shall be held in place by draw bolts for ease of service. A gasket shall provide a weather seal between the housing and base. Assembly shall be double-faced, with lenses held in place by screws. The upper housing shall form a sun visor for both directions of the light. Light assembly shall usually be mounted resting on the warning gate arm or barrier and secured using a bolt through a mounting tab cast into the base section. Lenses shall be red fresnel plastic, 4 inch minimum diameter. Lamp shall be 12V LED, 100,000 hour, double contact bayonet base, with individual LEDs arranged for 2-way light projection.

The flasher shall be moisture and corrosion resistant and shall be capable of dissipating heat sufficient for continuous duty. The flasher shall have two alternately flashing circuits, and one steady burn circuit. Each flashing circuit shall flash 0.5 seconds on and 0.5 seconds off. The input voltage shall be 120 VAC. The 120 V/12 V transformer shall provide 12 V for the flasher and the arm lights. The flasher shall operate properly for input voltages within 10% of nominal. The output circuits shall be rated at 10 amps at 12VAC each (10 amps total load). A voltage drop of up to 0.5 volts to the output terminals shall be acceptable. They shall be provided with Built-in, internal overload protection with auto-reset (no fuse required). All connections shall be made to terminals. The terminals shall be clearly labeled and shall be compression type screw terminals.

Each gate shall be provided with a warning gong. The warning gong shall be used as an audible traffic signaling device to draw attention to the warning gate or traffic barrier and, thereby, to the bridge status. The housing shall be of heavy duty, cast aluminum construction. Gong assembly shall be equipped with an aluminum mounting adapter for mounting to the top of the gate housing. Mounting shall be designed to enclose all wiring.

A hinged and gasketed rear door shall provide service access. A cast aluminum guard above the shell shall provide weather protection. Gong shall operate on 120 V power. Current draw is 0.45 FLA. Gong shell shall be spun silicon bronze.

The barrier shall utilize 6x25 construction, 300-series stainless steel, annealed energy absorption cables to assist in diffusing the kinetic energy of an impacting vehicle. Cables shall be annealed in a coil not less than 42" diameter. The barrier shall typically be capable of absorbing the energy of a 5,000 pound vehicle traveling up to 50 mph. Actual capacity shall necessarily depend on individual barrier configuration. Double rail aluminum tube arms shall have two or three 0.5 inch cables, one inside each tube, and one along the center of the arm if three cables are used.

The energy absorption cables shall be anchored at both ends of the span in the closed to traffic position. At the housing, heavy duty side arm latches shall be mechanically linked to the operating mechanism to automatically engage a shaft through the side arm tubes when the arm is lowered, to assist in transferring the impact load into the housing in the event of an impact.

The energy absorption cables shall be anchored at the tip end of the arm in the closed to traffic position. A passive end latch mounted on the arm tip shall engage a rigidly mounted and anchored socket on or in a wall or post for independent barriers. For paired barriers, on-coming barrier shall be fitted with a bar and anchor nut while off-going barrier shall be fitted with a yoke. On-coming barriers shall be sequenced to close first and open last. Yoke on the off-going traffic barrier shall fit over the anchor nut in the closed to traffic position. End latch system shall be designed so that the yoke will engage the anchor nut in a collision to connect the two barriers into a continuous unit. End latches shall not require powered actuation for proper engagement.

The barrier shall be fixed to a suitable foundation, as specified by the project engineer, using eight 1 inch diameter anchor bolts provided by the gate manufacturer. The barrier housing base shall provide 1.25 inch mounting holes.

Both a hand crank and a drill crank shall be provided with each barrier to facilitate manual operation.

A manual disconnect switch shall be provided, pre-wired at the factory to break the main motor leads, to protect personnel during service. A hand crank safety switch shall be provided to prevent automatic actuation of the barrier during manual operation. Additionally, safety switches shall be installed and set at the factory to break the control circuit when either access door is opened. Door safety switches shall have a pull-to-override feature for test operation and shall automatically reset when doors are closed. Control components and terminal blocks shall be mounted inside an electrical enclosure mounted facing the roadway side access opening. Stud and nut phenolic terminal blocks shall be provided and shall be fully labeled and clearly coded to the control system vendors wiring diagrams. All control wiring shall be clearly coded to the control system vendors wiring diagrams and shall terminate at the terminal block. Connections to screw-

type terminals shall have lugs. Conductors shall be #14 AWG stranded, minimum. Wiring shall be run in conduit where practical.

The arm end latch shall be equipped with a proximity switch to indicate correct engagement of the end latch. The mechanism shall be mounted on the arm end latch and send a confirmation signal only when the end latch is properly engaged. The mechanism shall be fully adjustable and preset at the factory.

Provide a warranty to cover the barrier and related equipment against defective material and components for 2 years from date of shipment from manufacturer. Manufacturer shall furnish replacement parts for a minimum of 10 years. Replacement parts for most components shall normally be available in 1 working day. Lamps, fuses and other components designed for a life less than 2 years shall be covered for the rated life of the component or the warranty period of the component manufacturer.

Provide resistance barriers with gongs and arm lights, manufactured by B&B Roadway, Automatic Power, Energy Absorption Systems or engineer approved equal.

B.28 Air Horns for Mason Street

For giving the necessary boat signals, one compressed air horn with mounting brackets shall be furnished and installed on the operator house, pointing parallel to the navigable channel.

The horn shall be diaphragm type, 4 inch vibratory horn having a frequency of about 300 cycles per second. The horn shall be of weatherproof construction with a projector bell of bronze. The horn shall be provided with a stainless steel bracket for mounting on the machinery house as indicated on the plans.

The compressed air horn shall be actuated by a rotary air compressor driven by an integral 1-horsepower electric motor. The motor shall be a 120-volt, single-phase, 60-cycle unit. The compressor unit shall be mounted in the operator house, and a brass pipe shall be extended through the house wall to the horn. The compressor unit shall be manufactured by B&B Roadway, Automatic Power, Federal Signal or engineer approved equal.

The air horn shall produce a minimum 120 decibels.

B.29 Pier Protection and Mid Span Navigation Lights for Mason Street

Navigation lights shall be provided in accordance to the rules and regulations of the United States Coast Guard as shown on the plans.

For all navigation lights, the doors and lenses shall be gasketed, and each entire unit shall be completely weatherproof and vandal resistant. Fittings shall be non-corroding, and the sockets shall be of porcelain mounted on shock absorbers. The housings for all units shall be cast-bronze, and an LED 120-volt lamp with brass base shall be installed in each socket.

The bascule span lights shall be controlled by the fully open limit switches so that the green lights shall show when both leaves are fully opened, and the red lights shall show at all other times.

All navigation lights shall be equipped with bronze junction boxes.

The housing shall be of cast bronze and shall be suitable for marine environment. Construction shall be rain-tight and fully gasketed. The light assembly shall be designed for heavy duty, long life service. Design shall provide ready access for lamp service.

The lens shall be heat-resistant fresnel glass. Lens sections shall be 180 degrees red over 180 degrees green. Inside lens diameter shall measure approximately 7 inches. Outside lens diameter shall measure approximately 8 inches.

Lamp fixture head shall be suspended from the swivel on a 2 inch schedule 40 pipe, 2.375 inch outer diameter. Pipe material shall be stainless steel.

Each span navigation light shall be equipped with a swivel. The swivel design shall provide for all wiring to be completely contained inside the light assembly. Gaskets and o-rings shall be used to provide a weather tight assembly. Swivel shall be of heavy duty construction, cast of the same material as the fixture head. Spindle shall be of stainless steel.

The navigation lights shall be equipped with an anti-swivel brake. The brake shall allow the light to pivot under its own weight as the bascule leaf rotates while preventing oscillation of the light during windy conditions.

Base shall be cast of the same material as the fixture head. Light assembly shall mount via four ½ inch diameter bolts through the base, provided by installer to suit installation. A junction box shall be provided at the base of the unit. A cast junction box with gasketed access cover shall be provided. Junction box shall be of the same material as the fixture assembly and shall match the navigation light base footprint. Orientation of junction box shall be capable of rotation in 90 degree increments.

The pier protection lights and bascule span lights shall be as manufactured by B&B Roadway, Automatic Power, Tidewater or as approved by the engineer.

The navigation light system shall be controlled by photoelectric control device. The photoelectric control unit shall be a completely self-contained, weatherproof device rated 1,800 VA at 120 volts and shall be provided with a time-delay feature and a deluxe, encapsulated lightning arrestor for protection against surges and lightning. The unit shall provide turn-on of the pier navigation lighting system at 10.74-lux nominal. The unit shall be suitable for operation within a temperature range of -50° C to 70° C and shall have a fail-safe feature so that the lighting load remains energized in the event of component failure. The unit shall be suitable for installation in a twist lock receptacle

with adapter for mounting on PVC-coated rigid metal conduit. Locate the photoelectric controller on the machinery house, as approved by the engineer.

A three-position selector switch shall be provided on the control console for operating the rest pier navigation lights. In the "Auto" position, the lights shall be controlled by the photoelectric control device. The "On" position shall override the photocell and turn the lights on. The lights can be turned to the off position for safety during maintenance.

B.30 Spare Parts

Supply spare parts in accordance to AASHTO requirements and contract plans. Provide shop drawings and/or product specifications to the engineer for approval prior to ordering spare parts.

Provide the following general spare parts, as applicable, for Mason Street Bridge (B-05-134), Walnut Street Bridge (B-05-269) and Tayco Street Bridge (B-70-097):

- Six fuses of each kind and size installed.
- One limit switch or proximity switch of each type specified. In addition, a full set of contacts and contacts fingers for each type of limit switch. For rotary limit switches, furnish eight contact assemblies.
- A set of contacts and contact fingers for each unit or fractional unit of five or less of each kind or size installed, including contactors and starters. For units that do not incorporate replaceable contacts, furnish a complete unit with coil.
- One coil for every five or less of each size relay, contactor, and motor starter installed.
- One complete relay timer, time delay relay, contactor, and starter for each unit or fractional unit of five or less of each kind and size installed.
- Two heaters for overload relays of each size installed.
- For the motor and machinery brakes:
  - One spare thrustor of each size complete with heater and motor
  - Two limit switches for hand-release mechanism
  - Two limit switches - brake released
  - Two limit switches - brake set
  - Five liters of thrustor oil
- For the navigation lights:
  - One each color and type lens
  - Two each color and type LED lamp
  - Six lens gaskets
- For the PLC system:
  - One each of every type PLC input card and PLC output card
  - In addition, a quantity of 4 discrete input cards and 4 relay contact output cards
  - One PLC chassis power supply module
  - One control switch contact unit of each type installed
- For each drive provided:
  - Three incoming line fuses
  - Three control power fuses

- For the barrier gates:
  - One spare motor of each size
  - One spare transmission of each size
  - One spare gate arm of each size
  - Six spare lamp assemblies

Provide the following additional spare parts for Tayco Street Bridge (B-70-097):

- Two Air Conditioners with 10,000 BTU 115v Window Model with Remote:
  - Provide LG Electronics Model No. LW1012ER, GE Model No. AEL10AQ or Approved Equal
- Thirty Polycarbonate Structural Sheets:
  - Provide shatter resistant, extruded polycarbonate cellular sheet with minimum thickness of 5/8 inch. Provide sheet with UV-stabilized co-extruded outer layer and triple wall configuration with x-brace inner structure. Provide base material mass approximately 0.737 lb per square foot. Provide sheeting with a clear color. Provide PolyCarb 16RDC as manufactured by Gallina, USA, Polygal Titan as manufactured by Polygal Plastics Industries, Lexan Thermoclear as manufactured by General Electric Co., or an approved equal.
  - Provide sheeting classified as CC-1 for extent of burning per ASTM D-635 and having a smoke density rating no greater than 450 when tested according to ASTM E-84
  - Provide sheeting having a light transmission rating of approximately 80 percent
  - Provide extruded profiles and trim as recommended by the manufacturer to seal and neatly finish all edges
  - Provide sheeting 48” x 96” in size
  - Provide neoprene sealing washers having the following properties:
    - Min. tensile strength of 2500 psi
    - Elongation at rupture min. 350%
    - Max. compression 35%
    - Tear resistance min. 122 lbs/in
- Electric Incinerating Toilet:
  - Provide One Incinolet Model No. TR240, Ecojohn Model No. SR12 or Approved Equal

Provide the following additional spare parts for Walnut Street Bridge (B-05-269):

- Three Air Conditioners with 10,000 BTU 115v Window Model with Remote:
  - Provide LG Electronics Model No. LW1012ER, GE Model No. AEL10AQ or Approved Equal
- Inspections Tools:
  - Visual IR Thermometer:
    - Provide a Fluke VT02, Milwaukee M12 160x120 or Approved Equal
  - Digital Image Handheld Camera:
    - Provide a Milwaukee M-Spector 360 9ft Kit, Dewalt DCT410S1 with DCT4103 Extension or Approved Equal

- Side and Down Imaging Sonar (with mounting kits):
  - Provide a Humminbird 1198c SI Combo (with 1KW (8000 watt) tranducer AS 360SSI), Lowrance HDS-12 Gen2 Touch(with Insight USA, StructureScan HD, 50/200 kHz transducer and Structure Map View) or Approved Equal

Provide the following additional parts for Mason Street Bridge (B-05-134):

- Windows:
  - Provide Clear Anodized Aluminum Windows glazed with 1" grey reflective Low-E insulated glass
  - Provide 3½" - 4" Deep Frame
  - Include Insect Screen
  - Provide Eight 48" x 30" Double Hung Windows
  - Provide Six 68" x 72" Twin Double Hung Windows
  - Provide Two 68" x 122" (Total) Combination Windows. See the following for layout:
    - Double Hung
    - Stationary (48")
    - Double Hung
- Spare Drives:
  - Provide Two Allen-Bradley Flux vector drives, part number 20BD096A3NYNAED
- Warning Gate Assemblies:
  - Provide Eight Total Assemblies. See the following for characteristics:
    - 28' - 8" Length Aluminum/Fiberglass Arm, High Intensity Sheeting, 50 MPH rated
    - 11 or 13 Second Operating Time
    - Three 4" 12V LED Arm Lights, Flasher
    - 3/16" Hot Dipped Galvanized Steel Housing, Aluminum Finish
    - Removable Arm Shaft Assembly, AISI 4150 Arm and Connecting Rod Shafts
    - 8 Circuit Independently Adjustable Rotary Cam Limit Switch w/SS Cover
    - 1 HP Motor w/Disc Brake Assembly, Hand Crank Safety Switch
    - Double Reduction Transmission w/Iron Housing
    - Anchor Bolts and Template
    - F&R Access Doors w/Bronze Hinges, SS Pins, Pull-to-Override Interlock Safety Switches
    - Manual Disconnect Switch
    - Galvanized Steel Side Arm Channels
    - Adjustable Galvanized Steel Counterweights
    - Heater and Thermostat
    - Bumper Rod and Truss Cables/Brackets where required
    - Provide FedTransit Safety Systems Model ST-40 Traffic Warning Gate, B&B Roadway Model VW-4 Vertical Warning Gate or Approved Equal

- Navigation Lights:
  - Provide Twenty-Four 180 Degree Green over Red Glass Fresnel Lenses:
    - Cast Bronze Housing, Junction Box and Swivel with Stainless Steel Spindle
    - 100,000 hour rated, 120V LED Lamps
    - Weatherproof Neoprene Gaskets
    - Stainless Steel Retrieval Chain, Hanger Stem and Hardware
    - Provide B&B Roadway Model BS Bascule Span, FedTransit Safety Systems Model CCL Series 177mm Channel Lights or Approved Equal
  - Provide Twenty-Four 180 Degree Red Glass Fresnel Lenses:
    - Cast Bronze Housing and Junction Box
    - 100,000 hour rated, 120V LED Lamps
    - Weatherproof Neoprene Gaskets
    - Stainless Steel Hanger Stem
    - Provide B&B Roadway Model PL Pier Navigation Lights, FedTransit Safety Systems Model FL Series 177mm Pier/Fender Lights or Approved Equal
- Slip Resistant Metal Sidewalk Panels:
  - Provide Steel Plates made from A572 Gr50 Domestic Steel
  - Provide 5/16” Countersunk Hole Size
  - Provide a Tolerance: +0”/-1/8”, Squared
  - Provide Hot Dip Galvanized Finish
  - Provide Slip Resistant Coating to meet the following standards:
    - ASTM 1679, ASTM 1677, ANSI A1264.2, NFPA 1901, ADA A4.5 Ground and Floor Surfaces
  - Provide Sizes of Metal Plates as follows:
    - Ten 3/16” x 40-1/2” x 67” Steel plate with (6) countersunk holes
    - Ten 3/16” x 40-3/16” x 67” Steel plate with (6) countersunk holes
    - Ten 3/16” x 42” x 67” Steel plate with (6) countersunk holes
    - One 3/16” x 17” x 67” Steel plate with (3) countersunk holes
    - One 3/16” x 8” x 67” Steel plate with (3) countersunk holes

Arrange the spare parts in uniform size cartons of substantial construction, with typed and clearly varnished labels to indicate their contents, and store them where directed by the engineer. Provide large spare parts with moisture-proof wrapping. Provide a directory of permanent type, describing the spare parts. In the directory state the name of each part, the manufacturer's number thereof, and the rating of the device for which the part is a spare. When applicable, mark the spare parts to correspond with their respective item numbers as indicated on the elementary wiring diagram.

C Construction

C.1 Mason Street Bridge Electric Service

Re-use the existing auxiliary feeder on the east side of Mason Street. For the main service feeder on the west side the existing conductors shall be removed, the conduits cleaned with a ball and brush and then with a mandrel, and new conductors shall be drawn in.

C.2 Grounding

Bridge steel work on each side of the navigation channels shall be solidly bonded and grounded to 1 inch copper plated steel ground rods installed using No. 2/0 AWG bare, stranded, tinned copper cable.

The resistance to ground shall be no higher than 25 ohms. Provide exothermic welds, molded fusion, type as required, as manufactured by Cadweld, Thermoweld, Metalweld, or engineer approved equal.

Bond together and solidly connect to a ground bus in the machinery and/or electrical rooms grounding conductors in submarine cable, navigation lighting units, all metal framing, cases, and enclosures of the electrical equipment, such as motors, control console, control cabinets, conduits, submarine cable armor (stripped of its jacket prior to clamping), and all other metal parts in the proximity of current carrying conductors or equipment. Extend a No. 2/0 AWG bridge-grounding conductor connected to this ground bus to the service disconnect.

Ground new utility service neutral conductors in accordance to local utility grounding requirements.

Exothermically weld together the utility service neutral conductor, the bridge grounding conductor and two No. 2/0 AWG grounding electrode conductors.

Ground the submarine cable armor where applicable. The armor wires' individual jackets must be stripped before the submarine cables are clamped in order to provide an adequate connection to the conduit system.

Provide grounding system terminals that are solderless lugs and that are secured by means of hexagonal-head, copper plated, steel machine bolts with lock washers or lock nuts. Ground system conductors shall be continuous un-spliced connections between terminal lugs. Remove paint, rust, and scale over the contact area. Make up all connections as tightly as possible, and spot paint any bare metal or paint undercoat remaining exposed to restore the surface with the same coating and number of coats as applied to the adjacent metal.

Provide equipment ground conductors composed of seven-strand, soft-drawn, bare, tinned copper wire conforming to ASTM B33 and not smaller than No. 10 AWG.

C.3 Painting

C.3.1 General

The requirements for painting structural steel also apply to painting electrical equipment, unless otherwise specified.

C.3.2 Shop Painting

Electrical equipment such as conduits, boxes, supports, and other devices which have a galvanized finish and equipment such as motors, brakes, control console, and control

panel frames and enclosures which normally are given a factory finish need not be shop painted. Give all other electrical equipment one shop coat.

C.3.3 Field Painting

Electrical equipment, which is normally given a factory painted finish suitable to the engineer, need not be field painted. Give all other electrical equipment, such as conduits, boxes, device enclosures, supporting clips and brackets, and other devices, two field coats of paint as specified under the requirements for painting structural steel. Before applying the two field coats, clean galvanized surfaces free of all grease, oil, dirt, and foreign material and etch with copper sulfate solution, after which the solution shall be applied. In lieu of etching and a coat of shop paint, the contractor may use galvanizing primer as a first coat for galvanized surfaces. Apply a final field coat on electrical equipment in the operator house the color and type of paint to match the house interior.

C.4 PLC Programming and Sequence of Operation

It is the intent of these specifications that all three bridges, to the extent possible, be programmed similarly. Where possible, common sub routines and tag names shall be used. The following is a general sequence of operation based on the complete replacement system for Mason Street and the general requirements of AASHTO. During the shop drawing submittal process the operating sequence shall be further refined with input from the engineer and the department. The programming for Tayco and Walnut shall be modified as required based on the installed equipment.

Step 1: Turn oncoming traffic signals from green, through yellow, to red.

Step 2: Lower oncoming gates. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to lower, the operation shall stop and an alarm shall be sent to the HMI.

Step 3: Lower the pedestrian gate. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to lower, the operation shall stop and an alarm shall be sent to the HMI.

Step 4: Lower the off-going gates. If the off-going gates are down but proper indication is not given, the gate lowered bypass shall allow operations to continue and an alarm shall be sent to the HMI. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to lower, the operation shall stop and an alarm shall be sent to the HMI.

Step 5: Confirm that with all gates lowered the barrier gate latched limit switches are engaged. If they are not, the operation shall be stopped and an alarm sent to the HMI. The barrier (traffic) gate lowered bypass shall permit the operation to continue. The operation of the bypass switch shall cause an alarm to be sent to the HMI.

Step 6: Withdraw the span locks. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a lock takes longer than 30 seconds to withdraw, the operation shall stop and an alarm shall be sent to the HMI. If the span lock withdrawn limit switches fail to register, the span lock withdrawn bypass switch shall allow the operation to continue and an alarm shall be sent to the HMI.

Step 7: The drive/motor combination to be used shall be selected from the control desk. If there is a static drive fault, or a circuit breaker is not closed, the operation shall stop and an alarm shall be sent to the HMI. If any brake is hand released, the operation shall not continue and an alarm shall be sent to the HMI. One brake hand release per leaf shall be permitted to be bypassed using the brake hand release bypass and an alarm shall be sent to the HMI. Initiate span raise by momentarily turning the selector switch to raise. The drive shall smoothly ramp to 5% speed at 100% torque with the brakes still set. The system shall verify that the motor shafts are not turning. If the motor shafts turn, the operation shall stop and an alarm shall be sent to the HMI. If the shafts are not turning, the brakes shall release and the drives shall ramp the motors to 100% speed. If after 10 seconds the brakes do not release, the operation shall cease and an alarm shall be sent to the HMI.

Step 8: Once the leaf reaches the nearly open position (to be field determined), the drives shall ramp down to and remain at 5% speed until the span reaches fully open. The drive output torque shall be limited to 80%, the brakes shall set and then the drives shall shut down. An independent speed switch and rotary cam switch combination shall verify deceleration and shall emergency stop the span if deceleration does not occur. Should deceleration failure occur, an alarm shall be sent to the HMI. If the time to open the span exceeds 120 seconds, the operation shall stop and an alarm shall be sent to the HMI.

Step 9: The midspan navigation lights shall automatically change from red to green using the span position limit switches.

Step 10: Allow navigation traffic to clear.

Step 11: Initiate span lower by momentarily turning the selector switch to lower. The drive shall smoothly ramp to 5% speed at 100% torque with the brakes still set. The system shall verify that the motor shafts are not turning. If the motor shafts turn the operation shall stop and an alarm shall be sent to the HMI. If the shafts are not turning, the brakes shall release and the drives shall ramp the motors to 100% speed. If after 10 seconds the brakes do not release, the operation shall cease and an alarm shall be sent to the HMI.

Step 12: Once the leaf reaches the nearly closed position (to be field determined) the drives shall ramp down to and remain at 5% speed until the span seats. The drive output torque shall be limited to 80%, the brakes shall set and then the drives shall shut down. An independent speed switch and rotary cam switch combination shall verify

deceleration and shall emergency stop the span if deceleration does not occur. Should deceleration failure occur, an alarm shall be sent to the HMI. If the time to close the span exceeds 120 seconds, the operation shall stop and an alarm shall be sent to the HMI.

Step 13: Once the span is seated, the brakes are set, the drives shut off and the span locks driven. If the span is seated but the limit switches fail to provide proper indication, the span seated bypass switch shall be used to allow the locks to drive and an alarm shall be sent to the HMI. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a lock takes longer than 30 seconds to drive, the operation shall stop and an alarm shall be sent to the HMI. If the span lock driven limit switches fail to register, the span lock driven bypass switch shall allow the operation to continue and an alarm shall be sent to the HMI.

Step 14: Raise the off-going gates. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to raise, the operation shall stop and an alarm shall be sent to the HMI.

Step 15: Raise the on-coming gates. If the on-coming gates are raised but the proper indications are not given, the gate raised bypass switch shall allow the on-coming gates to raise and alarm shall be sent to the HMI. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to raise the operation shall stop and an alarm shall be sent to the HMI.

Step 16: Raise the pedestrian gate. If there is a circuit breaker fault, an overload, or a manual operation interlock fault, the operations shall stop and an alarm sent to the HMI. If a gate takes longer than 30 seconds to raise the operation shall stop and an alarm shall be sent to the HMI.

Step 17: Turn traffic signals to green.

Step 18: In general, any circuit breaker trip, any overload trip, any drive fault, any bypass switch, any overtime fault or any manual operation interlock fault shall send a fault to the HMI which shall display a message unique to that fault. The vendor shall submit a complete list of proposed fault messages for review and comment and additional messages shall be added as required. These messages shall be recorded in order with the time and date of the fault. Many operations can be bypassed; only one bypass switch can be enabled at any time, if more than one is enabled, the operation shall stop.

C.5 Manufacturer's Field Start-Up Service

Included with the furnishing of the major items of electrical equipment by the manufacturer is the furnishing of all necessary field supervisory start-up time by the manufacturer's Service Engineering Department to facilitate proper adjustment of the drive equipment so as to achieve satisfactory functioning of the drives.

The manufacturer's field service engineering personnel are required to be experienced in the adjustment and functioning of the particular control equipment furnished by the manufacturer. The personnel are required to be capable of locating and correcting faults or defects and of obtaining from the manufacturer, without delay, new parts or replacements for apparatus that, in the opinion of the engineer, does not perform satisfactorily.

C.6 Field Testing

C.6.1 General

Furnish all labor, materials, plant, and equipment and perform all work necessary, such as adjustments or corrective measures, to properly test all systems included in the initial and final acceptance field testing for the Mason, Walnut and Tayco Street Bridges.

All test results, parameters, data specified herein to be recorded shall be presented in legible, tabular format, listing associated parameters and conditions. For example, motor current shall reference speed (rpm), span height (feet-inches), raise or lower mode, normal or emergency drive control, drive control selector position number, etc. The results of the bridge electrical systems tests shall be presented in a matrix form on an Inspection Report Data Sheet. The proposed format of these sheets shall be submitted to the engineer for acceptance prior to the actual testing. Any parameter value, which falls beyond the recommended range, would require the readjustment or replacement of the defective device.

The table of the test results shall have references to the specific sections of the testing procedure. The precision of the results will depend on the accuracy of recording equipment, the observer and weather conditions. For each stage of testing of the bridge control equipment, the name of the person who will perform the test, instruments used with calibration data if required, the exact date, time and weather conditions shall be recorded.

Some devices such as the transfer switch, lamps, console indicator lights, brake function indicator lights, console controlled lighting, horn, etc. can be easily tested without performing any bridge opening operation.

The bridge main parameters shall also be observed and visually compared to the control desk indicating meters. Any discrepancy between results should be recorded. A discrepancy between critical measurements like span position and speed shall be resolved prior to continuing the tests.

The testing shall be accomplished sequentially, following the bridge operation instructions for normal operation and emergency operation, as established in the new approved Operating and Maintenance (O&M) Manuals. The major bridge systems shall be monitored while each bridge operates. All monitored parameters shall be kept for future reference, and a printout copy shall be attached to the O&M Manuals for reference. Another printout copy shall be provided to the engineer.

The testing of the bridge electrical equipment would necessitate the use of the following recording and testing devices:

- A computerized 16-bit, data acquisition system providing simultaneous sampling every 0.1 second of span position, motor input power, current, voltage, and motor RPM. Data shall stream to disk at a rate of 10 Hz. The data shall be transferred to graphing software.
- Portable tachometer
- Portable ohmmeter
- Amp-probe
- Recording ammeter
- Recording voltmeter
- Infrared scanner
- Measuring tape
- Stop watch (Timer)
- All other necessary instrumentation and tools to monitor, adjust and/or replace items during the bridge testing procedure.

All meters shall be calibrated per NIST guidelines within 6 months of the testing.

Arrange for and provide all the necessary field tests and provide a testing procedure subject to the approval of the engineer, to demonstrate that the entire electrical system is in proper working order and in accordance to the plans and specifications. The tests shall include, but not be limited to operational testing of traffic signals, warning gates, movable span, navigation lights and signals and manual transfer switch.

Should the tests show that any piece of equipment or cable or wiring connection, in the judgment of the engineer, is defective or functions improperly, such adjustments and/or replacements shall be made by the contractor as to make the installation satisfactory to the engineer and at no extra cost.

It may be found that minor deviations from the performance specification are required for optimum bridge operation. All hardware required for these modifications shall be included in the control system vendor scope of work at no additional cost to the department.

During the field testing period, arrange to have at the site representatives of the manufacturer of all major pieces of equipment or systems. The representatives shall be capable of supervising all adjustments to the equipment; of locating faults or defects and correcting them if possible; and of obtaining from the manufacturers, without delay, new parts or replacements for apparatus which, in the opinion of the engineer, does not perform satisfactorily.

C.6.2 Initial Field Testing

The initial field tests are intended to confirm that each major sub-component meets factory acceptance test criteria in its field installed condition and that each subsystem is operating properly as part of the completed system. Confirmation of correct operation of

sub-components will be demonstrated through successful operation of the particular component. However, the contractor is still responsible for the factory acceptance tests as required per contract specifications. Examples of subsystems are the span drive systems, control and power wiring, limit switches, starters, span lock system, etc.

The initial field testing is intended for the contractor to make the necessary adjustments and/or modifications such that the normal and emergency control and power systems are operational, trouble free, operating with all interlocks properly functioning, and in compliance with the requirements of the contract plans and specifications.

C.6.3 Final Acceptance Field Testing

C.6.3.1 General

The bridge acceptance testing is intended to show and/or demonstrate that the normal and emergency control and power systems are operational, trouble free, operating with all interlocks properly functioning, and in compliance with the requirements of the contract plans and specifications.

The final acceptance tests are not intended to substitute each sub-component acceptance factory and field tests. Confirmation of correct operation of sub-components shall be demonstrated through successful operation of the total control system. However, the contractor is still responsible for the factory and initial field tests as required per contract specifications. For example, it is not the intent to manually operate and test each limit switch during Final Acceptance Field Testing. This will have been accomplished by the contractor during Initial Field Testing. The contractor shall be able to prove that the results of the sub-component tests are in conformance with the contract plans and specifications. The recommended values of various device parameters can be found in the appropriate manufacturer's catalog cuts and instruction manuals. Correct operation of the sub-components, and control circuit wiring connections will be verified through the successful completion of the entire bridge control and power systems tests.

The Final Acceptance Field Testing procedure will evaluate performance and confirm correct and proper operation of all major subsystems and devices including the control desk meters and HMI, control switches and pushbuttons, traffic signals, warning gates, span locks, brakes, the span drives and motors, bypass switches, manual transfer switch, etc. The Final Acceptance Field Testing procedure shall demonstrate that the bridges can only be operated according to the “Sequence of Operation” as defined in the approved O&M Manuals. Visual inspections and physical measurements of some equipment are required for the purpose of recording valid parameter values. Bridge run printouts shall be provided for each test, and kept for the record together with all other recorded data.

The department must be in possession of the approved operating and maintenance (O&M) manuals at least thirty days before Final Acceptance Field Testing may begin. Start approval submissions of the O&M manuals as soon as possible, as several revisions may be required.

There shall be thirty consecutive days of nominal bridge operation using the new permanent systems, with a minimum of five successful openings per day, before scheduling of the Final Acceptance Field Testing.

Results and observations shall be carefully recorded throughout the various tests.

Prior to performance of these tests, all temporary PLC forces, bypasses, jumpers, switches, etc., installed during any previous testing must be removed. The control circuits shall be in the state presented in the originally As-Built control wiring diagrams (restored to normal).

All tests and verifications shall be for equipment at both the near and far sides. In addition to all devices listed below, all associated devices should also be tested.

C.6.3.2 PLC System

The bridge primary control system is provided by the PLC system, span drives and power distribution system. Prior to any other test, visually verify the wiring connection integrity of the major components including:

- All limit switches
- Control cabinets contactors
- Traffic signals, warning gates, interlocked heating and ventilating devices, etc.
- Control desk indicating lights
- Control Desk HMI screens

C.6.3.3 Control Desk

The control desk devices (HMI, switches, pilot lights,) will be used throughout the tests, and all irregularities observed shall be noted during and after the tests from the notes and printouts. Special attention shall be given to the desk meters accuracy verification.

Provide one desk multi-functional power monitor verification as follows:

- For a determined bridge span opening, at an exact start recording [Time stamp] time from the PLC log information shall be recorded.
- The PLC recorded values shall be filed. The results shall be compared and the meter accuracy estimated.

C.6.3.4 Air Horns

Test that the air horn produces a tone acceptable to the engineer.

C.6.3.5 Traffic Signals Control

Test that the traffic signals change state upon activation of the desk selector switch. The duration time of the amber light shall be of an acceptable time to the engineer. If necessary, the TSR timing relay shall be re-set to an acceptable time delay.

C.6.3.6 Barrier and Pedestrian Gate Control

Testing of the gates shall demonstrate the balance condition of the gate arms such that a stationary arm remains in the same position when the brake is released. Demonstrate

proper normal operation upon activation of the desk selector switches and sidewalk stations. Demonstrate proper manual operation.

Perform individual and group lower/raise commands and sequencing checks. Verify that the gates can only be lowered/raised in the proper sequence and the gongs activate/de-activate at the appropriate times.

Verify the gate interlocks are functioning properly by showing the following:

1. Gate operation is prevented when any of the following occur:
   - Gate housing door opened
   - Hand crank inserted
   - Gate motor disconnect switch opened
   - Gate motor overloaded
2. Gates cannot be lowered unless the traffic signals are red.
3. Gates cannot be raised unless the span is fully seated.
4. Gates cannot be raised unless the span locks are fully driven.

Verify that the bypass is functioning properly such that when the "Bypass Gate Interlocks" key switch is enabled, interlocks 3 and 4 listed above are overridden.

C.6.3.7 Span Locks Control

Perform pull/drive commands and sequence checks. Verify that the locks can only be pulled/ and driven in the proper sequence. Pull and drive locks using the control desk marked-up corresponding switches, and verify the locks are in the correct positions.

Verify the span lock interlocks are functioning properly by showing the following:

1. Span lock operation is prevented when any of the following occur:
   - Auxiliary cover removed and/or manual hand crank inserted
   - Span lock motor disconnect switch opened
   - Span lock motor overloaded
2. Span locks cannot be pulled unless the gates are lowered.
3. Span locks cannot be driven unless the span is fully seated.

Verify that the bypass is functioning properly such that when the "Bypass Span Locks Interlocks" key switch is enabled, interlocks 2 and 3 listed above are overridden.

C.6.3.8 Span Brakes Control

The normal automatic set and released operation of the brakes shall be visually recorded during the span raise and lower operations. Each brake shall be hand released, one at a time, and the hand-released indication on the control desk verified.

With the span in non-permissive operation mode (span locks driven, drives not energized), the brake set and release switches can be activated manually and their set/released indication monitored on the control desk.

C.6.3.9 Span Normal Operation

Several bridge openings will be required to demonstrate that all the operational parameters are acceptable and all interlocks and bypasses are functioning properly. Subsequent runs will be required to simulate failures and to test interlocking and bypass functions. The normal sequence of operation as described in the ”Sequence of Operation” section of the approved O&M Manuals shall be followed up to the indicated operational step of the equipment to be tested. All tests shall be performed for all span motors on all leafs.

Follow the full “Sequence of Operation”. During the span “Raise” and “Lower” operation, the following parameters shall be monitored and manually recorded:

- Span position [degrees]
- Motor power [kilowatt]
- 3-phase current [amperes]
- 3-phase voltage [volts]
- Motor speed [rpm]
- Manually record maximum height during the “Raise” [degrees]
- Manually record “Raise” and “Lower” times [seconds]

These parameters shall also be recorded at the fully closed, nearly closed, nearly open and fully open position as indicated at the control desk by PLC HMI.

Verify that the span operated normally within the permissible position limits.

Verify that the recorded position, the control desk indicated position and the limit switches indicated position are equal or within the set design tolerances.

Verify the span operation interlocks are functioning properly by showing the following:

1. The span cannot be operated if more than one brake in any machinery room has been manually released.
2. The span cannot be operated if the span locks are not pulled.

Verify that when the “Bypass Span Control Interlocks” switch is enabled, interlocks 1 and 2 listed above are overridden.

C.6.3.10 Emergency Span Stops

Under normal opening procedures, push the “Emergency Stop” red mushroom head button. Verify that all motor and brake contactors drop out and the span brakes set properly. For proper operation of the Mason Street Span Brakes, see that section of this special provision.

C.7 Bridge Operator

Provide persons to supervise the operation of the bridges and to train personnel for a period of thirty consecutive working days after the construction of the permanent control system has been completed, fine-tuned, field tested, and utilized for span operations. Instructors include, but are not limited to, representatives from manufacturers of the major equipment and a control engineer.

Provide operators who are skilled persons competent to operate the bridge and who are completely familiar with the operating equipment of the bridge and its auxiliaries, such as bridge security, the communications system, and fire alarm system. The operators are required to be able to make any adjustments required to the electrical and mechanical equipment.

During the 30-day period specified above, the operator(s) is required to be in attendance at the bridge for the normal working period of 8 hours per day.

Included in the 30-day training and instruction period, provide on-site training of electricians, maintenance workers, and other personnel as indicated by the department on subjects such as troubleshooting, repair of electronic motor controls, drive circuit logic, maintenance and adjustment of all electrical equipment, software, PLC hardware, and other items required for full bridge operation and maintenance. Devote three 8-hour sessions to hardware and maintenance related topics. In addition, devote three 8-hour sessions to software requirements. Offer instruction pertaining to hardware and maintenance on two separate occasions to allow bridge personnel to coordinate the course with their normal activities. Devote one 8-hour session to training on the fire, security, and communications systems and equipment. Furnish all necessary instruction sheets, student training aids, books, paper, and booklets to supplement training. Submit to the department, a minimum of two weeks prior to training session, an outline of topics to be covered and training material for review. It is the contractor's responsibility to coordinate with the department the location where training sessions will be held. Supplying of visual aid equipment and other miscellaneous items required for training shall be the responsibility of the contractor.

Make the instruction booklet that was specified above, “Operation and Maintenance Manual, Volume 1, Operation of Electrical Equipment”, available for use during the training period.

Training of the designated bridge operational personnel shall commence three weeks prior to the official bridge opening date. This will allow training of personnel without interruption of normal traffic flow.

D Measurement

The department will measure (Location) Bridge Electrical Work (Structure Number), acceptably completed, as a single complete lump sum unit of work by bridge location, acceptably completed.

E Payment

The department will pay for the measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.01	Mason Street Bridge Electrical Work, B-05-134	LS
SPV.0105.02	Walnut Street Bridge Electrical Work, B-05-269	LS
SPV.0105.03	Tayco Street Bridge Electrical Work, B-70-097	LS

Payment is full compensation for furnishing all labor, materials, operation and maintenance manuals, training and equipment necessary for completely installed, ready for operation, movable bridge electrical systems; and for furnishing all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

It is the intent and purpose of these special provisions to cover and include all apparatus and appliances to properly install, wire, connect, equip, test, adjust, and put into approved working order the respective portions of the electrical work herein specified. Furnish any incidental apparatus, appliance, material, or labor not herein specifically mentioned or included, but that the engineer deems necessary to comply with the requirements of the related documents and referenced standards or codes, just as if specifically mentioned in these specifications and without extra cost.

Submit to the engineer a detailed breakdown of the contractor's costs under these items within 30 days of award of the contract. This breakdown will be evaluated by the engineer and utilized as the basis for monthly progress payments for work satisfactorily completed. A minimum of ten-percent (10%) of the bid price for this item will be retained by the department until final acceptance of the bridge electrical system, the contractor and Control System vendor have completed all items on their punch-lists, and all aspects of bridge operation, operator and maintenance personnel testing, training, and control are complete. Five-percent (5%) of the bid price for this item will be retained until final approval of the operation and maintenance manuals is granted by the engineer.

24. Mason Street Bridge CCTV System, B-05-134, Item SPV.0105.04.

A Description

This special provision describes furnishing, installing, and placing in satisfactory operating condition the complete closed circuit television (CCTV) systems for permanent operation at the Mason Street Bridge as indicated on the plans, as indicated in these special provisions, and as required for complete pieces of work.

B Materials

B.1 Closed Circuit Television

Furnish and install a complete CCTV system including but not limited to five color cameras and one thermal camera, housings, cable, conduit, mounting hardware, software, wireless transmitters and receivers, power supply system, connectors, controllers, monitors and consoles, computer controlled network switchers, network storage managers, video encoders, video decoders, video console displays and keyboards,

equipment rack, and all necessary hardware to install a complete CCTV system as shown on the plans and described herein. Provide all labor and materials to install the CCTV system in the manner indicated or recommended by the manufacturer. All CCTV equipment shall be delivered with accessories, hangers, etc. all wired and assembled as indicated.

B.1.1 System Description

The IP video management system shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data.

B.1.2 Manufacturers

Manufacturer of the IP video management system shall be Pelco.

B.1.3 IP Video Management System

The IP video management system shall record video and audio streams from IP cameras and video encoders on the network.

The IP video management system shall incorporate the server functions and storage elements into a single, purpose-built chassis.

The IP video management system chassis shall be designed for video surveillance recording applications and encompass redundancy at all vital points:

- Redundant, hot swappable power supply modules
- Redundant, hot swappable system fans
- Hot swappable O/S drive
- Hot swappable rear chassis fans

The IP video management system chassis shall be designed for online service and maintenance and cannot be removed from the rack when hard disk drives, fans, power supplies, or operating system drives must be replaced.

The IP video management system shall offer an optional dual-path fiber channel card to support single and redundant connections to fiber channel-enabled external storage systems for increased retention times.

The IP video management system shall be built upon a reliable and robust Linux® operating system.

The IP video management system shall support a guaranteed recording throughput of 250 Mbps per storage device with a minimum of 64 Mbps of read throughput. This throughput shall be guaranteed under normal and error (RAID rebuild) conditions.

The IP video management system shall support the recording of MPEG-4 and H.264 baseline, main, and high profile streams from standard resolution and megapixel cameras.

The IP video management system shall support continuous, scheduled, alarm/event (including analytics alarms), motion, and manual recording. Pre- and post-alarm periods shall be configurable up to the total capacity of the system.

The IP video management system shall support bookmarking and locking/unlocking of video content on the drives.

The IP video management system shall support an intelligent video grooming protocol that can reduce the frame rate of recorded video as the video ages.

The IP video management system shall have the ability to report all diagnostic events, including software status diagnostics to a centralized user interface. In addition, Simple Network Management Protocol (SNMP) traps shall be available for monitoring through a third-party SNMP management console.

The IP video management system shall be fully managed from a remote workstation, including the ability to configure settings and update firmware and software.

The IP video management system shall be capable of interfacing with the APC® Smart-UPS® using a USB connector. The network storage manager shall receive status and control signals from the uninterruptible power supply (UPS) when it is in backup mode.

The IP video management system shall display live and recorded video on a separate personal computer with the supplied client installed.

The IP video management system client shall provide for full administrative capability of the unit from across a network.

The IP video management system client shall display MPEG-4, H.264 baseline, main, or high-profile streams.

The IP video management system client shall support Zone of Interest to allow zooming into a specific region of a camera's field of view while maintaining a full view of the scene.

The IP video management system client shall utilize an intelligent frame rate and resolution management capability that will automatically switch to a lower resolution, lower bit-rate stream based on monitor configuration to reduce CPU processing requirements and network bandwidth consumption.

The IP video management system client shall support searching for recorded video based on time/date, camera, event, or alarm. Instant playback shall also be supported. Playback and live video can be displayed simultaneously on the same monitor.

The IP video management system shall guarantee the evidentiary worth of video by digitally signing frames of video at the IP camera or encoder. Systems that only authenticate video at the point of export shall be prohibited.

The IP video management system shall meet or exceed the following design and performance specifications.

Power Specifications	
Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal, dual-redundant, hot-swappable
Cable Type	2 USA (117 VAC); or 2 European (220 VAC); or 2 UK (250 VAC); or 2 Argentinean (250 VAC); or 2 Australian (250 VAC); All, 3 prongs, molded connector
Power Consumption	
100 VAC	262 W, 2.65 A, 895 BTU/H
115 VAC	263 W, 2.31 A, 895 BTU/H
220 VAC	254 W, 1.25 A, 868 BTU/H
UPS	Compatible with APC Smart-UPS
Environmental Specifications	
Operating Temperature	50° to 95°F (10° to 35°C) at unit intake
Physical Specifications	
Construction	Steel cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish
System Specifications	
System Drive	Linux CompactFlash system drive
RAID Level	RAID 6 for storage drives
Effective Capacity	Up to 27.2 TB
Drive Interface	SAS/SATA II
Network Interface	2, 1 Gigabit Ethernet RJ-45 ports (1000Base-T)
Security	2 modes: secure mode and unsecured mode
Auxiliary Interfaces	
USB 2.0	2 USB 2.0 Ports on rear panel 1 USB 2.0 port on front panels

Front Panel Specifications

Power	Blue Pelco badge
Software Status	Green, amber, red (based on diagnostics)
Network Port 1 Speed	Green, amber, red
Network Port 2 Speed	Green, amber, red
Hardware Status	Green, amber, red
Hard Drive Status	Green, red
Power Button	On, off (soft), off (hard)

Pelco Model Numbers (Or Approved Equal)

Endura® System

B.1.4 Video Decoder/Encoder

The network video decoder shall be fully Endura® compatible.

The video decoder shall support any digital video stream on the network and allow for the decoding of up to 32 simultaneous streams from any video encoder or recorder. It shall also allow for simultaneous and independent viewing of both live and recorded video.

The video decoder shall decode MPEG-4 and H.264 baseline, main, and high profile encoded video streams.

The video decoder shall drive two high-resolution monitors through DVI connections for displaying the video footage.

The video decoder shall meet or exceed the following design and performance specifications.

Video Specifications

Maximum Resolution	2560 x 1600
Video Coding	MPEG-4, H.264 baseline, main, and high profiles
Video Display Modes	1 image, 4 images (2x2), 9 images (3x3), 16 images (4x4), 6 images (1 large + 5 small), 10 images (2 large + 8 small), 13 images (1 large + 8 small); High definition monitors can also display 6 images (3x2) and 12 images (4x3)
Decoding Performance	16X real-time MPEG-4 streams at 704 x 480/576; 12X real-time H.264 baseline profile streams at 704 x 480/576; 2X real-time H.264 baseline profile streams at 1080p
Video Outputs	2 DVI outputs (2 DVI-to-VGA adapters supplied)

Network Specifications

Interface	Gigabit Ethernet RJ-45 port (1000Base-T)

Certifications

CE, Class A; meets EN50130-4 standard requirements
FCC, Class A
UL/cUL listed
C-Tick
CCC

Pelco Model Numbers

Decoder: NET5402R Network Video Decoder

Teleste Model Numbers

Encoder: MPC-E1; Electrical Network Interface, 1 channel, RJ-45 connector
E1JD-FTRXXX-X-E1.

B.1.5 Network Storage Manager

The network storage manager shall record video and audio streams from IP cameras and video encoders on the network.

The network storage manager shall incorporate the server functions and storage elements in to a purpose-build chassis

The network storage manager shall use RAID 6 parity across the storage drives to protect recorded data against a hard disk drive failure.

The network storage manager chassis shall be designed for video surveillance recording applications and encompass redundancy at all vital points:

- Redundant, hot swappable power supply modules
- Redundant, hot swappable system fans
- Hot swappable O/S drive
- Hot swappable CPU fans

The network storage manager shall support a guaranteed recording throughput of 250 Mbps per storage device with a minimum of 64 Mbps or read throughput. This throughput shall be guaranteed under normal and error (RAID rebuild) conditions.

The network storage manager shall support the recording of MPEG-4 and H.264 baseline, and high profile streams from standard resolution and megapixel cameras.

Pelco Model Number: NSM5200

B.1.6 Workstation

The workstation shall be a high end personal computer with two DVI-I monitor outputs, USB keyboard, and mouse.

The workstation shall use a graphical user interface and keyboard/mouse that runs on 64-bit Microsoft Windows 7 Ultimate for monitoring live and recorded video, and virtual matrix functionality that shall allow operators to see and respond to any alarm from any device on the network as well as direct any camera to any monitor on the network.

The workstation shall support CCTV-style (joystick) keyboard control of Pan/Tilt/Zoom (PTZ) cameras and camera call-up.

The workstation shall detect the monitor's native resolution; provide users with single, 2 x 2, 3 x 3, 4 x 4, 1 + 5, 1 + 12, 2 + 8 displays for 4:3 aspect ratio monitors, and provide 3 x 2 and 4 x 3 displays for 16:9 aspect ratio monitors.

The workstation shall retain the camera's aspect ratio and allow mixing standard resolution and megapixel resolution cameras on the same display.

The workstation shall allow any combination of live or playback video on the same monitor at the same time. The workstation shall provide time-synchronized playback of up to 16 cameras simultaneously.

The workstation shall provide digital zoom capability for any camera in live or playback mode.

The workstation shall provide a Zone of Interest feature that can generate up to six independently controlled and zoomed images from a single image and allow operators to maintain a panoramic view of the scene while closely monitoring selected areas. This shall be accomplished without requiring additional network throughput.

The system shall be capable of customizing the display area to suit user preferences. All aspects of the graphical user interface shall be capable of being resized, torn-off and moved to other monitors, or simply hidden. The system shall allow up to 6 customizable workspaces to be created and loaded with camera groups to facilitate easy and efficient monitoring.

The workstation shall notify designated operators of all alarms on the system in an alarm tab. The workstation application shall support the functionality to view procedures and instructions for given alarms triggered to appear during alarm events, while generating detailed written or verbal instructions to the operator as to the actions to be taken. An operator shall have the capability of entering his or her own feedback to the given alarm. All user alarms and user actions shall be kept in the system log for audit purposes.

The workstation application shall provide the ability to control and program any camera equipped with PTZ. The workstation shall be capable of the following operations:

- Manually control the PTZ
- Set the pan/tilt home positions for manual or alarm activation
- Automatically control the cameras through an alarm trigger
- Ability to set multiple preset positions
- Ability to set multiple tours
- Remotely set and clear the movement limits of the pan/tilt mechanism from the control room, through a telemetry unit at an outdoor camera site
- Adjust the zoom lens
- Ability to control the camera menu and set up the camera through the IP video security system

The workstation shall meet or exceed the following design and performance specifications.

Hardware Specifications

Processor	Intel® Core 2 Quad Q9400
Internal Memory	4 GB RAM
Operating System	Windows 7 Ultimate, 64-bit version
User Interface	Graphical User Interface, WS5200 version 2.x, advanced system management software
Video System	Graphics card with 512 MB video RAM (nonshared memory), 2560 x 1600 display resolution, and DirectX® 10; true color (32-bit), 2 dual-link DVI outputs

Video Specifications

Video Output	2 DVI or VGA outputs (2 DVI-to-VGA supplied)
Video Decoding	MPEG-4 ASP; H.264 Baseline, Main, and High profile
Decoding Performance	16Xreal-time MPEG-4 streams at 704 x 480; 12X real-time H.264 Baseline profile streams at704 x 480; 4X H.264 Baseline profile streams at 720p; 2X real-time H.264 Baseline profile streams at1080p
Video Display Modes	1 image, 4 images (2 x 2), 9 images (3 x 3) 16 images (4 x 4), 6 images (1 large + 5 small), 10 images (2 large + 8 small), 13 images (1 large + 12 small); High definition monitors can also display 6 images (3 x 2) and 12 images (4 x 3)

Audio Specifications	
Audio Decoding	G.711 speech codec
Audio Bit Rate	64 kbps
Audio Input Level	Electret microphone
Audio Output Level	Up to 3 Vp-p, adjustable, min. load of 8 ohms
Audio Inputs	Microphone and line-in
Audio Outputs	Speaker or line out
PTZ Interface	On-screen
Network Specifications	
Interface	Gigabit Ethernet (GE) RJ-45 port, (1000Base-T)
Security	2 modes: secure mode and unsecured mode
Auxiliary Interfaces	
USB Ports	7 USB 2.0 ports (1 front, 6 rear)
Front Panel	
DVD±RW/CD-RW Drive	
CD read/write speed	24X
CD rewrite speed	24X
DVD read/write speed	8X
DVD rewrite speed	8X/6X (dual layer)
Power Specifications	
Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal
Power Consumption	Operating Maximum
100 VAC	160 W, 1.60 A, 547 BTU/H
115 VAC	160 W, 1.39 A, 547 BTU/H
220 VAC	160 W, 0.72 A, 547 BTU/H
Environmental Specifications	
Operating Temperature	50° to 95°F (10° to 35°C)
Storage Temperature	–40° to 149°F (–40° to 65°C)
Operating Humidity	20% to 80%, noncondensing
Max. Humidity Gradient	10% per hour
Operating Altitude	–50 to 10,000 feet (–15 to 3,048m)
Operating Vibration	0.25 G at 3 Hz to 200 Hz at a sweep rate of 0.5 octave/minute

Physical Specifications

Construction	Steel Cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish
Dimensions	17.0” Dx17.1” Wx3.5” H (43.20x43.40x8.90cm)
Mounting	Desktop (feet) or rack (2 RU per unit)
Unit Weight	28.80 lbs. (13.06kg)

Supplied Accessories

1 Pelco Keyboard, 1 Pelco Mouse, 1 Resource Disc, 1 Recovery Disc
Windows 7 Ultimate Disc with License
1 Rack Mount Kit (for mounting in 2 RU rack)
1 Power Cord

Certifications

CE, Class A
FCC, Class A
UL/cUL Listed
S-Mark for Argentina
CCC
C-Tick

Pelco Model Number (Or Approved Equal)

WS5070-Series, Workstation

B.1.7 Video Console Display

Furnish and install a video console in the control tower as shown on the plans.

The video console display shall decode and display IP streams from cameras and encoders across the network.

The video console display shall use EnduraView technology to automatically subscribe to a lower resolution, lower bit-rate secondary stream from the camera to reduce network bandwidth and CPU processing requirements as screen configurations dictate.

The video console display shall allow for simultaneous live and playback viewing of the same camera on the same monitor.

The video console display shall utilize a heads-up, icon-based menu structure coordinated with a CCTV-style keyboard, which shall allow operators to navigate through functionality without losing view of the scene.

The video console display shall support searching for video content through camera, time, date, or event.

The video console display shall support locking and unlocking archived video as well as exporting evidence-worthy clips and snapshots to a USB solid state device or CD/DVD ROM.

The video console display shall be built upon the Linux operating system.

The video console display shall meet or exceed the following design and performance specifications.

System Specifications	
Operating System	Linux®
User Interface	Icon-based, heads-up display
Video Specifications	
Video Standards	XVGA (2560 x 1600); 60 Hz capability for NTSC; 75 Hz capability for PAL
Video Coding	MPEG-4, H.264 baseline, main, or high profile
Video Outputs	2 DVI or VGA outputs (DVI-to-VGA supplied)
PTZ Control	
PTZ Interface	Through KBD5000
Network	
Interface	Gigabit Ethernet RJ-45 port (1000Base-T)
Auxiliary Interfaces	
USB Ports	7 USB 2.0 Ports (1 front, 6 rear)
Front Panel Functions	
DVD+/RW/CD-RW Drive	
CD Read/Write Speed	24X
CD Rewrite Speed	24X
DVD Read/Write Speed	8X
DVD Read/Write Speed	8X/6X (Dual layer)
Power Specifications	
Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal

Environmental Specifications

Operating Temperature	50° to 95°F (10° to 35°C)
Storage Temperature	–40° to 149°F (–40° to 65°C)
Operating Humidity	20% to 80%, noncondensing
Max. Humidity Gradient	10% per hour
Operating Altitude	–50 to 10,000 feet (–15 to 3,048m)
Operating Vibration	0.25 G at 3 Hz to 200 Hz at a sweep rate of 0.5 octave/minute

Physical Specifications

Construction	Steel Cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish
Dimensions	17.0” Dx17.1” Wx3.5” H (43.20x43.40x8.90cm)
Mounting	Desktop (feet) or rack (2 RU per unit)
Unit Weight	28.80 lbs. (13.06kg)

Certifications

CE, Class A
FCC, Class A
UL/cUL Listed
C-Tick
S-Mark for Argentina
CCC

Pelco Model Number (Or Approved Equal)

VCD5202 Video Console Display

B.1.8 Joystick Controller/Keyboard

The keyboard shall be compatible with all Endura® Series distributed, network video management components as well as DX® and DS® series DVRs and HVRs. One keyboard can control all system cameras through a video console display or DVR display.

The keyboard controls are located on three modules in the keyboard. Modules shall be capable of rotating to suit user preferences. The keyboard modules shall include a variable speed, vector-solving joystick for precise PTZ control, jog/shuttle for playback control and pattern control, a keypad for camera and monitor control, and a built-in speaker. The keyboard shall have LED buttons that work in conjunction with the feature being used.

Keyboard Base Specifications

Keyboard Interface	USB 2.0
Cable	USB, captive, 16.4 feet (5.0 m)
Input Voltage	12 VDC
Upstream Port	USB 2.0 (USB type B connector)
Downstream Port	2x USB 2.0 hi/full/low speed (USB type A connector)
Audio Output	Embedded speaker or plug-in headset, 0.5 W into 8-ohm load per channel
Audio Input	Plug-in microphone, mono (30 to 350mVp-p); or line input, stereo (0.35 to 2.0 Vp-p)

Keyboard Module Specifications

Keyboard Keypad	0-9, camera, monitor, and multiple view keys
Joystick	Fully proportional PTZ, variable speed; with zoom, iris, and focus controls
Jog/Shuttle	Proportional, fast forward, reverse, and video transport; menu navigation on VCD5000 video console display
Module Connectors	Three (one for each module), USB 1.1 mini-USB

B.1.9 Outdoor Camera Dome Positioning System

The outdoor camera dome system shall provide a 100Base-TX network interface for live streaming to a standard Web browser.

The outdoor camera dome system shall be a discreet camera dome system consisting of a dome drive with a variable speed/high speed pan/tilt drive unit with continuous 360° rotation; 1/4-inch high resolution color, monochrome, or color/black-white CCD camera; motorized zoom lens with optical and digital zoom; auto focus; and an enclosure consisting of a back box, lower dome, and a quick-install mounting.

The outdoor network positioning camera shall support standard IT protocols.

The outdoor network positioning camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming.

The network camera shall provide an additional processor for running Pelco Video analytics.

Pelco Analytic Suites shall allow remote operation and alarm notification when used with an Endura system.

The outdoor fixed dome system shall meet or exceed the following design and performance specifications.

Camera Specifications

Sensor Type	1/3-inch, CCD
Optical Zoom	18X
Maximum Resolution	1280 x 960
Lens	f/1.6 (focal length, 4.7~84.6 mm optical)
Aspect Ratios	4:3 or 16:9
Light Sensitivity	f/1.6; 2,850ºK; SNR >24dB
Color (33 ms)	0.70 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.25 lux
Mono (250 ms)	0.02 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace Curves	850 nm and 950 nm
Wide Dynamic Range	60dB
Iris Control	Auto iris with manual override
Backlight Compensation	Yes

Video Specifications

Compression	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 24, 15, 12.5, 12, 10, 8, 7.5, 6, 5, 4, 3, 2.5, 1 (depending upon coding, resolution, and stream configuration)
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, SNMPv2c/v3, QoS, HTTP, HTTP, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)

Electrical Specifications

Ports	RJ-45 for 100Base-TX; Auto MDI/MDI-X; auto negotiate/manual setting
Cabling Type	Cat5 cable or better for 100Base-TX
Input Voltage	18 to 32 VAC; 24 VAC nominal 22 to 27 VDC; 24 VDC nominal
Input Power	
24 VAC	23 VA nominal (without heater); 73 VA nominal (with heater)
24 VDC	0.7 A nominal (without heater); 3 A nominal (with heater)
PoE	IEEE802.3af (without heater)
Fuse	1.25 A

Dome Drive Specifications

Pan Speed	Variable between 400 per second continuous pan to 0.1º per second
Vertical Tilt	Unobstructed tilt of +0º to –90º
Manual Control Speed	Pan speed of 0.1º to 80º per second and pan at 150º per second in turbo mode; tilt operation shall range from 0.1º to 40º per second
Automatic Preset Speed	Pan speed of 400º and a tilt speed of 160º per second
Presets	255 positions with 16 preset tours
Preset Accuracy	± 0.1º
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	8, four-sided user-defined shapes, each side with different lengths; window blanking setting to turn off at user-defined zoom ratio; window blanking set to opaque gray or translucent smear; blank all video above user defined tilt angle; blank all video below user-defined tilt angle
Auto Flip	Rotates dome 180º at bottom of tilt travel
Dome Drive Compatibility	All dome drives are compatible with all back box configurations
Power Consumption	Nominal 23 VA (without heater running) Nominal 73 VA (with heater running)

Dome System Specifications

Diameter of Bubble	Maximum of 5.9 inches (15.0 cm)
Pendant, Environmental	10.6-inch (26.9 cm) overall length (including dome) by 8.6-inch (21.8 cm) diameter
Pendant, Standard	Pendant 10.6-inch (26.9 cm) overall length (including dome) by 8.6-inch (21.8 cm) diameter

Certifications and Ratings

CE, Class A
FCC, Class A
UL/cUL Listed
C-Tick
Meets NEMA Type 4X and IP66 standards when installed properly

Pelco Model Numbers (Or Approved Equal)

The discreet camera dome system shall be the Pelco Spectra® 4

B.1.10 Dome Mount

The dome mount shall consist of a medium duty mount designed specifically for mounting the Spectra® Series, DF5 Series, and DF8 Series pendant domes to a wall, pole, or roof top parapet along with any accessories that may be required for a complete dome mount.

The dome mount shall meet or exceed the following design and performance specifications:

- The mount shall be capable of supporting up to 75 lbs.
- The mount shall be versatile in that it may be mounted directly to a wall or adapted to a parapet, corner or pole when used with the proper optional adapter.
- The mount shall not be supplied with a pipe for dome mounting.
- The mount shall be constructed of cast aluminum and finished in gray or black polyester powder coat.
- The mount shall feature an integral 120/230VAC to 24VAC, 50/60 Hz, 100va transformer to power all environmental and dome functions.
- The transformer shall feature selectable input power via a slide switch.
- The mount shall be designed with a front access cover plate for the transformer.
- The transformer shall be fused with one, 1.6A, 120VAC fast acting fuse and one, 500mA, 230VAC fast acting fuse.
- The mount shall be capable of cable access either through the arm from openings in the mounting plate or .75” conduit fittings may be drilled on either side of the mount. Drill starts (dimples) shall be designed into the mount, one on either side for conduit hole location.
- The mount shall be designed with cable feed-through.
- The mount shall be mounted to a solid surface via four 3/8” fasteners suitable for the mounting surface.

The dome mount shall be provided with a manufacturer's warranty covering repair or replacement of defective parts for a period of one year from the date of shipment.

The dome mount shall be the Pelco IWM24-BK or IWM24-GY, and the optional adapters shall be the Pelco PP4348 or PP400 parapet mount, the Pelco PA402 pole mount or the Pelco CM400 corner mount or approved equal.

B.1.11 Ethernet Media Converter

The Ethernet media converter shall provide one 10BASE-TX port and one 100BASE-FX fiber port; the fiber port shall accept two fibers.

The Ethernet media converter shall be designed for point-to-point applications.

The Ethernet media converter shall provide user-selectable networking functions for each 10BASE-T/100BASE-TX port: autonegotiation between 10 Mbps and 100 Mbps data rates and between full-duplex and half-duplex modes; 10 Mbps or 100 Mbps data rate, selectable, full-duplex or half-duplex mode, selectable; and the enabling/disabling of flor control.

The Ethernet media converter shall support auto MDI/MDI-X (medium dependent interface/medium dependent interface crossover) operation.

The Ethernet media converter shall have a stand-alone and rack-mountable modular design.

The Ethernet media converter shall meet or exceed the following design and performance specifications:

Performance Specifications

Switch type	Unmanaged Layer 2
Switch Method	Store and forward
Data Rate	10/100 Mbps
Compliance	IEEE 802.3, 802.3u, 802.3x
Interface	Auto MDI/MDI-X
Operating Mode	Half-duplex or full-duplex
Address Table Size	1,024 MAC address entries with automatic learning and aging
Quality of Service	IEEE 802.1p priority, tag-based, 4 queues per Port, weighted fair queuing scheduling
Medium Frame Size	Untagged Ethernet frames up to 1,518 bytes Tagged Ethernet frames up to 1,522 bytes

Pelco Model Number: FX82011MSTR-2; Ethernet media converter, one 10BASE-T/100BASE-TX port, one multimode ST fiber port.

B.1.12 Unmanaged Ethernet Switch

The unmanaged Ethernet switch shall provide one 10BASE-T/100BASE-TX port and two 100BASE-FX fiber ports for the transport of bidirectional Ethernet data.

The unmanaged Ethernet switch shall support wavelength division multiplexing (WDM), which allows bidirectional data to be transported in a single fiber.

The unmanaged Ethernet switch shall be designed for point-to-point applications with optional fiber redundancy and for drop-and-repeat applications.

The unmanaged Ethernet switch shall provide user-selectable networking functions for each 10BASE-T/100BASE-TX port: autonegotiation between 10 Mbps and 100 Mbps data rated and between full-duplex and half-duplex modes; 10Mbps and 100 Mbps data rate, selectable: full-duplex or half-duplex mode, selectable, and the enabling/disabling of flow control.

The unmanaged Ethernet switch shall support auto MDI/MDI-X (medium dependent interface/medium dependent interface crossover) operation.

The unmanaged Ethernet switch shall have a stand-alone and rack-mountable modular design.

Pelco Model Number:

FX82012MSTR-2; Unmanaged Ethernet switch, one 10BASE-T/100BASE-TX port, two multimode SC fiber ports, one fiber per port.

B.1.13 Rack Mounts

The digital fiber transmitter or receiver rack shall hold up to 14 channels for mounting of single-width fiber transmitters or receivers in an EIA-standard 19-inch rack. The rack unit shall provide an electrical buss bar for plug-in connection of power, required for the operation of the fiber optic transmitters or receivers.

The digital fiber transmitter or receiver rack shall meet or exceed the following design and performance specifications:

Electrical Specifications

Input voltage	90 to 264VAC at 70W maximum
Output voltage	9 VDC +/-5% at 6.5A at 75°C
Fuse Rating	1.25A slow blow (rack power supply)
Power Connector	2-pin
Power Indicator	Red LED
AC Line Cord	Detachable, IEC-connected
MTBF	>100,000 hours

Mechanical Specifications

Construction	Aluminum
Dimensions	19.0”D x 7.5”W x 6.9”H

Pelco Model Number:

EURACK/US RACK; Rack-mount chassis for up to 14 fiber optic modules (EU and US power cords)

B.1.14 Flat Panel, LCD Monitor

Furnish eight flat panel LCD monitors. Install six of the eight monitors in the control tower as shown on the plans. The two remaining monitors will serve as spares.

The flat panel LCD monitors shall have performance-enhancing features such as VGA and DVI (digital visual interface) inputs, PIP (picture-in-picture), looping BNC output, HD resolution.

The flat panel LCD monitors shall provide a front panel that allows the user to adjust image quality, brightness, size, position, and geometry for optimal viewing.

Pelco Model Numbers: PMCL419-19 inch monitor

B.1.15 Uninterruptible Power Supply

One uninterruptible power supply (UPS) shall be provided to sustain the operation on the IP video management system in the main command center. The UPS shall be provided to sustain the operation of all equipment located in the main command center for a period of twenty (20) minutes.

The UPS shall provide continuous, no-break power during complete or momentary loss of supply power.

In the normal operating mode, the UPS shall condition line power protecting against environmental conditions, power surge, power sag, under-voltage, over-voltage, line noise, frequency (variation of the waveform), transients and harmonic distortion.

An external bypass switch shall be provided to allow the UPS to be removed from the incoming power line for service.

B.1.16 Training

Provide for a 1-day course of the Endura® System for the Administrator. Course shall be for end user’s involved in the implementation, support, or day-to-day operations of the Endura® system. Course shall be taught on-site. The course shall be Pelco-Certified Field Training.

C Construction

C.1 Closed Circuit Television

Provide and install a complete CCTV system including but not limited to five color cameras and one thermal camera, cable, conduit, mounting hardware, software, and all necessary hardware to install a complete CCTV system as shown on the plans and described herein. The new CCTV monitors and camera controls shall be installed on the operator's level of the Mason Street Bridge control house as shown on the drawings. Video and data transmissions shall be by a wireless system.

Furnish seven color cameras and two thermal cameras. Install five of the seven color cameras and one of the two thermal cameras on the Mason Street Bridge as shown on the plans. The two remaining color cameras and one remaining thermal camera will serve as spares. Cameras shall be as follows:

Camera #1 shall be located on the East end of the bridge and mounted on the existing sign bridge. The camera will be used to verify traffic on the roadway and people on the sidewalk. The camera shall be provided with a transmitter for wireless transmission. Camera #1 shall be a Pan Tilt Zoom camera with a smoked dome. The camera image will be displayed on the monitors in the Mason Street Bridge control house.

Camera #2 shall be located under the bridge on the North side and mounted on the support structure of the bridge. The camera will be used to verify boat traffic and that a vessel has cleared the bridge before the bridge can be lowered. The camera shall be provided with a transmitter for wireless transmission. Camera #2 shall be a Pan Tilt Zoom camera with a smoked dome. Provide a wall mount support for the camera. The camera image will be displayed on the monitors in the Mason Street Bridge control house.

Camera #3 shall be located on the West end of the bridge and mounted on the existing traffic signal pole. The camera will be used to verify traffic on the roadway and people on the sidewalk. The camera shall be provided with a transmitter for wireless transmission. Camera #3 shall be a thermal imaging camera. The camera image will be displayed on the monitors in the Mason Street Bridge control house.

Camera #4 shall be located on the West end of the bridge and mounted on the existing sign bridge. The camera will be used to verify boat traffic approaching the bridge. The camera shall be provided with a transmitter for wireless transmission. Camera #4 shall be a Pan Tilt Zoom camera with a smoked dome. The camera image shall be displayed on the monitors in the Mason Street Bridge control house.

Cameras #5 and #6 shall be located on the West end of the bridge and mounted on the existing sign bridge. The camera will be used to verify traffic on the roadway and people on the sidewalk. The camera shall be provided with a transmitter for wireless transmission. Camera #5 shall be a Pan Tilt Zoom camera with a smoked dome. Provide straps for mounting the camera on the existing sign bridge. The camera image will be displayed on the monitors in the Mason Street Bridge control house.

The color cameras shall be Pelco Spectra IV IP Series Network Dome system H.264, Digital, Pan/Tilt/Zoom High-speed dome. The camera dome system shall be a discreet camera dome system consisting of a dome drive with a variable speed/high speed pan/tilt drive unit with continuous 360° rotation; ¼- inch high resolution color, monochrome, or color/black-white CCD camera; motorized zoom lens with optical and digital zoom, auto focus, and an enclosure consisting of a back box, lower dome, and a quick-install mounting.

The thermal cameras shall be Pelco Sarix TI Series thermal IP cameras. The cameras shall be IP and analog thermal cameras with an integrated fixed enclosure. Enclosure shall meet NEMA type 4X and IP66 standards and be provided with a sun shroud and heater/defroster.

C.2 Rack

Furnish and install a rack in the Mason Street tower on the entrance floor level. The rack shall be used to house the digital video recorder, network video processor, network switch, indoor power supply and the wireless networking processor.

C.3 Control Equipment

- Furnish and install the Pelco Endura® control system for the CCTV system in the rack.
- Furnish and install the Encom wireless data system in the rack.
- Furnish and install the Network switching in the rack.
- Furnish and install all connections for a complete working system.
- Furnish and install all components for power connection to each camera. Cameras require 24 Volt power.

D Measurement

The department will measure Mason Street Bridge CCTV System, B-05-134, acceptably completed, as a single lump sum unit of work.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.04	Mason Street Bridge CCTV System, B-05-134	LS

Payment is full compensation for the complete installation of the Mason Street Bridge CCTV system and for furnishing all labor, tools, equipment, materials and incidentals necessary to complete the work.

25. Walnut Street Bridge CCTV System, B-05-269, Item SPV.0105.05.

A Description

This special provision describes furnishing, installing, and placing in satisfactory operating condition the complete closed circuit television (CCTV) systems for permanent operation at the Walnut Street Bridge as indicated on the plans, as indicated in these special provisions, and as required for complete pieces of work.

B Materials

B.1 Closed Circuit Television

Furnish and install a complete CCTV system including but not limited to five color cameras and one thermal camera, housings, cable, conduit, mounting hardware, software, wireless transmitters and receivers, power supply system, connectors, controllers, monitors and consoles, computer controlled network switchers, network storage managers, video encoders, video decoders, video console displays and keyboards, equipment rack, and all necessary hardware to install a complete CCTV system as shown on the plans and described herein. Provide all labor and materials to install the CCTV system in the manner indicated or recommended by the manufacturer. All CCTV equipment shall be delivered with accessories, hangers, etc. all wired and assembled as indicated.

B.1.1 System Description

The IP video management system shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data.

B.1.2 Manufacturers

Manufacturer of the IP video management system shall be Pelco.

B.1.3 IP Video Management System

The IP video management system shall record video and audio streams from IP cameras and video encoders on the network.

The IP video management system shall incorporate the server functions and storage elements into a single, purpose-built chassis.

The IP video management system chassis shall be designed for video surveillance recording applications and encompass redundancy at all vital points:

- Redundant, hot swappable power supply modules
- Redundant, hot swappable system fans
- Hot swappable O/S drive
- Hot swappable rear chassis fans

The IP video management system chassis shall be designed for online service and maintenance and cannot be removed from the rack when hard disk drives, fans, power supplies, or operating system drives must be replaced.

The IP video management system shall offer an optional dual-path fiber channel card to support single and redundant connections to fiber channel-enabled external storage systems for increased retention times.

The IP video management system shall be built upon a reliable and robust Linux® operating system.

The IP video management system shall support a guaranteed recording throughput of 250 Mbps per storage device with a minimum of 64 Mbps of read throughput. This throughput shall be guaranteed under normal and error (RAID rebuild) conditions.

The IP video management system shall support the recording of MPEG-4 and H.264 baseline, main, and high profile streams from standard resolution and megapixel cameras.

The IP video management system shall support continuous, scheduled, alarm/event (including analytics alarms), motion, and manual recording. Pre- and post-alarm periods shall be configurable up to the total capacity of the system.

The IP video management system shall support bookmarking and locking/unlocking of video content on the drives.

The IP video management system shall support an intelligent video grooming protocol that can reduce the frame rate of recorded video as the video ages.

The IP video management system shall have the ability to report all diagnostic events, including software status diagnostics to a centralized user interface. In addition, Simple Network Management Protocol (SNMP) traps shall be available for monitoring through a third-party SNMP management console.

The IP video management system shall be fully managed from a remote workstation, including the ability to configure settings and update firmware and software.

The IP video management system shall be capable of interfacing with the APC® Smart-UPS® using a USB connector. The network storage manager shall receive status and control signals from the uninterruptible power supply (UPS) when it is in backup mode.

The IP video management system shall display live and recorded video on a separate personal computer with the supplied client installed.

The IP video management system client shall provide for full administrative capability of the unit from across a network.

The IP video management system client shall display MPEG-4, H.264 baseline, main, or high-profile streams.

The IP video management system client shall support Zone of Interest to allow zooming into a specific region of a camera's field of view while maintaining a full view of the scene.

The IP video management system client shall utilize an intelligent frame rate and resolution management capability that will automatically switch to a lower resolution, lower bit-rate stream based on monitor configuration to reduce CPU processing requirements and network bandwidth consumption.

The IP video management system client shall support searching for recorded video based on time/date, camera, event, or alarm. Instant playback shall also be supported. Playback and live video can be displayed simultaneously on the same monitor.

The IP video management system shall guarantee the evidentiary worth of video by digitally signing frames of video at the IP camera or encoder. Systems that only authenticate video at the point of export shall be prohibited.

The IP video management system shall meet or exceed the following design and performance specifications.

Power Specifications	
Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal, dual-redundant, hot-swappable
Cable	Type2 USA (117 VAC); or 2 European (220 VAC); or 2 UK (250 VAC); or 2 Argentinean (250 VAC); or 2 Australian (250 VAC); All, 3 prongs, molded connector
Power Consumption	
100 VAC	262 W, 2.65 A, 895 BTU/H
115 VAC	263 W, 2.31 A, 895 BTU/H
220 VAC	254 W, 1.25 A, 868 BTU/H
UPS	Compatible with APC Smart-UPS
Environmental Specifications	
Operating Temperature	50° to 95°F (10° to 35°C) at unit intake
Physical Specifications	
Construction	Steel cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish

System Specifications

System Drive	Linux CompactFlash system drive
RAID Level	RAID 6 for storage drives
Effective Capacity	Up to 27.2 TB
Drive Interface	SAS/SATA II
Network Interface	2, 1 Gigabit Ethernet RJ-45 ports (1000Base-T)
Security	2 modes: secure mode and unsecured mode

Auxiliary Interfaces

USB 2.0	2 USB 2.0 Ports on rear panel 1 USB 2.0 port on front panels

Front Panel Specifications

Power	Blue Pelco badge
Software Status	Green, amber, red (based on diagnostics)
Network Port 1 Speed	Green, amber, red
Network Port 2 Speed	Green, amber, red
Hardware Status	Green, amber, red
Hard Drive Status	Green, red
Power Button	On, off (soft), off (hard)

Pelco Model Numbers (Or Approved Equal)

Endura® system

B.1.4 Video Decoder/Encoder

The network video decoder shall be fully Endura® compatible.

The video decoder shall support any digital video stream on the network and allow for the decoding of up to 32 simultaneous streams from any video encoder or recorder. It shall also allow for simultaneous and independent viewing of both live and recorded video.

The video decoder shall decode MPEG-4 and H.264 baseline, main, and high profile encoded video streams.

The video decoder shall drive two high-resolution monitors through DVI connections for displaying the video footage.

The video decoder shall meet or exceed the following design and performance specifications.

Video Specifications

Maximum Resolution	2560 x 1600
Video Coding	MPEG-4, H.264 baseline, main, and high profiles
Video Display Modes	1 image, 4 images (2x2), 9 images (3x3), 16 images (4x4), 6 images (1 large + 5 small), 10 images (2 large + 8 small), 13 images (1 large + 8 small); High definition monitors can also display 6 images (3x2) and 12 images (4x3)
Decoding Performance	16X real-time MPEG-4 streams at 704 x 480/576; 12X real-time H.264 baseline profile streams at 704 x 480/576; 2X real-time H.264 baseline profile streams at 1080p
Video Outputs	2 DVI outputs (2 DVI-to-VGA adapters supplied)

Network Specifications

Interface	Gigabit Ethernet RJ-45 port (1000Base-T)

Certifications

CE, Class A; meets EN50130-4 standard requirements
FCC, Class A
UL/cUL listed
C-Tick
CCC

Pelco Model Numbers
Decoder: NET5402R Network Video Decoder

Teleste Model Numbers

Encoder: MPC-E1; Electrical Network Interface, 1 channel, RJ-45 connector
E1JD-FTRXXX-X-E1.

B.1.5 Network Storage Manager

The network storage manager shall record video and audio streams from IP cameras and video encoders on the network.

The network storage manager shall incorporate the server functions and storage elements in to a purpose-build chassis

The network storage manager shall use RAID 6 parity across the storage drives to protect recorded data against a hard disk drive failure.

The network storage manager chassis shall be designed for video surveillance recording applications and encompass redundancy at all vital points:

- Redundant, hot swappable power supply modules
- Redundant, hot swappable system fans
- Hot swappable O/S drive
- Hot swappable CPU fans

The network storage manager shall support a guaranteed recording throughput of 250 Mbps per storage device with a minimum of 64 Mbps or read throughput. This throughput shall be guaranteed under normal and error (RAID rebuild) conditions.

The network storage manager shall support the recording of MPEG-4 and H.264 baseline, and high profile streams from standard resolution and megapixel cameras.

Pelco Model Number: NSM5200

B.1.6 Workstation

The workstation shall be a high end personal computer with two DVI-I monitor outputs, USB keyboard, and mouse.

The workstation shall use a graphical user interface and keyboard/mouse that runs on 64-bit Microsoft Windows 7 Ultimate for monitoring live and recorded video, and virtual matrix functionality that shall allow operators to see and respond to any alarm from any device on the network as well as direct any camera to any monitor on the network.

The workstation shall support CCTV-style (joystick) keyboard control of Pan/Tilt/Zoom (PTZ) cameras and camera call-up.

The workstation shall detect the monitor's native resolution; provide users with single, 2 x 2, 3 x 3, 4 x 4, 1 + 5, 1 + 12, 2 + 8 displays for 4:3 aspect ratio monitors, and provide 3 x 2 and 4 x 3 displays for 16:9 aspect ratio monitors.

The workstation shall retain the camera's aspect ratio and allow mixing standard resolution and megapixel resolution cameras on the same display.

The workstation shall allow any combination of live or playback video on the same monitor at the same time. The workstation shall provide time-synchronized playback of up to 16 cameras simultaneously.

The workstation shall provide digital zoom capability for any camera in live or playback mode.

The workstation shall provide a Zone of Interest feature that can generate up to six independently controlled and zoomed images from a single image and allow operators to maintain a panoramic view of the scene while closely monitoring selected areas. This shall be accomplished without requiring additional network throughput.

The system shall be capable of customizing the display area to suit user preferences. All aspects of the graphical user interface shall be capable of being resized, torn-off and moved to other monitors, or simply hidden. The system shall allow up to 6 customizable workspaces to be created and loaded with camera groups to facilitate easy and efficient monitoring.

The workstation shall notify designated operators of all alarms on the system in an alarm tab. The workstation application shall support the functionality to view procedures and instructions for given alarms triggered to appear during alarm events, while generating detailed written or verbal instructions to the operator as to the actions to be taken. An operator shall have the capability of entering his or her own feedback to the given alarm. All user alarms and user actions shall be kept in the system log for audit purposes.

The workstation application shall provide the ability to control and program any camera equipped with PTZ. The workstation shall be capable of the following operations:

- Manually control the PTZ
- Set the pan/tilt home positions for manual or alarm activation
- Automatically control the cameras through an alarm trigger
- Ability to set multiple preset positions
- Ability to set multiple tours
- Remotely set and clear the movement limits of the pan/tilt mechanism from the control room, through a telemetry unit at an outdoor camera site
- Adjust the zoom lens
- Ability to control the camera menu and set up the camera through the IP video security system

The workstation shall meet or exceed the following design and performance specifications.

Hardware Specifications

Processor	Intel® Core 2 Quad Q9400
Internal Memory	4 GB RAM
Operating System	Windows 7 Ultimate, 64-bit version
User Interface	Graphical User Interface, WS5200 version 2.x, advanced system management software
Video System	Graphics card with 512 MB video RAM (nonshared memory), 2560 x 1600 display resolution, and DirectX® 10; true color (32-bit), 2 dual-link DVI outputs

Video Specifications	
Video Output	2 DVI or VGA outputs (2 DVI-to-VGA supplied)
Video Decoding	MPEG-4 ASP; H.264 Baseline, Main, and High profile
Decoding Performance	16Xreal-time MPEG-4 streams at 704 x 480; 12X real-time H.264 Baseline profile streams at704 x 480; 4X H.264 Baseline profile streams at 720p; 2X real-time H.264 Baseline profile streams at1080p
Video Display Modes	1 image, 4 images (2 x 2), 9 images (3 x 3) 16 images (4 x 4), 6 images (1 large + 5 small), 10 images (2 large + 8 small), 13 images (1 large + 12 small); High definition monitors can also display 6 images (3 x 2) and 12 images (4 x 3)
Audio Specifications	
Audio Decoding	G.711 speech codec
Audio Bit Rate	64 kbps
Audio Input Level	Electret microphone
Audio Output Level	Up to 3 Vp-p, adjustable, min. load of 8 ohms
Audio Inputs	Microphone and line-in
Audio Outputs	Speaker or line out
PTZ Interface	On-screen
Network Specifications	
Interface	Gigabit Ethernet (GE) RJ-45 port, (1000Base-T)
Security	2 modes: secure mode and unsecured mode
Auxiliary Interfaces	
USB Ports	7 USB 2.0 ports (1 front, 6 rear)
Front Panel	
DVD±RW/CD-RW Drive	
CD read/write speed	24X
CD rewrite speed	24X
DVD read/write speed	8X
DVD rewrite speed	8X/6X (dual layer)

Power Specifications

Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal
Power Consumption	Operating Maximum
100 VAC	160 W, 1.60 A, 547 BTU/H
115 VAC	160 W, 1.39 A, 547 BTU/H
220 VAC	160 W, 0.72 A, 547 BTU/H

Environmental Specifications

Operating Temperature	50° to 95°F (10° to 35°C)
Storage Temperature	–40° to 149°F (–40° to 65°C)
Operating Humidity	20% to 80%, noncondensing
Max. Humidity Gradient	10% per hour
Operating Altitude	–50 to 10,000 feet (–15 to 3,048m)
Operating Vibration	0.25 G at 3 Hz to 200 Hz at a sweep rate of 0.5 octave/minute

Physical Specifications

Construction	Steel Cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish
Dimensions	17.0” Dx17.1” Wx3.5” H (43.20x43.40x8.90cm)
Mounting	Desktop (feet) or rack (2 RU per unit)
Unit Weight	28.80 lbs. (13.06kg)

Supplied Accessories

1 Pelco Keyboard, 1 Pelco Mouse, 1 Resource Disc, 1 Recovery Disc
Windows 7 Ultimate Disc with License
1 Rack Mount Kit (for mounting in 2 RU rack)
1 Power Cord

Certifications

CE, Class A
FCC, Class A
UL/cUL Listed
S-Mark for Argentina
CCC
C-Tick

Pelco Model Number (Or Approved Equal)

WS5070-Series, Workstation

B.1.7 Video Console Display

Furnish and install a video consoles in the control tower as shown on the plans.

The video console display shall decode and display IP streams from cameras and encoders across the network.

The video console display shall use EnduraView technology to automatically subscribe to a lower resolution, lower bit-rate secondary stream from the camera to reduce network bandwidth and CPU processing requirements as screen configurations dictate.

The video console display shall allow for simultaneous live and playback viewing of the same camera on the same monitor.

The video console display shall utilize a heads-up, icon-based menu structure coordinated with a CCTV-style keyboard, which shall allow operators to navigate through functionality without losing view of the scene.

The video console display shall support searching for video content through camera, time, date, or event.

The video console display shall support locking and unlocking archived video as well as exporting evidence-worthy clips and snapshots to a USB solid state device or CD/DVD ROM.

The video console display shall be built upon the Linux operating system.

The video console display shall meet or exceed the following design and performance specifications.

System Specifications	
Operating System	Linux®
User Interface	Icon-based, heads-up display
Video Specifications	
Video Standards	XVGA (2560 x 1600); 60 Hz capability for NTSC; 75 Hz capability for PAL
Video Coding	MPEG-4, H.264 baseline, main, or high profile
Video Outputs	2 DVI or VGA outputs (DVI-to-VGA supplied)
PTZ Control	
PTZ Interface	Through KBD5000
Network	
Interface	Gigabit Ethernet RJ-45 port (1000Base-T)

Auxiliary Interfaces

USB Ports	7 USB 2.0 Ports (1 front, 6 rear)

Front Panel Functions

DVD+/RW/CD-RW Drive	
CD Read/Write Speed	24X
CD Rewrite Speed	24X
DVD Read/Write Speed	8X
DVD Read/Write Speed	8X/6X (Dual layer)

Power Specifications

Power Input	100 to 240 VAC, 50/60 Hz, autoranging
Power Supply	Internal

Environmental Specifications

Operating Temperature	50° to 95°F (10° to 35°C)
Storage Temperature	–40° to 149°F (–40° to 65°C)
Operating Humidity	20% to 80%, noncondensing
Max. Humidity Gradient	10% per hour
Operating Altitude	–50 to 10,000 feet (–15 to 3,048m)
Operating Vibration	0.25 G at 3 Hz to 200 Hz at a sweep rate of 0.5 octave/minute

Physical Specifications

Construction	Steel Cabinet
Front Panel Finish	Gray metallic with black end caps
Chassis Finish	Black matte finish
Dimensions	17.0” Dx17.1” Wx3.5” H (43.20x43.40x8.90cm)
Mounting	Desktop (feet) or rack (2 RU per unit)
Unit Weight	28.80 lbs. (13.06kg)

Certifications

CE, Class A
FCC, Class A
UL/cUL Listed
C-Tick
S-Mark for Argentina
CCC

Pelco Model Number (Or Approved Equal)

VCD5202 Video Console Display

B.1.8 Joystick Controller/Keyboard

The keyboard shall be compatible with all Endura® Series distributed, network video management components as well as DX® and DS® series DVRs and HVRs. One keyboard can control all system cameras through a video console display or DVR display.

The keyboard controls are located on three modules in the keyboard. Modules shall be capable of rotating to suit user preferences. The keyboard modules shall include a variable speed, vector-solving joystick for precise PTZ control, jog/shuttle for playback control and pattern control, a keypad for camera and monitor control, and a built-in speaker. The keyboard shall have LED buttons that work in conjunction with the feature being used.

Keyboard Base Specifications

Keyboard Interface	USB 2.0
Cable	USB, captive, 16.4 feet (5.0 m)
Input Voltage	12 VDC
Upstream Port	USB 2.0 (USB type B connector)
Downstream Port	2x USB 2.0 hi/full/low speed (USB type A connector)
Audio Output	Embedded speaker or plug-in headset, 0.5 W into 8-ohm load per channel
Audio Input	Plug-in microphone, mono (30 to 350mVp-p); or line input, stereo (0.35 to 2.0 Vp-p)

Keyboard Module Specifications

Keyboard Keypad	0-9, camera, monitor, and multiple view keys
Joystick	Fully proportional PTZ, variable speed; with zoom, iris, and focus controls
Jog/Shuttle	Proportional, fast forward, reverse, and video transport; menu navigation on VCD5000 video console display
Module Connectors	Three (one for each module), USB 1.1 mini-USB

B.1.9 Outdoor Camera Dome Positioning System

The outdoor camera dome system shall provide a 100Base-TX network interface for live streaming to a standard Web browser.

The outdoor camera dome system shall be a discreet camera dome system consisting of a dome drive with a variable speed/high speed pan/tilt drive unit with continuous 360° rotation; 1/4-inch high resolution color, monochrome, or color/black-white CCD camera; motorized zoom lens with optical and digital zoom; auto focus; and an enclosure consisting of a back box, lower dome, and a quick-install mounting.

The outdoor network positioning camera shall support standard IT protocols.

The outdoor network positioning camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming.

The network camera shall provide an additional processor for running Pelco Video analytics.

Pelco Analytic Suites shall allow remote operation and alarm notification when used with an Endura system.

The outdoor fixed dome system shall meet or exceed the following design and performance specifications.

Camera Specifications

Sensor Type	1/3-inch, CCD
Optical Zoom	18X
Maximum Resolution	1280 x 960
Lens	f/1.6 (focal length, 4.7~84.6 mm optical)
Aspect Ratios	4:3 or 16:9
Light Sensitivity	f/1.6; 2,850ºK; SNR >24dB
Color (33 ms)	0.70 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.25 lux
Mono (250 ms)	0.02 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace Curves	850 nm and 950 nm
Wide Dynamic Range	60dB
Iris Control	Auto iris with manual override
Backlight Compensation	Yes

Video Specifications

Compression	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 24, 15, 12.5, 12, 10, 8, 7.5, 6, 5, 4, 3, 2.5, 1 (depending upon coding, resolution, and stream configuration)
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, SNMPv2c/v3, QoS, HTTP, HTTP, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)

Electrical Specifications

Ports	RJ-45 for 100Base-TX; Auto MDI/MDI-X; auto negotiate/manual setting
Cabling Type	Cat5 cable or better for 100Base-TX
Input Voltage	18 to 32 VAC; 24 VAC nominal 22 to 27 VDC; 24 VDC nominal

Input Power

24 VAC	23 VA nominal (without heater); 73 VA nominal (with heater)
24 VDC	0.7 A nominal (without heater); 3 A nominal (with heater)
PoE	IEEE802.3af (without heater)
Fuse	1.25 A

Dome Drive Specifications

Pan Speed	Variable between 400 per second continuous pan to 0.1º per second
Vertical Tilt	Unobstructed tilt of +0º to –90º
Manual Control Speed	Pan speed of 0.1º to 80º per second and pan at 150º per second in turbo mode; tilt operation shall range from 0.1º to 40º per second
Automatic Preset Speed	Pan speed of 400º and a tilt speed of 160º per second
Presets	255 positions with 16 preset tours
Preset Accuracy	± 0.1º
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	8, four-sided user-defined shapes, each side with different lengths; window blanking setting to turn off at user-defined zoom ratio; window blanking set to opaque gray or translucent smear; blank all video above user defined tilt angle; blank all video below user-defined tilt angle
Auto Flip	Rotates dome 180º at bottom of tilt travel
Dome Drive Compatibility	All dome drives are compatible with all back box configurations
Power Consumption	Nominal 23 VA (without heater running) Nominal 73 VA (with heater running)

Dome System Specifications

Diameter of Bubble,	Maximum of 5.9 inches (15.0 cm)
Pendant, Environmental	10.6-inch (26.9 cm) overall length (including dome) by 8.6-inch (21.8 cm) diameter
Pendant, Standard	Pendant 10.6-inch (26.9 cm) overall length (including dome) by 8.6-inch (21.8 cm) diameter

Certifications and Ratings

CE, Class A
FCC, Class A
UL/cUL Listed
C-Tick
Meets NEMA Type 4X and IP66 standards when installed properly‘

Pelco Model Numbers (Or Approved Equal)

The discreet camera dome system shall be the Pelco Spectra® 4

B.1.10 Dome Mount

The dome mount shall consist of a medium duty mount designed specifically for mounting the Spectra® Series, DF5 Series, and DF8 Series pendant domes to a wall, pole, or roof top parapet along with any accessories that may be required for a complete dome mount.

The dome mount shall meet or exceed the following design and performance specifications:

- The mount shall be capable of supporting up to 75 lbs.
- The mount shall be versatile in that it may be mounted directly to a wall or adapted to a parapet, corner or pole when used with the proper optional adapter.
- The mount shall not be supplied with a pipe for dome mounting.
- The mount shall be constructed of cast aluminum and finished in gray or black polyester powder coat.
- The mount shall feature an integral 120/230VAC to 24VAC, 50/60 Hz, 100va transformer to power all environmental and dome functions.
- The transformer shall feature selectable input power via a slide switch.
- The mount shall be designed with a front access cover plate for the transformer.
- The transformer shall be fused with one, 1.6A, 120VAC fast acting fuse and one, 500mA, 230VAC fast acting fuse.
- The mount shall be capable of cable access either through the arm from openings in the mounting plate or .75” conduit fittings may be drilled on either side of the mount. Drill starts (dimples) shall be designed into the mount, one on either side for conduit hole location.
- The mount shall be designed with cable feed-through.
- The mount shall be mounted to a solid surface via four 3/8” fasteners suitable for the mounting surface.

The dome mount shall be provided with a manufacturer's warranty covering repair or replacement of defective parts for a period of one year from the date of shipment.

The dome mount shall be the Pelco IWM24-BK or IWM24-GY, and the optional adapters shall be the Pelco PP4348 or PP400 parapet mount, the Pelco PA402 pole mount or the Pelco CM400 corner mount or approved equal.

B.1.11 Ethernet Media Converter

The Ethernet media converter shall provide one 10BASE-TX port and one 100BASE-FX fiber port; the fiber port shall accept two fibers.

The Ethernet media converter shall be designed for point-to-point applications.

The Ethernet media converter shall provide user-selectable networking functions for each 10BASE-T/100BASE-TX port: autonegotiation between 10 Mbps and 100 Mbps data rates and between full-duplex and half-duplex modes; 10 Mbps or 100 Mbps data rate, selectable, full-duplex or half-duplex mode, selectable; and the enabling/disabling of flor control.

The Ethernet media converter shall support auto MDI/MDI-X (medium dependent interface/medium dependent interface crossover) operation.

The Ethernet media converter shall have a stand-alone and rack-mountable modular design.

The Ethernet media converter shall meet or exceed the following design and performance specifications:

Performance Specifications

Switch type	Unmanaged Layer 2
Switch Method	Store and forward
Data Rate	10/100 Mbps
Compliance	IEEE 802.3u, 802.3x
Interface	Auto MDI/MDI-X
Operating Mode	Half-duplex or full-duplex
Address Table Size	1,024 MAC address entries with automatic Learning and aging
Quality of Service	IEEE 802.1 priority, tag-based, 4 queues per Port, weighted fair queuing scheduling
Medium Frame Size	Untagged Ethernet frames up to 1,518 bytes Tagged Ethernet frames up to 1,522 bytes

Pelco Model Number: FX82011MSTR-2; Ethernet media converter, one 10BASE-T/100BASE-TX port, one multimode ST fiber port.

B.1.12 Unmanaged Ethernet Switch

The unmanaged Ethernet switch shall provide one 10BASE-T/100BASE-TX port and two 100BASE-FX fiber ports for the transport of bidirectional Ethernet data.

The unmanaged Ethernet switch shall support wavelength division multiplexing (WDM), which allows bidirectional data to be transported in a single fiber.

The unmanaged Ethernet switch shall be designed for point-to-point applications with optional fiber redundancy and for drop-and-repeat applications.

The unmanaged Ethernet switch shall provide user-selectable networking functions for each 10BASE-T/100BASE-TX port: autonegotiation between 10 Mbps and 100 Mbps data rated and between full-duplex and half-duplex modes; 10Mbps and 100 Mbps data rate, selectable: full-duplex or half-duplex mode, selectable, and the enabling/disabling of flow control.

The unmanaged Ethernet switch shall support auto MDI/MDI-X (medium dependent interface/medium dependent interface crossover) operation.

The unmanaged Ethernet switch shall have a stand-alone and rack-mountable modular design.

Pelco Model Number: FX82012MSTR-2; Unmanaged Ethernet switch, one 10BASE-T/100BASE-TX port, two multimode SC fiber ports, one fiber per port.

B.1.13 Rack Mounts

The digital fiber transmitter or receiver rack shall hold up to 14 channels for mounting of single-width fiber transmitters or receivers in an EIA-standard 19-inch rack. The rack unit shall provide an electrical buss bar for plug-in connection of power, required for the operation of the fiber optic transmitters or receivers.

The digital fiber transmitter or receiver rack shall meet or exceed the following design and performance specifications:

Electrical Specifications

Input voltage	90 to 264VAC at 70W maximum
Output voltage	9 VDC +/-5% at 6.5A at 75°C
Fuse Rating	1.25A slow blow (rack power supply)
Power Connector	2-pin
Power Indicator	Red LED
AC Line Cord	Detachable, IEC-connected
MTBF	>100,000 hours

Mechanical Specifications

Construction	Aluminum
Dimensions	19.0”D x 7.5”W x 6.9”H

Pelco Model Number: EURACK/US RACK; Rack-mount chassis for up to 14 fiber optic modules (EU and US power cords)

B.1.14 Flat Panel, LCD Monitor

Furnish eight flat panel LCD monitors. Install six of the eight monitors in the control tower as shown on the plans. The two remaining monitors will serve as spares.

The flat panel LCD monitor shall have performance-enhancing features such as VGA and DVI (digital visual interface) inputs, PIP (picture-in-picture), looping BNC output, HD resolution.

The flat panel LCD monitor shall provide a front panel that allows the user to adjust image quality, brightness, size, position, and geometry for optimal viewing.

Pelco Model Numbers: PMCL419-19 inch monitor

B.1.15 Uninterruptible Power Supply

One uninterruptible power supply (UPS) shall be provided to sustain the operation on the IP video management system in the main command center. The UPS shall be provided to sustain the operation of all equipment located in the main command center for a period of twenty (20) minutes.

The UPS shall provide continuous, no-break power during complete or momentary loss of supply power.

In the normal operating mode, the UPS shall condition line power protecting against environmental conditions, power surge, power sag, under-voltage, over-voltage, line noise, frequency (variation of the waveform), transients and harmonic distortion.

An external bypass switch shall be provided to allow the UPS to be removed from the incoming power line for service.

B.1.16 Training

Provide for a 1-day course of the Endura® System for the Administrator. Course shall be for end user’s involved in the implementation, support, or day-to-day operations of the Endura® system. Course shall be taught on-site. The course shall be Pelco-Certified Field Training.

C Construction

C.1 Closed Circuit Television

Provide and install a complete CCTV system including but not limited to five color cameras and one thermal camera, cable, conduit, mounting hardware, software, and all necessary hardware to install a complete CCTV system as shown on the plans and described herein. The new CCTV monitors and camera controls shall be installed on the operator's level of the Walnut Street Bridge control house as shown on the drawings. Video and data transmissions shall be by a wireless system.

Furnish seven color cameras and two thermal cameras. Install five of the seven color cameras and one of the two thermal cameras on the Walnut Street Bridge as shown on the plans. The two remaining color cameras and one remaining thermal camera will serve as spares. Cameras shall be as follows:

Camera #1 shall be located on the East end of the bridge and mounted on the existing traffic signal pole. The camera will be used to verify traffic on the roadway and people on the sidewalk. The camera shall be provided with a transmitter for wireless transmission. Camera #1 shall be a Pan Tilt Zoom camera with a smoked dome. Provide a pole mount for support of the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

Camera #2 shall be located under the bridge on the North side and mounted on the support structure of the bridge. The camera will be used to verify boat traffic and that a vessel has cleared the bridge before the bridge can be lowered. The camera shall be provided with a transmitter for wireless transmission. Camera #2 shall be a Pan Tilt Zoom camera with a smoked dome. Provide a wall mount support for the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

Camera #3 shall be located under the bridge on the South side and mounted on the support structure of the bridge. The camera will be used to verify boat traffic and that a vessel has cleared the bridge before the bridge can be lowered. The camera shall be provided with a transmitter for wireless transmission. Camera #3 shall be a Pan Tilt Zoom camera with a smoked dome. Provide a wall mount support for the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

Camera #4 shall be located on the West end of the bridge and mounted on the existing traffic signal pole. The camera will be used to verify boat traffic approaching the bridge. The camera shall be provided with a transmitter for wireless transmission. Camera #4 shall be a Pan Tilt Zoom camera with a smoked dome. Provide a pole mount for support of the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

Camera #5 shall be located on the West end of the bridge and mounted on the existing traffic signal pole. The camera will be used to verify traffic on the roadway and people on the side walk. The camera shall be provided with a transmitter for wireless transmission. Camera #5 shall be a thermal imaging camera with a smoked dome. Provide a pole mount for support of the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

Camera #6 shall be located on the West end of the bridge and mounted on the existing traffic signal pole. The camera will be used to verify traffic on the roadway and people on the side walk. The camera shall be provided with a transmitter for wireless transmission. Camera #6 shall be a Pan Tilt Zoom camera with a smoke dome. Provide a pole mount for support of the camera. The camera image will be displayed on the monitors in the Walnut Street Bridge control house.

The color cameras shall be Pelco Spectra IV IP Series Network Dome system H.264, Digital, Pan/Tilt/Zoom High-speed dome. The camera dome system shall be a discreet camera dome system consisting of a dome drive with a variable speed/high speed pan/tilt drive unit with continuous 360° rotation; ¼- inch high resolution color, monochrome, or color/black-white CCD camera; motorized zoom lens with optical and digital zoom, auto focus, and an enclosure consisting of a back box, lower dome, and a quick-install mounting.

The thermal cameras shall be Pelco Sarix TI Series thermal IP cameras. The cameras shall be IP and analog thermal cameras with an integrated fixed enclosure. Enclosure shall meet NEMA type 4X and IP66 standards and be provided with a sun shroud and heater/defroster.

C.2 Rack

Furnish and install a rack in the Walnut Street tower on the third floor level. The rack shall be used to house the digital video recorder, network video processor, network switch, indoor power supply and the wireless networking processor.

C.3 Control Equipment

- Furnish and install the Pelco Endura control system for the CCTV system in the rack.
- Furnish and install the Encom wireless data system in the rack.
- Furnish and install the Network switching in the rack.
- Furnish and install all connections for a complete working system.

D Measurement

The department will measure Walnut Street Bridge CCTV System, B-05-269, acceptably completed, as a single lump sum unit of work.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.05	Walnut Street Bridge CCTV System, B-05-269	LS

Payment is full compensation for the complete installation of the Walnut Street Bridge CCTV system and for furnishing all labor, tools, equipment, materials and incidentals necessary to complete the work.

26. Tayco Street Bridge CCTV System, B-70-097, Item SPV.0105.06.

A Description

This special provision describes furnishing, installing, and placing in satisfactory operation condition the addition of a decoder to the existing Endura® closed circuit television (CCTV) systems for permanent operation at the Tayco Street Bridge control tower called for in these specifications, and as required.

B Materials

B.1 Video Decoder

Furnish and install a video decoder including but not limited to cable, conduit, mounting hardware, software, power supply system, connectors, controllers, video decoders, and all necessary hardware to install equipment complete and operating as described herein. Provide all labor and materials to install the video decoder system in the manner indicated or recommended by the manufacturer. All equipment shall be delivered with accessories, etc. all wired and assembled.

The network video decoder shall be fully Endura® compatible.

The video decoder shall support any digital video stream on the network and allow for the decoding of up to 32 simultaneous streams from any video encoder or recorder. It shall also allow for simultaneous and independent viewing of both live and recorded video.

The video decoder shall decode MPEG-4 and H.264 baseline, main and high profile encoded video streams.

The video decoder shall drive two high-resolution monitors through DVI connections for displaying the video footage.

The video decoder shall meet or exceed the following design and performance specifications.

Video Specifications

Maximum Resolution	2560 x 1600
Video Coding	MPEG-4, H.264 baseline, main, and high profiles
Video Display Modes	1 image, 4 images (2x2), 9 images (3x3), 16 images (4x4), 6 images (1 large + 5 small), 10 images (2 large + 8 small), 13 images (1 large + 8 small); High definition monitors can also display 6 images (3x2) and 12 images (4x3)
Decoding Performance	16X real-time MPEG-4 streams at 704 x 480/576; 12X real-time H.264 baseline profile streams at 704 x 480/576; 2X real-time H.264 baseline profile streams at 1080p
Video Outputs	2 DVI outputs (2 DVI-to-VGA adapters supplied)

Network Specifications

Interface	Gigabit Ethernet RJ-45 port (1000Base-T)

Certifications

CE, Class A; meets EN50130-4 standard requirements
FCC, Class A
UL/cUL listed
C-Tick
CCC

Pelco Model Numbers

Decoder: NET5402R Network Video Decoder

B.1.1 System Description

The IP video management system shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data.

B.1.2 Manufacturers

Manufacturer of the IP video decoder system shall be Pelco.

B.1.3 Video Management System

The IP video management system shall record video and audio streams from IP cameras and video encoders on the network.

The IP video management system chassis shall be designed for video surveillance recording supplications and encompass redundancy at all vital points:

- Redundant, hot swappable power supply modules
- Redundant, hot swappable system fans
- Hot swappable O/Sdrive
- Hot swappable rear chassis fans

C Construction

C.1 Video Decoder

Provide and install a video decoder at the Tayco Street Bridge. The network decoder shall be fully Endura® compatible. Provide and install cable, conduit, mounting hardware, software, and all necessary hardware to install the video decoder and connect to the existing Endura® CCTV control system. The video decoder shall be installed in an existing rack at the Tayco Street Bridge

C.2 Control Equipment

Furnish and install the Pelco Video Decoder for the CCTV system in the Rack.
Furnish and install all connections for a complete working system.

D Measurement

The department will measure Tayco Street Bridge CCTV System, B-70-097 completed in accordance to the contract and accepted, as a single lump sum unit of work.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.06	Tayco Street Bridge CCTV System, B-70-097	LS

Payment is full compensation for the complete installation of the Tayco Street Bridge CCTV system and for furnishing all labor, tools, equipment, materials and incidentals necessary to complete the work.

27. Mason Street Bridge Machinery Work, B-05-134, Item SPV.0105.07.

A Description

A.1 General

This special provision describes the furnishing, installing, adjusting, painting, testing and placing in operation, new bridge drive and instrument machinery components. Details and arrangements of new machinery components are shown on the plans and specified in these special provisions. This work also includes installing and aligning new drive motors, motor brakes, machinery brakes and limit switches to be furnished under Mason Street Bridge Electrical Work, B-05-134.

A.2 Submittals

Submit manufacturer's data and/or shop drawing data for all manufactured and purchased machinery components in accordance to the standard specifications and as specified herein.

Include for each manufactured item:

- Manufacturer's descriptive literature, drawings, diagrams, performance and characteristic curves, and catalog cuts.
- Manufacturer's name, trade name, catalog model or number, nameplate data, size, certified layout dimensions, capacity, specification reference, and applicable Federal and Military Specification references.
- All other information necessary to establish Contract compliance.

A.3 Shop Drawings

A.3.1 General

Show all parts completely detailed and dimensioned on the shop drawings. State the grade and amount of finish machining, with all tolerances and allowances, and identify each part requiring a specific fit. Finished surfaces are defined by the ANSI/ASME B46.1, Surface Texture, and fits are defined by the ANSI/ASME B4.1, Preferred Limits and Fits for Cylindrical Parts, unless otherwise noted on the plans or stated herein. The ANSI B4.1 also applies to fits for non-cylindrical parts.

Show proprietary items in outline form on the drawings. Indicate the method and sequence to be employed during assembly of new bridge drive and instrument drive machinery and installation of necessary utilities support and service facilities. Show all external dimensions and clearances necessary for installation and operation of each item, or furnish complete assembly diagrams showing each part contained within an assembly and the manufacturer's part number assigned to each part. Provide a diagram sufficient to enable complete disassembly and reassembly of the item covered. In the event that any part is modified in any manner from the way it is described or delivered by its original manufacturer, deliver a drawing that details each modification and assign a unique part number to preclude the supply of replacement parts not modified in similar fashion.

Provide assembly drawings of each item in addition to identifying and describing each internal part to contain:

- Dimensions of all principal elements within the item.
- Certified external dimensions affecting interfaces or installations.
- Gross weight capacity and normal operating ratings.
- Method and recommended type of lubrication, including location and type of fittings and provisions for adding, draining, and checking the level of each lubricant employed.
- Inspection openings, seals, and vents.
- And details of all fasteners used to mount the equipment to its foundation.

Make a complete shop bill of materials for all new bridge drive and instrument drive machinery parts.

State the material and material specifications for each part. Give the designated numbers of specifications where American Society for Testing and Materials Specifications or any other standard specifications are used. Use abbreviations on the drawings to designate standard specifications for materials and workmanship as listed in Section A.4.3, Codes and Standards, of this special provision.

These abbreviations are used on the plans and within these special provisions.

Furnish complete assembly and erection drawings. Include identifying marks and essential dimensions for locating each part or assembled unit with respect to the bridge drive machinery, bridge structure and/or foundation. Use of mirror image or opposite hand erection drawings is prohibited.

Give a suitable title to each shop drawing to describe the parts detailed thereon and state by whom the internal quality control shop inspection will be performed.

A.3.2 Standard Compliance

Submit proof of conformance for applicable organizations such as, American Society for Mechanical Engineers (ASME), Underwriters Laboratories (UL), American Gas Association (AGA), and American Refrigeration Institute (ARI), for all equipment or materials. The label or listing of the specified organization will be acceptable evidence. In lieu of the label or listing, submit a certificate from an independent testing organization, adequately equipped and competent to perform such services, and approved by the engineer. The certificate shall state that the item has been tested in accordance to the specified organization's test methods, and that the item conforms to the specified organization's standard or code.

A.4 Quality Assurance

A.4.1 Standard Products

Provide materials and equipment that are essentially the standard catalogued products of manufacturers regularly engaged in production of such materials or equipment and are manufacturer's latest standard design that complies with the specification requirements. Provide materials and equipment that are essentially duplicate items that have been in satisfactory commercial or industrial use at least two years prior to bid opening. Where two units of the same class of equipment are required, provide products of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer. Provide the manufacturer's name and address and the model and serial number on a nameplate, securely affixed in a conspicuous place for each major component. The nameplate of the distributing agent will not be acceptable.

A.4.2 Manufacturer’s Recommendations

Where installation procedures or any part thereof are required to be in accordance to the recommendations of the manufacturer of the material being installed, printed copies of these recommendations are to be furnished to the engineer prior to installation. Installation of the item will not be allowed to proceed until the recommendations are

received. Failure to furnish these recommendations can be cause for rejection of the material. Provide as part of the work all special machining and installation required by the component manufacturer.

A.4.3 Codes and Standards

All work under this pay items must comply with all applicable requirements of the latest edition of codes and standards issued by, but not limited to, the following organizations and publications, whose abbreviations used in this special provision are as shown:

- American Association of State Highway and Transportation Officials – AASHTO
- American Bearing Manufacturers Association – ABMA
- American Gear Manufacturers Association – AGMA
- American Iron and Steel Institute – AISI
- American National Standards Institute – ANSI
- American Society for Testing and Materials – ASTM
- American Welding Society – AWS
- National Lubricating Grease Institute – NLGI
- Society of Automotive Engineers – SAE
- Wisconsin Standard Specifications for Highway and Structure Construction

Meet the work requirements of all other codes and standards as specified elsewhere in these special provisions. Where codes and standards are mentioned for this pay item, it is intended to call particular attention to them; it is not intended that any other codes and standards be omitted if not mentioned.

A.4.4 Qualifications, Personnel, and Facilities

For the fabrication, installation, aligning, cleaning, lubricating, testing, and all other work required by this item, use adequate numbers of skilled, trained, and experienced mechanics, millwrights, and service personnel who are thoroughly familiar with the requirements and methods specified for the proper execution of work.

Equip mechanics, millwrights, and service personnel with all necessary instruments to assure that related components have been provided within acceptable tolerances, and to make all necessary adjustments for attaining the specified ratings.

A.4.5 Rules, Regulations, and Ordinances

Assure that work complies with all applicable federal, state, and local rules, regulations, and ordinances.

A.4.6 Substitutions

The terms "approved equal," "of equal quality," and "or equal" which appear on the plans and in these special provisions, are intended to allow the contractor to substitute other manufacturers and model numbers of products of equal quality and rating for those specified.

Prior to the contractor's ordering of any substitute product, obtain in writing the engineer's approval of the equivalence of the substitute product. The acceptance of the substitute product is at the sole discretion of the engineer who will establish the basis for equivalence, and will review the quality of the materials and products described in detail on the submitted shop drawings and product data.

The engineer will "Approve" or "Revise and Resubmit" substitute material. Upon return of a shop drawing showing rejection, resubmit the shop drawing showing the specified product. Rejection will not in any way result in any increase in the contract price.

Approval by the engineer of any substitute product submitted by the contractor does not relieve the contractor of responsibility for the proper operation, performance, or functioning of that product.

A manufacturer's name and catalog part number specifying a particular product, whether in this special provision or on the plans, is so specified to establish quality, configuration, and arrangement of parts. An equivalent product made by another manufacturer may be substituted for the specified product subject to the approval of the engineer; however, the contractor will make all necessary changes required by the substitution in related machinery and structural, architectural, and electrical parts, at no increase in the contract price.

If any departures from the plans or these special provisions are deemed necessary by the contractor, submit details of such departures and the reasons therefore, as soon as practicable for approval. Make no such departures without approval by the engineer.

B Materials

B.1 Fasteners

All high-strength bolts shown on the plans shall be finished body, high-strength bolts unless otherwise noted and used to connect machinery parts to each other or to supporting members.

Finished body high-strength bolts are to meet the requirements of ASTM A 449. High-strength bolts shall have finished bodies and regular hexagonal heads. Holes for high-strength bolts are to be individually reamed for a clearance of not more than 0.010 inch (0.25 mm) larger than the actual diameter of individual bolts for that hole.

Unless otherwise called for, sub-drill all bolt holes in the machinery parts for connecting these parts to the supporting steel work at least 1/32 inch (0.8 mm) smaller in diameter than the bolt diameter and ream assembled for the proper fit at assembly or at erection with the steel work after the parts are correctly assembled and aligned.

Furnish a hardened plain washer at each end of high-strength bolts meeting the requirements of ASTM F 436.

Use only fasteners manufactured in the United States with the property class and source identification appearing on the top of head.

B.2 Keys and Keyways

Furnish keys and keyways conforming to the dimensions and tolerances for square and rectangular keys of the ANSI B17.1, Keys and Keyseats, meeting the requirements of Class 2 fits, unless otherwise specified. Furnish keys with chamfers on the outside corners and keyways with fillet radii on the inside corners as suggested by the ANSI Standard.

Effectively hold all keys in place, preferably by setting them into closed-end keyways milled into the shaft. Round the ends of all such keys to a half circle equal to the width of the key. If two keys are used in a hub, locate the keys 120 degrees apart and in line with wheel arms where practicable.

Furnish keys that are machined from alloy steel forgings, ASTM A 668, Class K unless otherwise specified herein or on the plans. Orient the key lengths parallel to the metal flow during the hot working operation.

B.3 Enclosed Speed Reducers

Provide speed reducers that are standard models from one manufacturer, with sizes, ratios, and construction details as shown on the plans.

Submit for the engineer's approval, a certified print of each speed reducer showing as a minimum the following:

- All external mounting dimensions including shaft sizes, bores, and keyways as required
- Internal drawings showing each reducer component with part numbers
- The ratings that will appear on the nameplate
- Location of all lubricant connections
- Lubrication recommendations

B.4 Couplings

Provide couplings of the type as shown on the plans, which includes grid type, gear type, and others as needed.

Provide grid-type, self-aligning, fully flexible, torsionally flexible couplings to connect electric motors to machinery components. Provide grid-type couplings with steel hubs, alloy steel grids, and steel or aluminum covers. Furnish all couplings with shrouded bolts.

Provide gear-type, self-aligning, full-flexible couplings or semi-flexible couplings with floating shafts to connect all machinery components, except where other types of couplings are called for on the plans. Furnish all couplings with shrouded bolts. Make the gear-type couplings of forged steel having curved face teeth, and providing for at least a plus and minus 3/4 degree misalignment per gear mesh.

In general, furnish couplings that are finish-bored and have keyways cut by the coupling manufacturer to dimensions and tolerances established on the shop drawings then ship to the manufacturers of the various components for shop installation on the shafts.

Provide couplings that are standard products of an established manufacturer.

B.5 Hubs and Bores

Finish the hubs of all couplings on both faces. Bore the hubs concentric with the outside of the couplings. Furnish all hubs to have an ANSI Class FN2 medium shrink fit on the shafts, unless otherwise specified.

B.6 Sprockets

Provide sprockets conforming to ANSI B 29.1 Precision Power Transmission Roller Chains, Attachments and Sprockets. Bore the sprocket hubs concentric with the pitch circle of the sprockets with an ANSI Class FN1 light shrink fit with the reducer input shaft. Provide keyway to complement instrumentation reducer input shaft key and keyway.

B.7 Shims

As shown on the plans, provide stainless steel shims required for leveling and aligning of equipment; neatly trim to the dimensions of the assembled parts and drill for all bolts that pass through the shims. Use shims that are Stainless Steel ASTM_A_240, Type 304. To prevent distortion of the shims, do not punch the bolt holes at the machine shop. Instead, pre-drill the shim holes 1/16 inch larger in diameter than the permanent fasteners shank. For shims greater than 1/2 inch (12.7 mm), include one solid plate of thickness equal to 1/2 inch (12.7 mm) less than total shim thickness.

Provide fully dimensioned shims as shown and detailed on the shop drawings. Shims with open side or U-shaped holes for bolts will not be permitted. Shims will have a minimum of two holes for bolts.

In general, provide sufficient thickness to secure 1/64 inch (0.4 mm) variations of the shim allowance plus one shim equal to the full allowance. Comprise the 1/2 inch (12.7 mm) nominal shim pack of the following thickness variations:

- one 1/2 inch (12.7 mm)
- one 1/4 inch (6.4 mm)
- one 1/8 inch (3.2 mm)
- one 1/16 inch (1.6 mm)
- one 1/32 inch (0.8 mm)
- two 1/64 inch (0.4 mm)

B.8 Machinery Guards

Provide new machinery guards for all new bridge drive and instrument drive machinery components readily accessible to personnel, including, but not restricted to the following:

- motor couplings
- motor and machinery brakes
- instrument drive chain and sprockets
- instrument drive coupling

Construct machinery guards to comply with the applicable requirements of ANSI B15.1, Safety Standard for Mechanical Power Transmission Apparatus.

Unless otherwise indicated or specified, construct all machinery guards with stainless steel with minimum thickness of No. 12 Gauge (2.6 mm). Furnish guards that require no disassembly of any machinery component.

Provide machinery guards with removable hinged or bolted covers for access to lubrication fittings enclosed by the guard. Provide phenolic nameplates on these covers with lubrication instructions.

Paint the machinery guards “Safety Orange”.

B.9 Spare Parts

Provide one spare grid set for each grid-type coupling and one spare seal/gasket set for each flexible coupling.

C Construction

C.1 Delivery and Storage

C.1.1 Protection for Shipment

Clean new machinery components of dirt, chips, grit, and all other injurious materials and coat all unpainted surfaces with a corrosion-inhibiting preservative prior to shipping.

Finished metal surfaces and unpainted metal surfaces that would be damaged by corrosion are to be coated as soon as practicable after finishing with a rust-inhibiting preservative. Remove this coating prior to operation and from all surfaces prior to field painting.

Completely protect new machinery components from weather, dirt, and all other injurious conditions during manufacture, shipment, and storage.

C.1.2 Package and Deliver Spare Parts

Protect spare parts for shipment and prolonged storage by coating, wrapping, and boxing.

Durably tag or mark all spare parts with clear identification showing the designation used on the approved shop drawing.

Clearly mark on the outside of the boxes for spare parts showing their contents. Deliver spare parts to a location designated by the department.

C.1.3 Guarantee and Warranties

Manufacturers' warranties or guarantees on equipment, materials, or products purchased for use on the Contract are to be consistent with those provided as customary trade practice, obtained by the contractor, and upon acceptance of the Contract. The contractor shall assign to the department all manufacturers' warranties or guarantees on all such equipment, material, or products furnished for or installed as part of the Contract.

The contractor shall warrant the satisfactory in-service operation of the new machinery components, materials, products, and related components. This warranty extends for a period of one year following the date of final acceptance of the Project.

C.2 Installation

Perform installation of new motors, couplings, brakes, instrument drives and limit switches in a coordinated manner. Ensure all new bridge drive and instrument drive components fit properly with new or existing mechanical and electrical equipment.

C.2.1 Alignment and Bolting

Match-mark all parts of the new bridge drive and instrument drive components for proper assembly and correct orientation. Before final drilling or reaming, adjust all parts to exact alignment by means of shims. If required, provide tapered shims at contractor's expense. After final alignment and bolting, all parts are to operate smoothly.

Whenever possible, drill and ream assembled bolt holes in structural steel and new bridge drive/instrument drive components (with shims in place) to assure accurate alignment of the hole and accurate clearance over the entire length of the bolt within the specified limit. Check the clearance with 0.011 inch (0.28 mm) wire. The hole is considered too large if the wire can be inserted in the hole together with the bolt. Connect bridge drive/instrument drive components to structural elements comprised of different thickness using high-strength bolts. Wherever possible, install the bolts such that the head is adjacent to the connected element with the least thickness.

Torque finished body high-strength bolts meeting the requirements of ASTM_A_449 to the same tension value required for ASTM_A_325 bolts.

C.2.2 Edges and Corners

Round or chamfer all edges and corners of new machinery guards that are exposed in the finished work.

C.2.3 Personnel and Facilities

Use competent millwrights that are skilled in the type of work involved to erect and adjust the machinery. Provide them with all necessary measuring and leveling instruments, as required.

C.3 Contractor's Inspection
After installation is complete, make a thorough inspection to ensure that all new bridge drive and instrument drive machinery components are clean and free of obstruction, that all parts are properly aligned and adjusted as closely as practicable without actual operation; and that all bolts are properly tightened.

Verify that all new speed reducers are filled to the proper level, and all new rotating and sliding parts are supplied with lubricants as recommended by the manufacturers of the units.

Prior to field testing, the engineer will accompany the contractor during his final inspection. On the basis of the results of this inspection, the engineer determines whether the bridge is ready for field testing.

C.4 Field Testing
When the machinery components and electrical equipment are ready for field testing, inform the engineer not less than 15 calendar days prior to the scheduling of tests. During all tests, keep available a complete crew of mechanics in order to provide operation of the span and to make all adjustments and corrections required to complete the tests.

Prepare a field testing procedure and submit to the engineer for review and approval. Coordinate the testing procedure with tests required for the electrical equipment.

The testing procedure shall include but not be limited to the verification of proper installation, alignment, fastening, operation, and/or final adjustment of the new motors, couplings, brakes, instrument drives and limit switches.

C.5 Defective Material and Workmanship
All machinery rejected during inspection and testing, that is not made acceptable, is to be removed from the work site and replaced at contractor's expense.

Delays resulting from the rejection of material, equipment or work is not to be the basis of any claim.

Correct, at contractor's expense, all defects found during the guarantee period resulting from faulty material, components, workmanship, or installation.

D Measurement
The department will measure Mason Street Bridge Machinery Work as a single complete lump sum unit of work, acceptably completed.

E Payment
The department will pay for the measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.07	Mason Street Bridge Machinery Work, B-05-134	LS

Payment is full compensation for furnishing and installing new bridge drive machinery components, including the removal of existing and installation of new motor couplings and keys; installing and aligning new drive motors, motor brakes, machinery brakes and limit switches furnished under Mason Street Bridge Electrical Work; furnishing and installing new instrument drive machinery components, including new sprockets, reducers, couplings, keys and supports; cleaning, adjusting, lubricating and re-installing the existing instrumentation drive chain; and installing and aligning new instrument drive electrical equipment including drive and span lock rotary cam limit switches.

28. Removing Retractable Bollard Traffic Barrier System, Item SPV.0105.08.

A Description

This special provision describes removing the existing, hydraulically actuated, retractable bollard traffic barrier system at the Tayco Street Bridge, furnishing and installing new roadway cover plates at the existing bollard locations, and properly disposing of all related materials.

B Materials

Furnish new roadway cover plates that have been fabricated from high strength, low alloy steel conforming to ASTM A709 Gr. 50 and as shown on the plans.

C Construction

C.1 Removal of Existing Traffic Barrier System

Remove the existing, hydraulically actuated, retractable bollard traffic barrier system which includes but is not limited to the following:

- Two hydraulic power units each consisting of a hydraulic motor, pump, accumulator, hydraulic fluid reservoir and various miscellaneous hydraulic components.
- Twelve double-acting hydraulics cylinder assemblies each consisting of a base plate, hydraulic cylinder, rod end attachment with link pin and clevis.
- Twelve bollards each consisting of a 10-inch diameter x 5’-6 3/4” long concrete filled pipe with attached steel guide stripes, 1 1/4” cap plate, 2 1/2” x 9 1/2” x 12” cylinder connection plate and conical hood.
- All associated piping, hoses, valves and supports.

C.2 Existing Anchor Bolts

Remove exposed portion of existing anchor bolts securing each hydraulic cylinder assembly base plate to the existing concrete pedestal. Grind anchor bolts flush to the top of the existing concrete pedestal.

C.3 Welding

Weld new roadway cover plates to the existing 12-inch diameter extra-strong pipe sleeves and ring stiffener plates embedded in the roadway as shown on the plans and as specified herein. All welding shall conform to the requirements of these specifications, to

AASHTO/AWS D 1.5, under structural steel of the Bridge Welding Code and as indicated on the plans.

C.4 Related Work
Schedule and coordinate this work with the requirements of the article for Tayco Street Bridge Electrical Work, B-70-097 in accordance to these special provisions and as directed by the engineer.

C.5 Hydraulic Fluid Disposal
Properly dispose of system hydraulic fluid in accordance to all local, state and federal regulations. Any spilling of hydraulic fluid shall be cleaned as directed by and to the satisfaction of the engineer at no additional cost to the department.

C.6 Hydraulic Accumulators
Properly remove and dispose of both hydraulic accumulators according to the manufacturer's recommendations. The model 9A30-120 hydraulic accumulators normally retain hydraulic fluid pressure and were manufactured by Tobul Accumulator Inc., Bamberg, SC 29003.

D Measurement
The department will measure Removing Retractable Bollard Traffic Barrier System as a single complete lump sum unit of work, acceptably completed.

E Payment
The department will pay for the measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.08	Removing Retractable Bollard Traffic Barrier System	LS

Payment is full compensation for removing the entire existing, hydraulically actuated, retractable bollard traffic barrier system; furnishing and installing new roadway cover plates; for properly disposing of all materials in accordance to all local, state and federal regulations; and for furnishing all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

The electrical disconnection of the bollard traffic barrier system from the existing electrical control system shall be performed in accordance to and paid for under Tayco Street Bridge Electrical Work, B-70-097.

29. Survey Project 4065-15-71, Item SPV.0105.09.

A Description
Perform work according to standard spec 105.6 and standard spec 650.

Standard spec 105.6 and standard spec 650 are modified to define the requirements for construction staking for this contract.

Replace standard spec 105.6.2 with the following:

The department will not perform any construction staking for this contract. The contractor shall perform all survey required to layout and construct the work under this contract, subject to engineer's approval.

The survey includes establishing horizontal and vertical position for all aspects of construction including but not limited to storm sewer, subgrade, base, curb, gutter, curb and gutter, pipe culverts, structure layout, concrete pavement, concrete barrier, reference line, electrical installations, supplemental control, slope stakes, utilities, traffic control items, etc.

The department may choose to perform quality assurance survey during construction. This quality assurance survey does not relieve the contractor of the responsibility for furnishing all survey work required under this contract.

Delete standard spec 650.1.

B (Vacant)

C Construction
Survey required under this item shall be in accordance to all pertinent requirements of standard spec 650 and shall include all other miscellaneous survey required to layout and construct all work under this contract.

D Measurement
The department will measure Survey Project 4065-15-71 as a single lump sum unit of work for survey, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.09	Survey Project 4065-15-71	LS

Payment is full compensation for performing all survey work required to layout and construct all work under this contract.

30. Mason Street Bridge Steel Thrie Beam, B-05-134, Item SPV.0105.10.

A Description
This special provision describes installing steel thrie beam on Structure B-05-134 in accordance to standard spec 614, applicable standard details, and as shown on the plans.

B Materials

Furnish steel thrie beam rail, posts and offset blocks, terminal connectors, anchor assemblies, fittings, hardware, and all required items except sealant in accordance to standard spec 614.2 and as shown on the plans. Furnish a non-staining, gray, non-bituminous joint sealer in accordance to standard spec 502.2.9 and as shown on the plans. Furnish a custom, steel connector plate to provide a flush, thrie beam surface for the thrie beam terminal connector.

C (Vacant)

D Measurement

The department will measure Mason Street Bridge Steel Thrie Beam, B-05-134 as a single complete lump sum unit of work, acceptably completed.

E Payment

The department will pay for the measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.10	Mason Street Bridge Steel Thrie Beam, B-05-134	LS

Payment is full compensation for furnishing and installing all materials for the steel thrie beam system including all rail, posts and offset blocks, terminal connectors, anchor assemblies, fittings, and hardware; for furnishing all connections to the existing bridge structure; for properly disposing of all surplus materials; and for furnishing all incidental items necessary to complete the work.

ADDITIONAL SPECIAL PROVISION 1 (ASP 1)
FOR TRANSPORTATION ALLIANCE FOR NEW SOLUTIONS (TrANS)
PROGRAM EMPLOYMENT PLACEMENTS AND APPRENTICESHIPS

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Section 5204(e) – Surface Transportation Workforce Development Training and Education, provides for 100 percent Federal funding if the core program funds are used for training, education, or workforce development purposes, including "pipeline" activities. The core programs includes: Congestion Mitigation and Air Quality Improvement (CMAQ) Program, Highway Bridge Program (HBP), Interstate Maintenance (IM), National Highway System (NHS), and Surface Transportation Program (STP). These workforce development activities cover surface transportation workers, including OJT/SS programs for women and minorities as authorized in 23 U.S.C. §140(b).

TrANS is an employment program originally established in 1995 in Southeastern Wisconsin. Currently TrANS has expanded to include TrANS program locations to serve contractors in Southeast (Milwaukee and surrounding counties), Southcentral (Dane County and surrounding counties including Rock County), and most Northeastern Wisconsin counties from locations in Keshena, Rhinelander and surrounding far Northern areas. TrANS attempts to meet contractor's needs in other geographic locations as possible. It is an industry driven plan of services to address the outreach, preparation, placement and retention of women, minorities and non-minorities as laborers and apprentices in the highway skilled trades. These candidate preparation and contractor coordination services are provided by community based organizations. For a list of the TrANS Coordinators contact the Disadvantaged Business Enterprise Office at (414) 438-4583 in Milwaukee or (608) 266-6961 in Madison. These services are provided to you at no cost.

I. BASIC CONCEPTS

Training reimbursements to employing contractors for new placements, rehires or promotions to apprentice of TrANS Program graduates will be made as follows:

1) **On-the-Job Training, Item ASP.1T0G, ASP 1 Graduate.** At the rate of $5.00 per hour on federal aid projects when TrANS graduates are initially hired, or seasonally rehired, as unskilled laborers or the equivalent.

   Eligibility and Duration: To the employing contractor, for up to 2000 hours from the point of initial hire as a TrANS program placement.

   Contract Goal: To maintain the intent of the Equal Employment Opportunity program, it is a goal that 6 *(number)* TrANS Graduate(s) be utilized on this contract.

2) **On-the-Job Training, Item ASP.1T0A, ASP 1 Apprentice.** At the rate of $5.00 per hour on federal aid projects at the point when an employee who came out of the TrANS Program is subsequently entered into an apprenticeship contract in an underutilized skilled trade (this will include the Skilled Laborer Apprenticeship when that standard is implemented).

Eligibility and Duration: To the employing contractor, for the length of time the TrANS graduate is in apprentice status.

Contract Goal: To maintain the intent of the Equal Employment Opportunity program, it is a goal that __3__ *(number)* TrANS Apprentice(s) be utilized on this contract.

3) The maximum duration of reimbursement is two years as a TrANS graduate plus time in apprentice status.

4) If a TrANS program is not available in the contractor's area and another training program is utilized, payment of On-the-Job Training hours may be approved by the Wisconsin Department of Transportation (WisDOT) if the training program meets the established acceptance criteria. Only On-the-Job Training Hours accumulated after WisDOT approval will be reimbursed as specified under Items ASP.1T0G and ASP.1T0A. For more information, contact the Disadvantaged Business Enterprise Office at the phone numbers listed above.

5) WisDOT reserves the right to deny payments under items ASP.1T0G and ASP.1T0A if the contractor either fails to provide training or there is evidence of a lack of good faith in meeting the requirements of this training special provision.

I. RATIONALE AND SPECIAL NOTE

The $5.00 per hour now being paid for TrANS placements is intended to cover the duration of two years to allow for reaching entry-level laborer status. An additional incentive, the $5.00 rate, would promote movement into the underutilized skilled trades' apprenticeships and applies until the individual completes their apprenticeship. These incentives benefit TrANS candidates by giving them a better opportunity to enter a skilled trade; benefits contractors who will be assisted in meeting their EEO profiles and goals; and benefits the public who will see the program reinforce larger public-private employment reform in Wisconsin. The pool of TrANS graduates was created for the purpose of addressing underutilization in the skilled trades, an objective that is further reinforced by a parallel retention pilot program, known as the Companywide Reporting. *Whether or not reimbursement is involved, the WisDOT reassures contractors who are in the Companywide Program that TrANS placements still contribute toward fulfilling the new hire goal of 50% women and minorities.* Based on data administered by United States Department of Labor (US DOL), the highway skilled trades remain underutilized for women statewide (less than 6.9%); and for minorities in all counties (% varies by county).

NOTE: *Unless using other advancement strategies, contractors are encouraged to use some or all of this monetary incentive to offset the cut in hourly wages an individual may incur when entering an apprenticeship if the full general laborer hourly rate has been previously paid. No special accounting measures are required.*

II. IMPLEMENTATION

The implementation of ASP 1 is intended to cover only the amount of time it takes for underutilization to be resolved across the trades. This will be measured annually at the county and/or state levels using data administered by WisDWD in relation to goals set by the USDOL-

OFCCP. With appropriate state and federal approvals, we may also do some measurement at the company level.

It is the contractor's responsibility to note on their Certified Payrolls if their employee is a TrANS graduate or a TrANS apprentice. The District EEO Coordinators utilize the information on the Certified Payrolls to track the hours accumulated by TrANS Graduates and TrANS apprentices on WisDOT contracts. Payment under this ASP 1 is made based on the hours recorded off of the Certified Payrolls. Tracking may eventually include improved linkages with the WisDWD apprentice database, information from company and committee level sources.

TrANS is nondiscriminatory by regulation, and is a tool for optional use by contractors to address the underutilization of women and minorities as laborers and apprentices in our industry's skilled trades.

IV. *TRANS TRAINING*

As part of the contractor's equal employment opportunity affirmative action program, training shall be provided to employees enrolled in apprenticeship and on-the-job training programs as follows:

The contractor shall provide on-the-job training aimed at developing full journey workers in the type of trade or job classifications involved. In the event the contractor subcontracts a portion of the contract work, the contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract.

Training and upgrading of minorities and women toward journey workers status is a primary objective of this training special provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority trainees and women trainees); to the extent such persons are available within a reasonable area of recruitment. The contractor will be given an opportunity and will be responsible for demonstrating the steps that they have taken in pursuance thereof, prior to determination as to whether the contractor is in compliance with this training special provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journey workers status or in which they have been employed as a journey worker. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the contractor's records should document the findings in each case.

V. APPRENTICESHIP TRAINING

The Federal Highway Administration's (FHWA) policy is to require full use of all available training and skill improvement opportunities to assure increased participation of minority groups, disadvantaged persons and women in all phases of the highway construction industry. The FHWA On-the-Job Training (OJT) Program requires the State transportation agencies (STAs) to establish apprenticeships and training programs targeted to move women, minorities, and disadvantaged individuals into journey-level positions to ensure that a competent workforce is available to meet highway construction hiring needs, and to address the historical under-representation of members of these groups in highway construction skilled crafts.

The OJT Supportive Services (OJT/SS) Program was established in Title 23 Code of Federal Regulations (CFR), Part 230) to supplement the OJT program and support STA training programs by providing services to highway construction contractors and assistance to highway construction apprentices and trainees. The primary objectives of OJT/SS are:

(1) To increase the overall effectiveness of the State highway agencies' approved training programs.
(2) To seek other ways to increase the training opportunities for women, minorities, and disadvantaged individuals.

The STAs are responsible for establishing procedures, subject to the availability of Surface Transportation and Bridge Funds under 23 U.S.C. §140(b*)* (Nondiscrimination), for the provision of supportive services with respect to training programs approved under 23 CFR, Part 230(a*)* (Equal Employment Opportunity on Federal and Federal-aid Construction Contracts – including Supportive Services).

The contractor and subcontractor shall maintain records to demonstrate compliance with these apprenticeship requirements. Reasonable exemptions and modifications to and from any or all of these requirements will be determined by the Wisconsin Department of Transportation-Civil Rights Office. A request for an exemption or modification, with justification, shall be made in writing, addressed to WisDOT Civil Rights Office, 4802 Sheboygan Avenue, P.O. Box 7965, Rm. 451, Madison, WI 53707.

ADDITIONAL SPECIAL PROVISION 3
DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

1. Description

General

a. The disadvantaged business enterprise (DBE) requirements of 49 CFR Part 26 apply to this contract. The department's DBE goal is shown on the cover of the bidding proposal. The contractor can meet the specified contract DBE goal by procuring services or materials from a DBE or by subcontracting work to a DBE. The department calculates the DBE participation as the dollar value of DBE participation included in the bid expressed as a percentage of the total contract bid amount.

b. Under the contract, the contractor agrees to provide the assistance to participating DBE's in the following areas:

   i. Produce accurate and complete quotes.
   ii. Understand highway plans applicable to their work.
   iii. Understand specifications and contract requirements applicable to their work.
   iv. Understand contracting reporting requirements.

c. The department encourages the contractor to assist and develop DBE firms to become fully knowledgeable contractors to successfully perform on its contracts.

d. For information on the disadvantaged business program, visit the department's Civil Rights and Compliance Section website at:

   http://www.dot.wisconsin.gov/business/engrserv/dbe-main.htm

2. Definitions

a. Interpret these terms, used throughout this additional special provision, as follows:

   i. **Bid Percentage:** The DBE percentage indicated in the bidding proposal at the time of bid.
   ii. **DBE:** A disadvantaged business enterprise (DBE) certified as a DBE by the department and included on the department's list of certified DBE's who are determined to be ready, willing and able.
   iii. **DBE goal:** The amount of DBE participation expected in the contract as shown on the cover of the Highway Work Proposal.
   iv. **Discretionary Goal:** A contractor assigned DBE goal, typically abbreviated as “Disc” on the cover of the Highway Work Proposal, which is enforced as committed.
   v. **Manufacturer:** A firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract.
   vi. **Supplier:** A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment required under the contract are bought, kept in stock, and regularly sold or leased to the public.
   vii. **Voluntary Achievement:** The amount of DBE participation achieved and reported in the contract in excess of the assigned goal.

3. DBE Percentage Required at Bid Submission

Indicate the bid percentage (i.e. 0% through 100%) of DBE participation on the completed bidding proposal, including projects with discretionary goals. For electronic submittals, show the percentage in the miscellaneous data folder, Item 3, DBE Percent. For paper submittals, show the percentage on the sheet included after the schedule of items. By submission of the bid, the bidder contractually commits to DBE participation at or above the bid percentage, or certifies that they have utilized

comprehensive good faith efforts to solicit and utilize DBE firms to meet the DBE participation requirements of this contract proposal, and that the bid percentage is reflective of these good faith efforts. If the bidder does not indicate the bid percentage of DBE participation on the completed bidding proposal, the department will consider the bid irregular and may reject the bid.

4. Department's DBE Evaluation Process

a. Documentation Submittal

Within 10 business days after the notification of contract award, the contractor is to identify, by name, the DBE firms whose utilization is intended to satisfy this provision, the items of work of the DBE subcontract or supply agreement and the dollar value of those items of work by completing the Commitment to Subcontract to DBE Form [DT1506] and all necessary attachment A forms, as well as, Good Faith Waiver Form [DT1202] and supporting documentation as necessary. If the contractor fails to furnish the required forms within the specified time, the department may cancel the award. Delay in fulfilling this requirement is not a cause for extension of the contract time and shall not be used as a tool to delay execution.

i. Bidder Meets DBE Goal

If the bidder indicates that the contract DBE goal is met, after award and before execution, the department will evaluate the Commitment to Subcontract to DBE Form DT1506 and attachment A(s) to verify the actual DBE percentage achieved. If the DBE commitment is verified, the contract is eligible for execution with respect to the DBE commitment.

ii. Bidder Does Not Meet DBE Goal

(1) If the bidder indicates a bid percentage on the Commitment to Subcontract to DBE Form [DT1506] that does not meet the contract DBE goal, the bidder must submit a Good Faith Waiver Form [DT1202] and supporting documentation. After award and before execution, the department will evaluate the bidder's DBE commitment and consider the bidder's good faith waiver request.

(2) The department will review the bidder's good faith waiver request and notify the bidder of one of the following:

a. If the department grants a good faith waiver, the bid is eligible for contract execution with respect to DBE commitment.

b. If the department rejects the good faith waiver request, the department may declare the bid ineligible for execution. The department will provide a written explanation of why the good faith waiver request was rejected. The bidder may appeal the department's rejection as allowed under 7 a. & b.

5. Department's Criteria for Good Faith Effort

The Code of Federal Regulations {CFR}, 49 CFR Part 26-Appendix A, is the guiding regulation concerning good faith efforts. However, the federal regulations do not define “good faith” but states that bidder must actively and aggressively attempt to meet the goal. The federal regulations are general and do not include every factor or effort that can be considered. As a result, each state must establish its own processes and consider the factors established in its own process when making a determination of good faith.

a. The department will only grant a good faith waiver if the bidder has made the effort, given the relevant circumstances under the contract that a bidder actively and aggressively seeking to meet the goal would make. The department will evaluate the bidder's good faith effort to determine whether a good faith waiver will be granted. The bidder must demonstrate, on the DT1202 that they have aggressively solicited DBE participation in an attempt to meet the contract DBE goal and attaining the stated DBE goal is not feasible.

b. The department, in conjunction with industry stakeholders, has developed the following guidance for contractor good faith effort. The guidance and the attached appendices provide a framework for the actions required by all parties in the processing and evaluation of bidder's total efforts to achieve the project specific DBE goal prior to the bid letting date.

c. Prime Contractors should:
   i. Document all efforts and decisions made toward achieving the DBE goal on the contract. The bidder should use the Civil Rights & Compliance System [CRCS] and related WisDOT-approved DBE outreach tools, including the Bid Express Small Business Network, to foster DBE participation on all applicable contracts.

   ii. Request quotes by identifying potential items to subcontract and solicit. Prime contractors are strongly encouraged to include in their initial contacts a single page including a detailed list of items for which they are accepting quotes, by project, within a letting. *See attached sample entitled "Sample Contractor Solicitation Letter" in Appendix A*. Prime contractors should also indicate a willingness to accept quotes in areas they are planning to perform themselves, ***as required by federal rules***. In some cases, it might be appropriate to use DBE's to do work in a prime contractor's area of specialization.

      (1) Solicit quotes through all reasonable and available means from certified DBE firms who match 'possible items to subcontract' and send copies to DBESS office, highlighting areas in which you are seeking quotes. Email is acceptable.

      (2) SBN is the preferred outreach tool. https://www.bidx.com/wi/main. Other acceptable means include postal mail, email, fax, phone call.

         a. Primes must ask DBE firms for a response in their solicitations. See *Sample Contractors Solicitation Letter* in Appendix. This letter can be included as an attachment to the SBN sub-quote request.

         b. Solicit quotes at least 10 calendar days prior to the letting date {ideally two Fridays before the letting} to allow DBE firms sufficient time to respond. Prime contractors should contact DBE firms early, asking them if they need help in putting together a quote, or helping to arrange for equipment needs, or solve other problems.

      (3) Second solicitation should take place within 5 days
         a. An email solicitation is highly recommended for this second solicitation

      (4) Upon request, provide interested DBE firms with adequate information about plans, specifications and the requirements of the contract by letter, information session, email, phone call and/or referral.

      (5) When potential exists, advise interested DBE firms on how to obtain bonding, line of credit or insurance as may be requested.

      (6) Document DBE firm's interest in quoting by taking appropriate steps to follow up initial solicitation with:
         a. Email to all prospective DBE firms in relevant work areas
         b. Phone call log to DBE firms who express interest via written response or call.
         c. Fax/letter confirmation
         d. Copy of the DBE quotes
         e. Signed copy of Bid Express SBN Record of Subcontractor Outreach Effort.

d. Evaluate DBE quotes as documentation is critical if the prime does not utilize the DBE firm's quote for any reason.
   i. Evaluate DBE firm's capability to perform 'possible items to subcontract' using legitimate reasons, including but not limited to, ***a discussion with the DBE firm*** regarding its

capabilities prior to the bid letting. If lack of capacity is your reason for not utilizing the DBE quote, you are required to contact the DBE directly regarding their ability to perform the work indicated in the UCP directory as their work area [NAICS code]; only the work area and/or NAICS code listed in the UCP directory will be counted for DBE credit. Documentation of the conversation is required.

ii. In striving to meet a DBE conscious contract goal, prime contractors are expected to use DBE quotes that are responsive and reasonable. This includes DBE quotes that are not the low quote.

iii. **Special Circumstance:** Evaluation of DBE quotes with tied bid items. "Tied quotes are the condition in which a subcontractor submits quotes including multiple areas of expertise across multiple work areas noting that the items and price are tied. Typically this type of quoting represents a cost saving to the prime but is not clearly stated as a discount; tied quotes are usually presented as 'all or none' quote to the prime." When non-DBE subcontractors submit tied bid items in their quotes to the prime, the DBE firms' quote may seem not competitive. In such a case, the following steps are taken in comparing the relevant quotes. These are qualitative examples.

(1) Compare bid items common to both quotes, noting the reasonableness in the price comparison.

(2) Review quotes from other firms for the bid items not quoted by the DBE firm to see if combining both can provide the same competitive advantage that the tied bid items offered.

e. After notification of contract award, submit **'Commitment to Subcontract'** form within the time period specified in the contract.

i. Provide the following information along with department form DT1202:

(1) The names, addresses, e-mail addresses, telephone numbers of DBE's contacted. The dates of both initial and follow-up contact. A printed copy of SBN solicitation is acceptable.

(2) A description of information provided to the DBE's regarding the plans, specifications, and estimated quantities for portions of the work to be performed by that DBE.

(3) Photocopies or electronic copies of all written solicitations to DBE's.

(4) Documentation of each quote received from a DBE and, if rejected, the reason for that rejection.

(5) Bidder attendance at any pre-solicitation or pre-bid meetings the department held to inform DBE's of participation opportunities available on the project.

f. The department's DBE Support Services Office is available by phone, email or in writing to request assistance in meeting the DBE goal:

DBE Support Services Office
6150 Fond du Lac Ave.
Milwaukee, WI 53218
Phone: 414-438-4583 / 608-266-6961
Fax: 414-438-5392
E-mail: DOTDBESupportServices@dot.wi.gov

6. Bidder's Appeal Process

a. A bidder can appeal the department's decision to deny the bidder's good faith waiver request. The bidder must provide written documentation refuting the specific reasons for rejection as stated in the department's rejection notice. The bidder may meet in person with the department if so

requested. Failure to appeal within 7 calendar days after receiving the department's written notice of rejection of a good faith waiver request under constitutes a forfeiture of the bidder's right of appeal. If the bidder does not appeal, the department may declare the bid ineligible for execution.

b. The department will appoint a representative, who did not participate in the original determination, to assess the bidder's appeal. The department will issue a written decision within 7 calendar days after the bidder presents all written and oral testimony. In that written decision, the department will explain the basis for finding that the bidder did or did not meet the contract DBE goal or make an adequate good faith effort to meet the contract DBE goal. The department's decision is final. If the department finds that the bidder did not meet the contract DBE goal or did not make adequate efforts to meet the DBE goal, the department may declare the bid ineligible for execution.

7. Department's Criteria for DBE Participation

Department's DBE List

a. The department maintains a DBE list on the department's website at

http://app.mylcm.com/wisdot/Reports/WisDotUCPDirectory.aspx

b. The DBE office is also available to assist at 414-438-4583 or 608-266-6961.

8. Counting DBE Participation

Assessing DBE Work

a. The department will only count the DBE usage towards the contract DBE goal if the DBE firm is certified as a DBE by one of the unified certification program agencies. If a firm becomes DBE certified before entering into a subcontract, the department may consider that DBE usage towards the contract goal. The department only counts the value of the work a DBE actually performs towards the DBE goal. The department assesses the DBE work as follows:

b. The department counts work performed by the DBE's own resources. The department includes the cost of materials and supplies the DBE obtains for the work. The department also includes the cost of equipment the DBE leases for the work. The department will not include the cost of materials, supplies, or equipment the DBE purchases or leases from the prime contractor or its affiliate, except the department will count non-project specific leases the DBE has in place before the work is advertised.

c. The department counts fees and commissions the DBE charges for providing a bona fide professional, technical, consultant, or managerial services. The department also counts fees and commissions the DBE charges for providing bonds or insurance. The department will only count costs the engineer deems reasonable based on experience or prevailing market rates.

d. If a DBE subcontracts work, the department counts the value of the subcontracted work only if the DBE's subcontractor is also a DBE.

e. The contractor shall maintain records and may be required to furnish periodic reports documenting its performance under this item.

f. It is the prime contractor’s responsibility to determine the DBE's ability to perform the work with the use of the UCP directory.

9. Commercially Useful Function

a. The department counts expenditures of a DBE toward the DBE goal only if the DBE is performing a commercially useful function on that contract.

b. A DBE is performing a commercially useful function if the following conditions are met:

c. For contract work, the DBE is responsible for executing a distinct portion of the contract work and it is carrying out its responsibilities by actually performing, managing, and supervising that work.

d. For materials and supplies, the DBE is responsible for negotiating price, determining quality and quantity, ordering, and paying for those materials and supplies.

10. Trucking

All bidders are expected to adhere to the department's current trucking policy posted on the HCCI website at

http://www.dot.wisconsin.gov/business/engrserv/docs/dbe-trucking-notice.pdf

11. Manufacturers and Suppliers

The department counts material and supplies a DBE provides under the contract. The department will give full credit toward the DBE goal if the DBE is a manufacturer of those materials or supplies. The department will give 60 percent credit toward the DBE goal if the DBE is merely a supplier of those materials or supplies. It is the bidder's responsibility to find out if the DBE is considered a supplier or a manufacturer before listing them on Commitment to Subcontract to DBE form DT1506.

12. DBE Prime

If the prime contractor is a DBE, the department will only count the work the contractor performs with its own forces, the work DBE subcontractors perform, and the work DBE suppliers or manufacturers perform.

13. Joint Venture

If a DBE performs as a participant in a joint venture, the department will only count that portion of the total dollar value of the contract equal to that portion of the work that the DBE performs with its own forces.

14. Mentor Protégé

a. If a DBE performs as a participant in a mentor protégé agreement, the department will credit the portion of the work performed by the DBE protégé firm

b. On every other project that the mentor protégé team identifies itself on.

c. For no more than one half of the total contracted DBE goal on any WisDOT project.

15. DBE Replacement

In the event a Prime Contractor needs to replace a DBE firm originally listed on the approved DBE Commitment Form DT1506, the Prime Contractor must comply with the department's DBE Replacement Policy located on the DBE page on the following web site:

http://www.dot.wisconsin.gov/business/engrserv/docs/policyreplacingdbe.pdf

16. Changes to the approved DBE Commitment Form DT1506

If there are any changes to the approved Commitment to Subcontract to DBE Form DT1506, the prime contractor must submit a revised DBE Commitment Form DT1506 and relevant attachment A(s) to the DBE Programs Office within 5 business days.

17. Contract Modifications

When additional opportunity is available by contract modifications, the Prime Contractor shall utilize DBE Subcontractors, that were committed to equal work items, in the original contract.

18. Payment

Costs for conforming to this Additional Special Provision (ASP) and any associated DBE requirements are incidental to the contract.

APPENDIX A
Sample Contractor Solicitation Letter Page 1
This sample is provided as a guide not a requirement

GFW SAMPLE MEMORANDUM

TO: DBE FIRMS

FROM: POTENTIAL PRIME CONTRACTOR OR MAJOR SUBCONTRACTOR

SUBJECT: **REQUEST FOR DBE QUOTES**

LET DATE & TIME

DATE: MONTH DAY YEAR

CC: DBE OFFICE ENGINEER

Our company is considering bidding on the projects indicated on the next page, as a prime and/or a subcontractor for the Wisconsin Department of Transportation Month- date -year Letting. Page 2 lists the projects and work items that we may subcontract for this letting. We are interested in obtaining subcontractor quotes for these projects and work categories. Also note that we are willing to accept quotes in areas we may be planning to perform ourselves as required by federal rules.

Please review page 2, respond whether you plan to quote, highlight the projects and work items you are interested in performing and return it via fax or email within 3 days. Plans, specifications and addenda are available through WisDOT at the DBE Support Services office or at the Highway Construction Contract Information (HCCI) site at http://roadwaystandards.dot.wi.gov/hcci/

Your quote should include all of the costs required to complete the items you propose to perform including labor, equipment, material, and related bonding or insurance. The quote should note items that you are DBE certified to perform, tied items, and any special terms. Page 2, with the indicated projects and items you plan to quote, should be used as a cover sheet for your quote.

Please make every effort to have your quotes into our office by time deadline the prior to the letting date. ***Make sure the correct letting date, project ID and proposal number, unit price and extension are included in your quote.*** We prefer quotes be sent via SBN but prime's alternative's are acceptable. Our office hours are include hours and days. Please call our office as soon as possible prior to the letting if you need information/clarification to prepare your quote at contact number.

If you wish to discuss or evaluate your quote in more detail, contact us after the contract is awarded. Status of the contract can be checked at WisDOT's HCCI site at http://roadwaystandards.dot.wi.gov/hcci/

All questions should be directed to:

Project Manager, John Doe,
Phone: (000) 123-4567
Email: Joe@joetheplumber.com
Fax: (000) 123- 4657

Sample Contractor Solicitation Letter Page 2

This sample is provided as a guide not a requirement

REQUEST FOR QUOTATION

Prime's Name: _____

Letting Date: _____

Project ID: _____

Please check all that apply

- ☐ Yes, we will be quoting on the projects and items listed below
- ☐ No, we are not interested in quoting on the letting or its items referenced below
- ☐ Please take our name off your monthly DBE contact list
- ☐ We have questions about quoting this letting. Please have some one contact me at this number

Prime Contractor 's Contact Person		DBE Contractor Contact Person	
Phone:		Phone	
Fax:		Fax	
Email:		Email	

Please circle the jobs and items you will be quoting below

Proposal No.	1	2	3	4	5	6	7
County							

WORK DESCRIPTION:

Clear and Grub	X		X	X		X	X
Dump Truck Hauling	X		X	X		X	X
Curb & Gutter/Sidewalk, Etc.	X		X	X		X	X
Erosion Control Items	X		X	X		X	X
Signs and Posts/Markers	X		X	X		X	X
Traffic Control		X	X	X		X	X
Electrical Work/Traffic Signals		X	X	X		X	
Pavement Marking		X	X	X	X	X	X
Sawing Pavement		X	X	X	X	X	X
QMP, Base	X	X		X	X	X	X
Pipe Underdrain	X			X			
Beam Guard				X	X	X	X
Concrete Staining							X
Trees/Shrubs	X						X

Again please make every effort to have your quotes into our office by time deadline prior to the letting date.

We prefer quotes be sent via SBN but prime's preferred alternative's are acceptable.

If there are further questions please direct them to the prime contractor's contact person at phone number.

APPENDIX B
BEST PRACTICES FOR PRIME CONTRACTOR & DBE SUBCONTRACTOR GOOD FAITH EFFORT

This list is not a set of requirements; it is a list of potential strategies

Primes

- Prime contractor open houses inviting DBE firms to see the bid "war room" or providing technical assistance
- Participate in speed networking and mosaic exercises as arranged by DBE office
- Host information sessions not directly associated with a bid letting;
- Participate in a formal mentor protégé or joint venture with a DBE firm
- Participate in WisDOT advisory committees i.e. TRANSAC, or Mega Project committee meetings
- Facilitate a small group DBE 'training session' Clarifying how your firm prepares for bid letting, evaluates subcontractors, preferred qualifications and communication methods
- Encourage subcontractors to solicit and highlight DBE participation in their quotes to you
- Quality of communication, not quantity creates the best results. Contractors should do as thorough a job as possible in communicating with DBE firms before the bid and provide any assistance requested to assure best possible bid.

DBE

- DBE firms should contact primes as soon as possible with questions regarding their quotes or bid; seven days prior is optimal.
- Continually check for contract addendums on the HCCI website through the Thursday prior to letting to stay abreast of changes.
- Review the status of contracts on the HCCI website reviewing the 'apparent low bidder' list, and bid tabs at a minimum.
- Prepare a portfolio or list of related projects and prime and supplier references; be sure to note transportation-related projects of similar size and scope, firm expertise and staffing.
- Participate in DBE office assessment programs
- Participate on advisory and mega-project committees
- Sign up to receive the DBE Contracting Update
- Consider membership in relevant industry or contractor organizations
- Active participation is a must. Quote as many projects as you can reasonably work on; quoting the primes and bidding as a prime with the department are the only ways to get work.

APPENDIX C
Types of Efforts considered in determining GFE
This list represents concepts being assessed; analysis requires additional steps

1. Whether the contractor attended any pre-solicitation or pre-bid meetings that were scheduled by WisDOT to inform DBEs of contracting and subcontracting opportunities;
2. Whether the contractor provided written notice to a reasonable number of specific DBEs that their interest in the contract was being solicited, in sufficient time to allow the DBEs to participate effectively;
3. Whether the contractor followed up initial solicitations of interest by contacting DBEs to determine if the DBEs were interested; returned the phone calls of interested DBE firms.
4. Whether the contractor selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the DBE goal;
5. Whether the contractor provided interested DBEs with adequate information about the plans, specifications and requirements of the contract;
6. Whether the contractor negotiated in good faith with interested DBEs, not rejected DBEs as unqualified without sound reasons based on a thorough investigation of their capabilities;
7. Whether the contractor made efforts to assist interested DBEs in being more competitive.
8. Whether the contractor effectively used the services of available minority community organizations: minority contractors groups, local, state, and Federal minority business assistance offices, and other organizations that provide assistance to small businesses and DBE firms.
9. Whether Prime used CRCS to identify DBE who specialize in relevant work areas.
10. Whether the contractor used available resources including contacting the DBE office, using WisDOT's website
11. Whether the contractor returned calls of firms expressing interest in a timely manner.

APPENDIX D
Good Faith Effort Evaluation Guidance
Excerpt from Appendix A of 49 CFR Part 26

APPENDIX A TO PART 26 -- GUIDANCE CONCERNING GOOD FAITH EFFORTS

I. When, as a recipient, you establish a contract goal on a DOT assisted contract, a bidder must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The bidder can meet this requirement in either of two ways. First, the bidder can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the bidder can document adequate good faith efforts. This means that the bidder must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.

II. In any situation in which you have established a contract goal, part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a bidder that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The efforts employed by the bidder should be those that one could reasonably expect a bidder to take if the bidder were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere pro forma efforts are not good faith efforts to meet the DBE contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.

III. The Department also strongly cautions you against requiring that a bidder meet a contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a contract, even though the bidder makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring bona fide good faith efforts.

IV. The following is a list of types of actions which you should consider as part of the bidder's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

D. (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non solicitation of bids in the contractor's efforts to meet the project goal.

F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

V. In determining whether a bidder has made good faith efforts, you may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the contract goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, you may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.

Appendix E
Small Business Network [SBN] Overview

The Small Business Network is a part of the Bid Express® service that was created to ensure that prime bidders have a centralized online location to find subs - including small and disadvantaged business enterprises (DBEs). It is available for prime bidders to use as part of their Basic Service subscription. Within the Small Business Network, **Prime Contractors** can:

1. Easily select proposals, work types and items:
    a. After adding applicable work types, select items that you wish to quote. Enter the sub-quote quantities and add comments, if desired. Adding or removing items and work types can be done quickly. If needed, you can save the sub-quote for completion at a later time.
2. Create sub-quotes for the subcontracting community:
    a. Create sub-quotes with ease using the intuitive sub-quote creator. In seven short steps, you can rapidly create a custom sub-quote directed to all subcontractors that bid on the applicable work types. Steps include: provide contact information and sub-quote expiration date, select letting and proposal, add work types and items, specify terms and conditions, upload attachments, and select vendors.
    b. Create a sub-quote to send to subcontractors or suppliers that lists the items in a proposal that you want quoted
    c. Create an unlimited number of sub-quotes for items you want quoted, and optionally mark them as a DBE-preferred request
    d. Add attachments to sub-quotes
3. View sub-quote requests & responses:
    a. After logging into the Bid Express service, you can quickly review all of your sub-quote requests and all unsolicited sub-quote requests from subcontractors. To simplify the Small Business Network home screen, sub-quote requests can be hidden with one click if they are not applicable.
    b. View or receive unsolicited sub-quotes that subcontractors have posted, complete with terms, conditions and pricing
4. View Record of Subcontractor Outreach Effort:
    a. For each sub-quote produced, a *Record of Subcontractor Outreach Effort* is generated that shows the response statistics for a particular sub-quote. If accepted by the letting agency, this report may serve as proof of a "Good Faith" effort in reaching out to the DBE community.
    b. Easily locate pre-qualified and certified small and disadvantaged businesses
    c. Advertise to small and disadvantaged businesses more efficiently and cost effectively
    d. Document your interactions with subs/DBEs by producing an Outreach Report (may be accepted as proof of DBE outreach at the discretion of each agency)

The Small Business Network is a part of the Bid Express® service that was created to ensure that small businesses have a centralized area to access information about upcoming projects. It can help small businesses learn more about opportunities, compete more effectively, network with other contractors and subcontractors, and win more jobs.

1. View and reply to sub-quote requests from primes:
    a. After logging into the Bid Express service, you can quickly review all incoming sub-quote requests and all unsolicited sub-quotes created by your company. Receive notifications by selected work type. To simplify on the Small Business Network home screen, sub-quote requests can be filtered by work types relevant to your interests, or hidden with one click if they are not applicable.
2. Select items when responding to sub-quote requests from primes:
    a. You have the freedom to choose and price any number of items when responding to a sub-quote request. Quantities can be modified, and per-item comments are also available.
    b. View requests for sub-quotes for work that primes have posted for projects they are bidding, add your pricing, terms, and conditions, and submit completed sub-quotes to the requesting primes
    c. Add attachments to a sub-quote
3. Create and send unsolicited sub-quotes to specific contractors:
    a. Create unsolicited sub-quotes with ease using the intuitive sub-quote creator. In eight short steps, you can rapidly create a custom sub-quote directed at any number of specific vendors of your choosing. Steps include: provide contact information and sub-quote expiration date, select letting and proposal, add work types and items, specify terms and conditions, upload attachments, and select vendors.
4. Easily select and price items for unsolicited sub-quotes:
    a. After adding applicable work types, select items that you wish to quote. The extended price calculates automatically, cutting out costly calculation errors. Comments can be provided on an per-item basis as well.
    b. Create an unsolicited sub-quote that lists the items from a proposal that you want to quote, include pricing, terms and conditions, and send it to selected prime/plan holder
    c. Add attachments to a sub-quote
    d. Add unsolicited work items to sub-quotes that you are responding to
5. Easy Access to Valuable Information
    a. Receive a confirmation that your sub-quote was opened by a prime
    b. View Bid Tab Analysis data from past bids, including the high, average and low prices of items.
    c. View important notices and publications from DOT targeted to small and disadvantaged businesses
6. Accessing Small Business Network for WisDOT contracting opportunities
    a. If you are a contractor not yet subscribing to the Bid Express service, go to **www.bidx.com** and select "Order Bid Express." The Small Business Network is a part of the Bid Express Basic Service.
    b. DBE firms can request a Bid Express Small Business Network Account at no cost by calling 414-438-4588

ADDITIONAL SPECIAL PROVISION 4

Payment to First-Tier Subcontractors

Within 10 calendar days of receiving a progress payment for work completed by a subcontractor, pay the subcontractor for that work. The prime contractor may withhold payment to a subcontractor if, within 10 calendar days of receipt of that progress payment, the prime contractor provides written notification to the subcontractor and the department documenting the reasons for withholding payment.

The prime contractor may also withhold retainage from payments due subcontractors. Reduce the total amount retained from all first-tier subcontractors to no more than the department retains within 10 calendar days of the department releasing retainage.

Payment to Lower-Tier Subcontractors

Ensure that subcontracting agreements at all tiers provide prompt payment and release of retainage rights to lower-tier subcontractors that parallel those granted first-tier subcontractors in this provision.

ADDITIONAL SPECIAL PROVISION 6
ASP 6 - Modifications to the standard specifications

Make the following revisions to the 2013 edition of the standard specifications:

106.3.4.3.1 General

Replace paragraph two with the following effective with the November 2012 letting:

(2) Required sampling and testing methodologies and documentation are specified in CMM chapter 8.

(3) If disputed, approval of materials and components, as well as acceptance of the work incorporating those materials or components, is subject to review under the QMP dispute resolution process.

107.17.3 Railroad Insurance Requirements

Replace the entire text with the following effective with the August 2012 letting:

(1) If required by the special provisions, provide or arrange for a subcontractor to provide railroad protective liability insurance in addition to the types and limits of insurance required in 107.26. Keep railroad protective liability insurance coverage in force until completing all work, under or incidental to the contract, on the railroad right of way or premises of the railroad and until the department has accepted the work as specified in 105.11.2.4.

(2) Provide railroad protective liability insurance coverage written as specified in 23 CFR part 646 subpart A. Provide a separate policy for each railroad owning tracks on the project. Ensure that the railroad protective liability insurance policies provide the following minimum limits of coverage:

1. Coverage A, bodily injury liability and property damage liability; $2 million per occurrence.
2. Coverage B, physical damage to property liability; $2 million per occurrence.
3. An annual aggregate amount of $6 million that shall apply separately to each policy renewal or extension.

(3) Obtain coverage from insurance companies licensed to do business in Wisconsin that have an A.M. Best rating of A- or better. The cost of providing the required insurance coverage and limits is incidental to the contract. The department will make no additional or special payment for providing insurance.

(4) Submit the following to each railroad owning tracks on the project as evidence of that railroad's respective coverage:

1. A certificate of insurance for the types and limits of insurance specified in 107.26.
2. The railroad protective liability insurance policy or other acceptable documentation to the railroad company.

(5) Submit the following to the region as evidence of the required coverage:

1. A copy of the letter to the railroad company transmitting the submittal documents specified in 107.17.3(4).
2. A certificate of insurance for the required railroad protective liability coverages.

(6) Do not begin work on the right of way or premises of the railroad company until the region receives the submittals specified in 107.17.3(5) and notification from the railroad company that the contractor has provided sufficient insurance information to begin work.

(7) Notify the railroad and the region immediately upon cancellation or initiating cancellation, whichever is earlier, or any material change in coverage. Cease operations within 50 feet of the railroad right of way immediately if insurance is cancelled or reduced. Do not resume operations until the required coverage is in force.

460.2.8.3.1.4 Department Verification Testing Requirements

Replace paragraph four with the following effective with the December 2012 letting:

(4) The department will randomly test each design mixture at the following minimum frequency:

FOR TONNAGES TOTALING:	
Less than 501 tons	no tests required
From 501 to 5,000 tons	one test
More than 5,000 tons	add one test for each additional 5,000-ton increment

501.2.1 Portland Cement

Replace paragraph one with the following effective with the March 2013 letting:

(1) Use cement conforming to ASTM specifications as follows:

- Type I portland cement; ASTM C150.
- Type II portland cement; ASTM C150.
- Type III portland cement; ASTM C150, for high early strength.
- Type IP portland-pozzolan cement; ASTM C595, except maximum loss on ignition is 2.0 percent.
- Type IS portland blast-furnace slag cement; ASTM C595.
- Type IL portland-limestone cement; ASTM C595, except maximum nominal limestone content is 10 percent with no individual test result exceeding 12.0 percent.

501.2.5.5 Sampling and Testing

Replace the entire text with the following effective with the January 2013 letting:

(1) Sample and test aggregates for concrete according to the following:

Sampling aggregates	AASHTO T2
Lightweight pieces in aggregate	AASHTO T113
Material finer than No. 200 sieve	AASHTO T11
Unit weight of aggregate	AASHTO T19
Organic impurities in sands	AASHTO T21
Sieve analysis of aggregates	AASHTO T27
Effect of organic impurities in fine aggregate	AASHTO T71
Los Angeles abrasion of coarse aggregate	AASHTO T96
Freeze-thaw soundness of coarse aggregate	AASHTO T103
Sodium sulfate soundness of aggregates	AASHTO T104
Specific gravity and absorption of fine aggregate	AASHTO T84
Specific gravity and absorption of coarse aggregate	AASHTO T85
Flat & elongated pieces based on a 3:1 ratio	ASTM D4791[1]
Sampling fresh concrete	AASHTO R60
Making and curing concrete compressive strength test specimens	AASHTO T23
Compressive strength of molded concrete cylinders	AASHTO T22

[1] As modified in CMM 8-60.

501.2.6 Fly Ash

Replace paragraph three with the following effective with the March 2013 letting:

(3) Test fly ash using a recognized laboratory, as defined in 501.2.2(1), starting at least 30 days before its proposed use, and continuing at ASTM-required frequencies as the work progresses. The manufacturer shall test the chemical and physical properties listed in tables 1 and 2 of ASTM C618 at the frequencies and by the test methods prescribed in ASTM C311.

501.3.1.1.1 Air-Entrained Concrete

Replace paragraph one with the following effective with the March 2013 letting:

(1) Prepare air-entrained concrete with type I, IL, II, IS, or IP portland cement and sufficient air-entraining admixture to produce concrete with the air content specified in 501.3.2.4.

503.2.2 Concrete

Replace paragraph five with the following effective with the March 2013 letting:

(5) Furnish prestressed concrete members cast from air-entrained concrete, except I-type girders may use non-air-entrained concrete. Use type I, IL, IS, , IP, II, or III portland cement. The contractor may replace up to 30 percent of type I, IL, II, or III portland cement with an equal weight of fly ash, slag, or a combination of fly ash and slag, except for prestressed box girders and slabs, the contractor shall replace 20-30 percent of the cement with fly ash, slag, or a combination of fly ash and slag. Ensure that fly ash conforms to 501.2.6 and slag conforms to 501.2.7. Use only one source and replacement rate for work under a single bid item. Use a department-approved air-entraining admixture conforming to 501.2.2 for air-entrained concrete. Use only size No. 1 coarse aggregate conforming to 501.2.5.4.

506.3.22 Shop Inspection

Replace paragraph one with the following effective with the July 2010 letting:

(1) The engineer or an independent inspection agency under department contract may inspect all structural steel and miscellaneous metals furnished. The department will provide the contractor with monthly consultant inspection invoices and identify any quality deficiencies at the fabrication facility.

506.5 Payment

Add paragraph nine as follows effective with the June 2010 letting:

(9) The department will limit costs for inspections conducted under 506.3.2 to $0.05 per pound of material and deduct costs in excess of that amount from payment due the contractor. The department will determine costs for in-house inspections based on hourly rates for department staff plus overhead and use invoiced costs for contracted-out inspections. The department will administer deductions for the contractor's share of the total inspection cost under the Excess Costs For Fabrication Shop Inspection administrative item.

507.2.2.1 General

Replace paragraph four with the following effective with the December 2012 letting:

(4) Ensure that there are no unsound knots or knot holes. Also ensure that there are no tight knots of a diameter exceeding one-quarter of the greater dimension at the point where they occur. Measure a knot by taking its diameter at right angles to the length of the timber. Ensure that the sum of sizes of all knots in any one-foot length does not exceed 2 times the size of the largest allowed single knot. The engineer will treat cluster knots as if they were a single knot. A cluster knot is 2 or more knots grouped together, with the fibers of the wood deflected around the entire unit.

512.3.1 Driving and Cutting Off

Replace the entire text with the following effective with the December 2012 letting:

512.3.1.1 General

(1) Coordinate driving operations to prevent damage or displacement of concrete in substructure units or damage to adjacent facilities due to vibrations.

(2) Drive sheeting with a variation of 1/4 inch or less per foot from the vertical or from the batter the plans show. Ensure that the sheetpiles are within 6 inches of the plan position after driving. Do not damage sheetpiles attempting to correct for misalignment.

(3) Remove and replace, or otherwise correct, sheetpiles the engineer deems unacceptable under 105.3. Submit details of planned corrections to the engineer for review and approval before initiating any corrective actions.

(4) Drive sheetpiles to or beyond the required tip elevation the plans show.

512.3.1.2 Driving System

(1) Furnish a sheetpile driving system capable of driving the sheetpiles to the required minimum tip elevation the plans show.

(2) The engineer may order the contractor to remove a pile driving system component from service if it causes insufficient energy transfer or damages the sheetpiles. Do not return a component to service until the engineer determines that it has been satisfactorily repaired or adjusted.

(3) Drive sheetpiles with diesel, air, steam, gravity, hydraulic, or vibratory hammers.

512.3.1.3 Cut-Offs

(1) Cut off sheetpiles at the elevations the plans show or as the engineer directs. Pile cut-offs become the property of the contractor. Dispose of cut-offs not incorporated into the work.

518.2.1 General

Replace paragraph one with the following effective with the March 2013 letting:

(1) Furnish portland cement and water as specified in 501.2. Unless the engineer allows an alternate, use either type I, IL, IS, , or IP portland cement.

526.3.3 Temporary Structures

Replace paragraphs two through four with the following effective with the January 2013 letting:

(2) Inspect temporary structures conforming to the National Bridge Inspection Standards (NBIS) and the department's structure inspection manual before opening to traffic. Perform additional inspections, as the department's structure inspection manual requires, based on structure type and time in service. Submit inspection reports on department form DT2007 to the engineer and electronic copies to the department's bureau of structures maintenance section. Ensure that a department-certified active team leader, listed online in the department's highway structures information system (HSIS), performs the inspections.

(3) Maintain temporary structures and approaches in place until no longer needed. Unless the engineer directs otherwise, completely remove and dispose of as specified in 203.3.4. Contractor-furnished materials remain the contractor's property upon removal.

614.2.5 Wood Posts and Offset Blocks

Retitle and replace the entire text with the following effective with the July 2012 letting:

614.2.5 Posts and Offset Blocks

614.2.5.1 Wood Posts and Offset Blocks

(1) Furnish sawed posts and offset blocks of one of the following species:

Douglas fir	Southern pine	Ponderosa pine	Jack pine	White pine
Red pine	Western hemlock	Western larch	Hem-fir	Oak

(2) Ensure that posts are the size the plans show and conform to the nominal and minimum dimensions tabulated in 507.2.2.3. The contractor does not have to surface the posts. Provide posts of the net length the plans show after setting and cut off.

(3) Use stress graded posts rated at 1200 psi f_b or higher. Determine the stress grade rating for douglas fir, western larch, and southern pine as specified in 507.2.2.4.

(4) For hem-fir, hemlock, red pine, white pine, jack pine, ponderosa pine, and oak conform to the following:

TABLE 614-1 PROPERTIES FOR WOOD POSTS AND BLOCKS

SPECIES			WESTERN HEMLOCK, HEM-FIR, RED PINE, WHITE PINE, JACK PINE, PONDEROSA PINE		OAK	
MAXIMUM SLOPE OF GRAIN			1 in 15		1 in 12	
NOMINAL WIDTH OF FACE			6"	8"	6"	8"
SHAKES, CHECKS, AND SPLITS		GREEN	1"	1 3/8"	2 3/8"	3 1/8"
		SEASONED	1 1/2"	2"	2 5/8"	3 1/2"
MAXIMUM WANE			1"	1 3/8"	1 1/8"	1 5/8"
MAXIMUM ALLOWABLE KNOTS	NARROW FACE	MIDDLE 1/3 OF LENGTH	1 3/8"	1 5/8"	2 1/8"	2 3/8"
		END[1]	2 3/4"	3 1/4"	4 1/4"	4 3/4"
		SUM IN MIDDLE 1/2 OF LENGTH[2]	11"	13"	17"	19
	WIDE FACE	EDGE KNOT N MIDDLE 1/3 OF LENGTH	1 3/8"	1 5/8"		
		EDGE KNOT AT END[1]	2 3/4" 7	3 1/4"		
		CENTERLINE	1 3/8"	1 7/8"	2 1/4"	2 7/8"
		SUM IN MIDDLE 1/2 OF LENGTH	5 1/2"	7 1/2"	9"	11 1/2"

[1] But do not exceed the maximum allowable knot on the centerline of the wide face of the same piece.

[2] But do not exceed 4 times the maximum allowable knot on the centerline of the wide face of the same piece.

(5) Pressure treat posts and offset blocks as specified in 507.2.2.6. Use one of the oil-soluble preservatives or chromated copper arsenate conforming to 507.2.3. Use the same material for offset blocks and posts and treat material used in each continuous installation with the same type of preservative.

614.2.5.2 Steel Posts

(1) Furnish steel posts conforming to AASHTO M270 Grade 36 and galvanized according to AASTHO M111.

614.2.5.3 Plastic Offset Blocks

(1) Furnish plastic offset blocks from the department's approved products list.

614.3.1 General

Replace the entire text with the following effective with the July 2012 letting:

(1) Paint the ends of cut-off galvanized posts, rail, bolts, cut or drilled surfaces of galvanized components, and areas of damaged zinc coating with 2 coats of zinc dust/zinc oxide paint. Clean the damaged and adjacent areas thoroughly before applying paint.

(2) Apply 2 coats of wood preservative to cut surfaces of wood components. Use the same preservative originally used to treat that component or use a 2-percent solution of copper naphthenate conforming to AWPA Standard P8 or P36.

614.3.2.1 Installing Posts

Replace paragraph four with the following effective with the July 2012 letting:

(4) Cut post tops to the finished elevation the plans show.

628.2.13 Rock Bags

Replace paragraph one with the following effective with the November 2012 letting:

(1) Furnish rock bags made of a porous, ultraviolet resistant, high-density polyethylene or geotextile fabric that will retain 70% of its original strength after 500 hours of exposure according to ASTM D4355 and a minimum in-place filled size of 18-inches long by 12-inches wide by 6-inches high. Ensure that the fabric conforms to the following:

TEST REQUIREMENT	METHOD	VALUE
Minimum Tensile	ASTM D4632	
Machine direction		70 lb minimum
Cross direction		40 lb minimum
Elongation	ASTM D4632	
Machine direction		20% minimum
Cross direction		10 % min
Puncture	ASTM 4833	65 lbs minimum
Minimum Apparent Opening		0.0234 inches (No. 30 sieve)
Maximum Apparent Opening		0.0787 inches (No. 10 sieve)

639.2.1 General

Replace paragraph two with the following effective with the March 2013 letting:

(2) For grout use fine aggregate conforming to 501.2.5.3 and type I, IL, IS, or IP portland cement.

649.3.1 General

Replace paragraphs three and four with the following effective with the March 2013 letting:

(3) For pavements open to all traffic, apply centerline and no-passing barrier line markings as follows:

- On intermediate pavement layers, including milled surfaces, on the same day the pavement is placed or milled.
- On the upper layer of pavement, on the same day the pavement is placed unless the contractor applies permanent marking on the same day the pavement is placed.

If weather conditions preclude same-day application, apply as soon as weather allows. Do not resume next-day construction operations until these markings are completed unless the engineer allows otherwise.

(4) If required to apply no passing zone temporary pavement marking, reference the beginning and end of all existing no-passing barrier lines. Apply temporary no-passing barrier lines at those existing locations. If the contract contains the Locating No-Passing Zones bid item, relocate the no-passing zones as specified in section 648 for permanent marking.

701.4.2 Verification Testing

Replace paragraph two with the following effective with the December 2012 letting:

(2) The department will sample randomly at locations independent of the contractor's QC tests and use separate equipment and laboratories. The department will conduct a minimum of one verification test for each 5 contractor QC tests unless specific QMP provisions specify otherwise.

715.2.3.1 Pavements

Replace paragraph two with the following effective with the March 2013 letting:

(2) Provide a minimum cement content of 565 pounds per cubic yard, except if using type I, IL, or III portland cement in a mix where the geologic composition of the coarse aggregate is primarily igneous or metamorphic materials, provide a minimum cement content of 660 pounds per cubic yard.

715.3.1.3 Department Verification Testing

Replace paragraph one with the following effective with the December 2012 letting:

(1) The department will perform verification testing as specified in 701.4.2 except as follows:

- Air content, slump, and temperature: a minimum of 1 verification test per lot.
- Compressive strength: a minimum of 1 verification test per lot.

Errata

Make the following corrections to the 2013 edition of the standard specifications:

102.12 Public Opening of Proposals

Correct 102.12(1) errata by changing htm to shtm in the web link.

(1) The department will publicly open proposals at the time and place indicated in the notice to contractors. The department will post the total bid for each proposal on the Bid Express web site beginning at 9:30 AM except as specified in 102.8. If a proposal has no total bid shown, the department will not post the bid. After verification for accuracy under 103.1, the department will post bid totals on the department's HCCI web site.

http://roadwaystandards.dot.wi.gov/hcci/bid-letting/index.shtm

107.22 Contractor's Responsibility for Utility Facilities, Property, and Services

Correct errata by eliminating references to the department. Costs are determined by statute.

(3) If the contractor damages or interrupts service, the contractor shall notify the utility promptly. Coordinate and cooperate with the utility in the repair of the facility. Determine who is responsible for repair costs according to Wisconsin statutes 66.0831 and 182.0175(2).

204.3.2.2 Removing Items

Correct errata by changing the reference from 490.3.2 to 490.3.

(5) Under the Removing Asphaltic Surface Milling bid item, remove and dispose of existing asphaltic pavement or surfacing by milling at the location and to the depth the plans show. Mill the asphaltic pavement or surfacing as specified for milling salvaged asphaltic pavement in 490.3.

501.2.9 Concrete Curing Materials.

Correct errata by changing AASHTO M171 to ASTM C171.

(4) Furnish polyethylene-coated burlap conforming to ASTM C171 for white burlap-polyethylene sheets.

506.2.6.5.2 Pad Construction

Correct errata by changing ASTM A570 to ASTM A1011.

(4) For the internal steel plates use rolled mild steel conforming to ASTM A36, or ASTM A1011 grade

512.3.3 Painting

Correct errata by changing 511.3.5 to 550.3.11.3.

(1) Paint permanent steel sheet piling as specified for painting steel piling in 550.3.11.3.

513.2.2.8 Toggle Bolts

Correct errata by changing ASTM A570 to ASTM A1011.

(1) Use toggle bolts made of steel, conforming to the plans. Make the assembly from the material specified below:

Toggle bolt and pin ..... Cold finished steel heat-treated Brinell 311-363 ASTM A354.

Toggle washer ..... Hot rolled steel ASTM A1011. Manufacturer's standard washer.

Spacer nut ..... Grade 1213, ASTM A108. Cold finished steel heat-treated ASTM A325.

660.2.1 General

Correct errata by changing section 511 to 550.

(1) Furnish materials conforming to the following:

Concrete ..... section 501

Concrete bridges ..... section 502

Luminaires ..... section 659

Steel piling ..... section 550

Steel reinforcement ..... section 505

660.3.2.3 Pile Type Foundations

Correct errata by changing section 511 to 550.

(1) Drive piles as specified in for steel piling in section 550.

701.3 Contractor Testing

Correct errata by updating AASHTO T141 to AASHTO R60 and changing AASHTO T309 to ASTM C1064.

(1) Perform contract required QC tests for samples randomly located according to CMM 8-30. Also perform other tests as necessary to control production and construction processes, and additional testing enumerated in the contractor's quality control plan or that the engineer directs. Use test methods as follows:

TABLE 701-2 TESTING STANDARDS

TEST	TEST STANDARD
Washed P 200 analysis	AASHTO T11[1]
Sieve analysis of fine and coarse aggregate	AASHTO T27[1]
Aggregate moisture	AASHTO T255[1]
Sampling freshly mixed concrete	AASHTO R60
Air content of fresh concrete	AASHTO T152[2]
Concrete slump	AASHTO T119[2]
Concrete temperature	ASTM C1064
Concrete compressive strength	AASHTO T22
Making and curing concrete cylinders	AASHTO T23
Standard moist curing for concrete cylinders	AASHTO M201

[1] As modified in CMM 8-60.

[2] As modified in CMM 8-70.

ADDITIONAL SPECIAL PROVISION 7

A. Reporting 1st Tier and DBE Payments During Construction

1. Comply with reporting requirements specified in the department's Civil Rights Compliance, Contractor's User Manual, Sublets and Payments.
2. Report payments to all DBE firms within 10 calendar days of receipt of a progress payment by the department or a contractor for work performed, materials furnished, or materials stockpiled by a DBE firm. Report the payment as specified in A(1) for all work satisfactorily performed and for all materials furnished or stockpiled.
3. Report payments to all first tier subcontractor relationships within 10 calendar days of receipt of a progress payment by the department for work performed. Report the payment as specified in A(1) for all work satisfactorily performed.
4. All tiers shall report payments as necessary to comply with the DBE payment requirement as specified in A(2).
5. Require all first tier relationships, DBE firms and all other tier relationships necessary to comply with the DBE payment requirement in receipt of a progress payment by contractor to acknowledge receipt of payment as specified in A(1), (2), (3) and (4).
6. All agreements made by a contractor shall include the provisions in A(1), (2), (3), (4) and (5), and shall be binding on all first tier subcontractor relationships and all contractors and subcontractors utilizing DBE firms on the project.

B. Costs for conforming to this special provision are incidental to the contract.

ADDITIONAL SPECIAL PROVISION 9
Electronic Certified Payroll Submittal

(1) Use the department's Civil Rights Compliance System (CRCS) to submit certified payrolls electronically. Details are available online through the department's highway construction contractor information (HCCI) site on the Labor, Wages, and EEO Information page at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm

(2) Ensure that all tiers of subcontractors, as well as all trucking firms, submit their weekly certified payrolls electronically through CRCS. These payrolls are due within seven calendar days following the close of the payroll period. Every firm providing physical labor towards completing the project is a subcontractor under this special provision.

(3) Upon receipt of contract execution, promptly make all affected firms aware of the requirements under this special provision and arrange for them to receive CRCS training as they are about to begin payrolls. The department will provide training either in a classroom setting at one of our regional offices or by telephone. Contact Tess Mulrooney at 608-267-4489 to schedule the training.

(4) The department will reject all paper submittals of forms DT-1816 and DT-1929 for information required under this special provision. All costs for conforming to this special provision are incidental to the contract.

(5) Firms wishing to export payroll data from their computer system into CRCS should have their payroll coordinator send several sample electronic files to Tess two months before a payroll needs to be submitted. Not every contractor's payroll system is capable of producing export files. For details, see pages 17-22 of the CRCS System Background Information manual available online on the Labor, Wages, and EEO Information page at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/crc-basic-info.pdf

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

SEPTEMBER 2002

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Employment Practices" and "Equal Opportunity Clause" set forth in the Required Contract Provisions, FHWA 1273.

2. The goals and timetables for minority and female participation expressed in percentage terms for the contractor's aggregate work force in each trade, on all construction work in the covered area, are as follows:

Goals for Minority Participation for Each Trade:

County	%	County	%	County	%
Adams	1.7	Iowa	1.7	Polk	2.2
Ashland	1.2	Iron	1.2	Portage	0.6
Barron	0.6	Jackson	0.6	Price	0.6
Bayfield	1.2	Jefferson	7.0	Racine	8.4
Brown	1.3	Juneau	0.6	Richland	1.7
Buffalo	0.6	Kenosha	3.0	Rock	3.1
Burnett	2.2	Kewaunee	1.0	Rusk	0.6
Calumet	0.9	La Crosse	0.9	St. Croix	2.9
Chippewa	0.5	Lafayette	0.5	Sauk	1.7
Clark	0.6	Langlade	0.6	Sawyer	0.6
Columbia	1.7	Lincoln	0.6	Shawano	1.0
Crawford	0.5	Manitowoc	1.0	Sheboygan	7.0
Dane	2.2	Marathon	0.6	Taylor	0.6
Dodge	7.0	Marinette	1.0	Trempealeau	0.6
Door	1.0	Marquette	1.7	Vernon	0.6
Douglas	1.0	Menominee	1.0	Vilas	0.6
Dunn	0.6	Milwaukee	8.0	Walworth	7.0
Eau Claire	0.5	Monroe	0.6	Washburn	0.6
Florence	1.0	Oconto	1.0	Washington	8.0
Fond du Lac	1.0	Oneida	0.6	Waukesha	8.0
Forest	1.0	Outagamie	0.9	Waupaca	1.0
Grant	0.5	Ozaukee	8.0	Waushara	1.0
Green	1.7	Pepin	0.6	Winnebago	0.9
Green Lake	1.0	Pierce	2.2	Wood	0.6

Goals for female participation for each trade: 6.9%

These goals are applicable to all the contractor's construction work, (whether or not it is federal or federally assisted), performed in the covered area. If the contractor performs construction work in the geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the Executive Order and the Regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the Regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

   As referred to in this section, the Director means:

   Director
   Office of Federal Contract Compliance Programs
   Ruess Federal Plaza
   310 W. Wisconsin Ave., Suite 1115
   Milwaukee, WI 53202

   The "Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

4. As used in this notice, and in the contract resulting from solicitation, the "covered area" is the county(ies) in Wisconsin to which this proposal applies.

APRIL 2013

ADDITIONAL FEDERAL-AID PROVISIONS

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible bid rigging, bidding collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

Effective with September 2004 Letting

WISCONSIN DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS AND TRANSPORTATION FACILITIES

SUPPLEMENTAL REQUIRED CONTRACT PROVISIONS

I. WAGE RATES, HOURS OF LABOR AND PAYMENT OF WAGES

The schedule of "Minimum Wage Rates" attached hereto and made a part hereof furnishes the prevailing wage rates that have been determined pursuant to Section 103.50 of the Wisconsin Statutes. These wage rates are the minimum required to be paid to the various laborers, workers, mechanics and truck drivers employed by contractors and subcontractors on the construction work embraced by the contract and subject to prevailing hours and wages under Section 103.50, Stats. If necessary to employ laborers, workers, mechanics or truck drivers whose classification is not listed on the schedule, they shall be paid at rates conformable to those listed for similar classifications. Apprentices shall be paid at rates not less than those prescribed in their state indenture contacts.

While the wage rates shown are the minimum rates required by the contract to be paid during its life, this in not a representation that labor can be obtained at these rates. It is the responsibility of bidders to inform themselves as to the local labor conditions and prospective changes or adjustments of wage rates. No increase in the contract price shall be allowed or authorized on account of the payment of wage rates in excess of those listed herein.

Pursuant to Section 103.50 of the Wisconsin Statutes, the prevailing hours of labor have been determined to be up to 10 hours per day and 40 hours per calendar week Monday through Friday. If any laborer, worker, mechanic or truck driver is permitted or required to work more than the prevailing number of hours per day or per calendar week on this contract, they shall be paid for all hours in excess of the prevailing hours at a rate of at least one and one-half (1 1/2) times their hourly rate of pay. All work on Saturday, Sunday and the following holidays is to be paid at time and a half: (1) January 1, (2) the last Monday in May, (3) July 4, (4) the first Monday in September, (5) the fourth Thursday in November, (6) December 25, (7) the day before if January 1, July 4 or December 25 falls on a Saturday and (8) the day following if January 1, July 4 or December 25 falls on a Sunday.

All laborers, workers, mechanics and truck drivers shall be paid unconditionally not less often than once a week. Persons who own and operate their own trucks must receive the prevailing truck driver rate for the applicable type of truck (i.e. 2 axle, 3 or more axle, articulated, eculid or dumptor) he or she operates, plus an agreed upon amount for the use of his or her truck. Every owner-operator MUST be paid separately for their driving and for the use of their truck.

For those projects subject to the requirements of the Davis-Bacon Act, the Secretary of Labor will also have determined "Minimum Wage Rates" for work to be performed under the contract. These rates are, for all or most of the labor, worker, mechanic or truck driver classifications, identical to those established under Section 103.50 of the Wisconsin Statutes. In the event the rates are not identical, the higher of the two rates will govern.

II. PAYROLL REQUIREMENTS

All contractors and subcontractors must submit weekly Certified Payrolls and Compliance Statement verifying that all laborers, workers, mechanics and truck drivers working on the project have been paid the prevailing wage rates for all work performed under the contract required by Section 103.50 of the Wisconsin Statutes.

III. POSTINGS AT THE SITE OF THE WORK

In addition to the required postings furnished by the Department, the contractor shall post the following in at least one conspicuous place at the site of work:

a. "NOTICE TO EMPLOYEES," which provides information required to be posted by the provisions of Section 103.50 of the Wisconsin Statutes.

b. A copy of the State of Wisconsin Minimum Wages Rates. (Four pages.)

c. A copy of the contractor's Equal Employment Opportunity Policy.

d. On any project involving federal aid, in addition to the furnished postings, the contractor shall post a copy of the "Davis-Bacon Act, Minimum Wage Rates". (Three pages.)

IV. WAGE RATE REDISTRIBUTION

The amount specified as the hourly basic rate of pay and the amount(s) specified as the fringe benefit contribution(s), for all classes of laborers, workers, mechanics or truck drivers may be redistributed, when necessary, to conform to those specified in any applicable collective bargaining agreement, provided that both parties to such agreement

request and receive the approval for any such redistribution from both the Department of Transportation and the Department of Workforce Development prior to the implementation of such redistribution.

V. ADDITIONAL CLASSIFICATIONS

Any unlisted laborer or mechanic classification that is needed to perform work on this project, and is not included within the scope of any of the classifications listed in the application prevailing wage rate determination, may be added after award only if all of the following criteria have been met:

1. The affected employer(s) must make a written request to WisDOT Central Office to utilize the unlisted classification on this project.

2. The request must indicate the scope of the work to be performed by the unlisted classification and must indicate the proposed wage/fringe benefit package that the unlisted classification is to receive.

3. The work to be performed by the unlisted classification must not be performed by a classification that is included in the applicable prevailing wage rate determination.

4. The unlisted classification must be commonly employed in the area where the project is located.

5. The proposed wage/fringe benefit package must bear a reasonable relationship to those set forth in the applicable prevailing wage rate determination.

6. The request should be made prior to the actual performance of the work by the unlisted classification.

7. DWD must approve the use of the unlisted classification and the proposed wage/fringe benefit package. USDOL also must approve the use of the unlisted classification and the proposed wage/fringe benefit package on federal aid projects.

8. WisDOT and DWD may amend the proposed wage/fringe benefit package, as deemed necessary, and may set forth specific employment ratios and scope of work requirements in the approval document.

The approved wage/fringe benefit package shall be paid to all laborers, workers, mechanics or truck drivers performing work within the scope of that performed by the unlisted classification, from the first day on which such work is performed. In the event that work is performed by the unlisted classification prior to approval, the wage/fringe benefit package to be paid for such work must be in conformance with the wage/fringe

benefit package approved for such work. Under this arrangement a retroactive adjustment in wages and/or fringe benefits may be required to be made to the affected laborers, workers, mechanics or truck drivers by the affected employer(s).

ANNUAL PREVAILING WAGE RATE DETERMINATION
FOR ALL STATE HIGHWAY PROJECTS
BROWN COUNTY

Compiled by the State of Wisconsin - Department of Workforce Development
for the Department of Transportation
Pursuant to s. 103.50, Stats.
Issued on May 1, 2013

CLASSIFICATION: Contractors are required to call the Department of Workforce Development if there are any questions reqarding the proper trade or classification to be used for any worker on a public works project.

OVERTIME: Time and one-half must be paid for all hours worked over 10 hours per day and 40 hours per calendar week and for all hours worked on Saturday, Sunday and the following six (6) holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; the day before if January 1, July 4 or December 25 falls on a Saturday; the day following if January 1, July 4 or December 25 falls on a Sunday.

FUTURE INCREASE: If indicated for a specific trade or occupation, the full amount of such increase MUST be added to the "TOTAL" indicated for such trade or occupation on the date(s) such increase(s) becomes effective.

PREMIUM PAY: If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.

SUBJOURNEY: Wage rates may be available for some of the classifications indicated below. Any employer that desires to use any subjourney classification on a project MUST request the applicable wage rate from the Department of Workforce Development PRIOR to the date such classification is used on such project. Form ERD-10880 is available for this purpose and can be obtained by writing to the Department of Workforce Development, Equal Rights Division, P.O. Box 8928, Madison, WI 53708.

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
	$	$	$
Bricklayer, Blocklayer or Stonemason	35.58	19.20	54.78
Carpenter	30.16	15.31	45.47
Cement Finisher	31.52	16.60	48.12
Future Increase(s): Add $1.87 on 6/1/13; Add $1.87 on 6/1/14; Add $1.87 on 6/1/15;Add $1.75 on 6/1/16. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			
Electrician	28.01	16.49	44.50
Fence Erector	28.00	4.50	32.50
Ironworker	28.03	21.97	50.00
Line Constructor (Electrical)	31.29	15.34	46.63
Painter	23.62	9.07	32.69
Pavement Marking Operator	24.10	16.85	40.95
Piledriver	30.66	15.31	45.97
Roofer or Waterproofer	20.93	5.48	26.41
Teledata Technician or Installer	21.26	11.75	33.01
Tuckpointer, Caulker or Cleaner	23.41	14.51	37.92
Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	33.35	14.21	47.56
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	35.50	15.09	50.59
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
	$	$	$
TRUCK DRIVERS			
Single Axle or Two Axle	33.22	18.90	52.12
Three or More Axle	23.31	17.13	40.44
Future Increase(s): Add $1.85/hr on 6/1/2013. Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Articulated, Euclid, Dumptor, Off Road Material Hauler	27.77	19.90	47.67
Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.			
Pavement Marking Vehicle	23.99	14.70	38.69
Shadow or Pilot Vehicle	33.22	18.90	52.12
Truck Mechanic	22.50	16.19	38.69
LABORERS			
General Laborer	28.07	13.90	41.97
Future Increase(s): Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014. Premium Pay: Add $.10/hr for topman, air tool operator, vibrator or tamper operator (mechanical hand operated), chain saw operator and demolition burning torch laborer; Add $.15/hr for bituminous worker (raker and luteman), formsetter (curb, sidewalk and pavement) and strike off man; Add $.20/hr for blaster and powderman; Add $.25/hr for bottomman; Add $.35/hr for line and grade specialist; Add $.45/hr for pipelayer. DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).			
Asbestos Abatement Worker	30.06	0.00	30.06
Landscaper	28.07	13.90	41.97
Future Increase(s): Add $1.70/hr on 6/1/13; Add $1.60/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).			
Flagperson or Traffic Control Person	24.70	13.90	38.60
Future Increase(s): Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
Railroad Track Laborer	23.41	15.14	38.55

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
HEAVY EQUIPMENT OPERATORS			
Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Traveling Crane (Bridge Type). Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.	35.22	19.90	55.12
Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs., & Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver. Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.	34.72	19.90	54.62
Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boatmen (NOT Performing Work on the Great Lakes); Boring Machine (Directional, Horizontal or Vertical); Bridge (Bidwell) Paver; Bulldozer or Endloader; Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, VIbratory/Sonic, Manual or Remote); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Conveyor System; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump, Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane WIth a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A- Frames. Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.	34.22	19.90	54.12

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
	$	$	$
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.			
Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or WIthout Attachments); Telehandler; Tining or Curing Machine.	33.96	19.90	53.86
Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.			
Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack.	33.67	19.90	53.57
Future Increase(s): Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor- wages- eeo/ index. shtm.			
Fiber Optic Cable Equipment.	25.74	15.85	41.59
Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	27.75	19.15	46.90
Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks-Great Lakes ONLY.	27.75	19.15	46.90

SUPERSEDES DECISION WI20070010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin
DECISION NUMBER: W1080010
DATE: February 1, 2013
DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

LABORERS CLASSIFICATION:	Basic Hourly Rates	Fringe Benefits
Group 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence and Bridge Builder; Landscaper, Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, Utility Man); Batch Truck Dumper; or Cement Handler; Bituminous Worker; (Dumper, Ironer, Smoother, Tamper); Concrete Handler	$26.92	13.45
Group 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated);	27.02	13.45
Group 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off man	27.07	13.45
Group 4: Line and Grade Specialist	27.27	13.45
Group 5: Blaster and Powderman	27.12	13.45
Group 6: Flagperson; Traffic Control	23.55	13.45

Truck Drivers:	Basic Hourly Rates	Fringe Benefits
1 & 2 Axles	23.16	17.13
Three or More Axles; Euclids, Dumptor & Articulated, Truck Mechanic	23.31	17.13

Notes: Welders receive rate prescribed for craft performing operation to which welding is incidental. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)). Includes Modification #0, dated January 4, 2013; Modification #1 dated February 1, 2013.

CLASSES OF LABORER AND MECHANICS

Bricklayer	30.77	16.62
Carpenter	30.48	15.80
Millwright	32.11	15.80
Piledriverman	30.98	15.80
Ironworker	28.23	22.72
Cement Mason/Concrete Finisher	31.52	16.30
Electrician		See Page 3
Line Construction		
Lineman	38.25	18.00
Heavy Equipment Operator	34.43	16.71
Equipment Operator	30.60	15.41
Heavy Groundman Driver	26.78	14.11
Light Groundman Driver	24.86	13.45
Groundsman	21.04	12.16
Painters	23.37	11.52
Well Drilling:		
Well Driller	16.52	3.70

SUPERSEDES DECISION WI20070010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin
DECISION NUMBER: W1080010
DATE: February 1, 2013
DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

LABORERS CLASSIFICATION:	Basic Hourly Rates	Fringe Benefits
Group 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence and Bridge Builder; Landscaper, Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, Utility Man); Batch Truck Dumper; or Cement Handler; Bituminous Worker; (Dumper, Ironer, Smoother, Tamper); Concrete Handler	$26.92	13.45
Group 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated);	27.02	13.45
Group 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off man	27.07	13.45
Group 4: Line and Grade Specialist	27.27	13.45
Group 5: Blaster and Powderman	27.12	13.45
Group 6: Flagperson; Traffic Control	23.55	13.45

CLASSES OF LABORER AND MECHANICS

Bricklayer	26.78	12.75
Carpenter	30.48	15.80
Millwright	32.11	15.80
Piledriverman	30.98	15.80
Ironworker	28.23	22.72
Cement Mason/Concrete Finisher	31.52	16.30
Electrician		See Page 3
Line Construction		
Lineman	38.25	18.00
Heavy Equipment Operator	34.43	16.71
Equipment Operator	30.60	15.41
Heavy Groundman Driver	26.78	14.11
Light Groundman Driver	24.86	13.45
Groundsman	21.04	12.16
Painters	23.37	11.52
Well Drilling:		
Well Driller	16.52	3.70

Truck Drivers:	Basic Hourly Rates	Fringe Benefits
1 & 2 Axles	23.16	17.13
Three or More Axles; Euclids, Dumptor & Articulated, Truck Mechanic	23.31	17.13

Notes: Welders receive rate prescribed for craft performing operation to which welding is incidental. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)). Includes Modification #0, dated January 4, 2013; Modification #1 dated February 1, 2013.

SUPERSEDES DECISION WI20070010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin
DECISION NUMBER: W1080010
DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: February 1, 2013

POWER EQUIPMENT OPERATORS CLASSIFICATION:	Basic Hourly Rates	Fringe Benefits
Group 1: Cranes, tower cranes and derricks, with or without attachments, with a lifting capacity of over 100 tons or cranes, tower cranes and derricks with boom, leads and/or jib lengths measuring 176 feet or longer	$35.22	$19.65
Group 2: Cranes, tower cranes and derricks, with or without attachments, with a lifting capacity of 100 tons or less or cranes, tower cranes and derricks with boom, leads and/or jib lengths measuring 175 feet or less, and backhoes (excavators) having a manufacturer's rated capacity of 3 cu. yds. and over, caisson rigs, pile driver, dredge operator, dredge engineer.	$34.72	$19.65
Group 3: Mechanic or welder - heavy duty equipment, cranes with a lifting capacity of 25 tons or less, concrete breaker (manual or remote); vibrator/sonic concrete breaker; concrete laser screed; concrete slipform paver; concrete batch plant operator; concrete pavement spreader - heavy duty (rubber tired); concrete spreader and distributor, automatic subgrader (concrete); concrete grinder and planing machine; concrete slipform curb and gutter machine; slipform concrete placer; tube finisher; hydro blaster (10,000 psi and over); bridge paver; concrete conveyor system; concrete pump; stabilizing mixer (self propelled); shoulder widener; asphalt plant engineer; bituminous paver; bump cutter and grooving machine; milling machine; screed (bituminous paver); asphalt heater, planer and scarifier; backhoes (excavators) having a manufacturers rated capacity of under 3 cu. yds.; grader or motor patrol; tractor (scraper, dozer, pusher, loader); scraper - rubber tired (single or twin engine); endloader hydraulic backhoe (tractor-type); trenching machine; skid rigs; tractor, side boom (heavy); drilling or boring machine (mechanical heavy); roller (over 5 tons); percussion or rotary drilling machine; air track; blaster; loading machine (conveyor); tugger; boatmen; winches and A-frames; post driver; material hoist operator.	$34.22	$19.65
Group 4: Greaser, roller steel (5 tons or less); roller (pneumatic tired) - self-propelled; tractor (mounted or towed compactors and light equipment); shouldering machine; self-propelled chip spreader; concrete spreader; finishing machine; mechanical float; curing machine; power subgrader; joint saw (multiple blade) belting machine; burlap machine; texturing machine; tractor, endloader (rubber tired) - light; jeep digger; fork lift; mulcher; launch operator; fireman; environmental burner.	$33.96	$19.65
Group 5: Air compressor; power pack; vibratory hammer and extractor; heavy equipment, leadman; tank car heaters; stump chipper; curb machine operator; concrete pro-portioning plants generators; mudjack operator; rock breaker; crusher or screening plant; screed (milling machine); automatic belt conveyor and surge bin; pug mill operator; oiler; pump (over 3 inches); drilling machine helper.	$33.67	$19.65
Group 6: Off – road material hauler with or without ejector	$27.77	$19.65

Premium Pay:
EPA Level "A" protection - $3.00 per hour
EPA Level "B" protection - $2.00 per hour
EPA Level "C" protection - $1.00 per hours

SUPERSEDES DECISION WI20070010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin
DECISION NUMBER: W1080010
DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: February 1, 2013

LABORERS CLASSIFICATION:	Rates	Benefits
Electricians		
Area 1	$27.80	16.52
Area 2:		
Electricians	29.13	17.92
Area 3:		
Electrical contracts under $130,000	26.24	16.85
Electrical contracts over $130,000	29.41	16.97
Area 4:	28.10	17.24
Area 5	28.61	16.60
Area 6	35.25	19.30
Area 8		
Electricians	30.00	17.76
Area 9:		
Electricians	32.94	18.71
Area 10	28.97	19.55
Area 11	31.27	23.12
Area 12	32.87	19.23
Area 13	32.20	21.64
Teledata System Installer		
Area 14		
Installer/Technician	21.89	11.83
Sound & Communications		
Area 15		
Installer	16.47	14.84
Technician	24.75	16.04

Area 1 - CALUMET (except township of New Holstein), GREEN LAKE (N. part, including Townships of Berlin, St. Marie and Seneca), MARQUETTE (N. part, including Townships of Crystal Lake, Neshkoro, Newton & Springfield), OUTAGAMIE, WAUPACA, WAUSHARA and WINNEBAGO COUNTIES.

Area 2 - ASHLAND, BARRON, BAYFIELD, BUFFALO, BURNETT, CHIPPEWA, CLARK (except Mayville, Colby, Unity, Sherman, Fremont, Lynn and Sherwood), CRAWFORD, DUNN, EAU CLAIRE, GRANT, IRON, JACKSON, LA CROSSE, MONROE, PEPIN, PIERCE, POLK, PRICE, RICHLAND, RUSK, ST. CROIX, SAWYER, TAYLOR, TREMPEALEAU, VERNON and WASHBURN COUNTIES

Area 3 - FLORENCE (townships of Aurora, Commonwealth, Fern, Florence and Homestead), MARINETTE (Niagara township)

Area 4 - BROWN, DOOR, KEWAUNEE, MANITOWOC (except Schleswig), MARINETTE (Wausauke and area south thereof), OCONTO, MENOMINEE (East of a line 6 miles West of the West boundary of Oconto County), SHAWANO (except area North of Townships of Aniwa and Hutchins) COUNTIES.

Area 5 - ADAMS, CLARK (Colby, Freemont, Lynn, Mayville, Sherman, Sherwood, Unity), FOREST, JUNEAU, LANGLADE, LINCOLN, MARATHON, MARINETTE (Area North of the town of Wausaukee), MENOMINEE (Area West of a line 6 miles West of the West boundary of Oconto County), ONEIDA, PORTAGE, SHAWANO (Area North of the townships of Aniwa and Hutchins), VILAS AND WOOD COUNTIES

Area 6 - KENOSHA COUNTY

Area 8 - DODGE, (Emmet Township only), GREEN, JEFFERSON, LAFAYETTE, RACINE (Burlington township), ROCK and WALWORTH COUNTIES

Area 9 - COLUMBIA, DANE, DODGE, (area west of Hwy. 26, except Chester & Emmet Townships), GREEN LAKE (except townships of Berlin, Seneca and St. Marie), IOWA, MARQUETTE (except townships of Neshkoka, Crystal Lake, Newton and Springfield), and SAUK COUNTIES

Area 10 - CALUMET (Township of New Holstein), DODGE (East of Hwy. 26 including Chester Township), FOND DU LAC, MANITOWOC (Schleswig), and SHEBOYGAN COUNTIES

Area 11 - DOUGLAS COUNTY

Area 12 - RACINE (except Burlington township) COUNTY

Area 13 - MILWAUKEE, OZAUKEE, WASHINGTON and WAUKESHA COUNTIES

Area 14 - Statewide.

Area 15 - DODGE (East of Hwy 26 including Chester Twp, excluding Emmet Twp), FOND DU LAC (Except Waupun), MILWAUKEE, OZAUKEE, MANITOWOC (Schleswig), WASHINGTON, AND WAUKESHA COUNTIES.

FEBRUARY 1999

NOTICE TO BIDDERS
WAGE RATE DECISION

The wage rate decision of the Secretary of Labor which has been incorporated in these advertised specifications is incomplete in that the classifications may be omitted from the Secretary of Labor's decision.

Since the bidder is responsible, independently, for ascertaining area practice with respect to the necessity, or lack of necessity, for the use of these classifications in the prosecution of the work contemplated by this project, no inference may be drawn from the omision of these classifications concerning prevailing area practices relative to their use. Further, this omission will not, per se, be construed as establishing any governmental liability for increased labor cost if it is subsequently determined that such classifications are required.

There may be omissions and/or errors in the federal wage rates. The bidder is responsible for evaluating and determining the correct applicable rate. The higher of state or federal rate will apply.

SCHEDULE OF ITEMS REVISED:

CONTRACT: 20130611009

PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71

FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 CONTRACT ITEMS					
0010	203.0210.S ABATEMENT OF ASBESTOS CONTAINING MATERIAL (STRUCTURE) 01. B-05-134	LUMP	LUMP			.
0020	203.0700.S REMOVING OLD STRUCTURE OVER WATERWAY WITH DEBRIS CAPTURE SYSTEM (STATION) 01. 42+50	LUMP	LUMP			.
0030	204.0100 REMOVING PAVEMENT	20.000 SY	.			.
0040	204.0110 REMOVING ASPHALTIC SURFACE	2.000 SY	.			.
0050	204.0150 REMOVING CURB & GUTTER	15.000 LF	.			.
0060	204.0155 REMOVING CONCRETE SIDEWALK	40.000 SY	.			.
0070	204.0195 REMOVING CONCRETE BASES	2.000 EACH	.			.
0080	204.9060.S REMOVING (ITEM DESCRIPTION) 01. STATIONARY BALLARDS	2.000 EACH	.			.

CONTRACT: 20130611009

PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71

FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0090	205.9015.S GRADING SHAPING & FINISHING INTERSECTION (LOCATION) 01. WATER STREET	LUMP	LUMP			.
0100	213.0100 FINISHING ROADWAY (PROJECT) 01. 4065-15-71	1.000 EACH		.		.
0110	305.0120 BASE AGGREGATE DENSE 1 1/4-INCH	20.000 TON		.		.
0120	415.0090 CONCRETE PAVEMENT 9-INCH	5.000 SY		.		.
0130	416.0610 DRILLED TIE BARS	16.000 EACH		.		.
0140	465.0105 ASPHALTIC SURFACE	1.000 TON		.		.
0150	502.0100 CONCRETE MASONRY BRIDGES 01. B-05-134	19.000 CY		.		.
0160	502.5005 MASONRY ANCHORS TYPE L NO. 5 BARS	74.000 EACH		.		.
0170	502.6115 MASONRY ANCHORS TYPE S 7/8-INCH	8.000 EACH		.		.
0180	505.0405 BAR STEEL REINFORCEMENT HS BRIDGES	290.000 LB		.		.

CONTRACT: 20130611009
PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71
FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0190	505.0605 BAR STEEL REINFORCEMENT HS COATED BRIDGES	1,680.000 LB		.		.
0200	506.0105 STRUCTURAL STEEL CARBON	4,120.000 LB		.		.
0210	506.0605 STRUCTURAL STEEL HS	21,840.000 LB		.		.
0220	513.4050 RAILING TUBULAR TYPE F (STRUCTURE) 01. B-05-134	LUMP	LUMP			.
0230	517.0600 PAINTING EPOXY SYSTEM (STRUCTURE) 01. B-05-134	LUMP	LUMP			.
0240	601.0409 CONCRETE CURB & GUTTER 30-INCH TYPE A	14.000 LF		.		.
0250	601.0452 CONCRETE CURB & GUTTER INTEGRAL 30-INCH TYPE D	26.000 LF		.		.
0260	602.0410 CONCRETE SIDEWALK 5-INCH	410.000 SF		.		.
0270	602.0505 CURB RAMP DETECTABLE WARNING FIELD YELLOW	8.000 SF		.		.
0280	603.8000 CONCRETE BARRIER TEMPORARY PRECAST DELIVERED	662.500 LF		.		.

CONTRACT: 20130611009
PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71
FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0290	603.8125 CONCRETE BARRIER TEMPORARY PRECAST INSTALLED	662.500 LF		.		.
0300	614.0905 CRASH CUSHIONS TEMPORARY	2.000 EACH		.		.
0310	616.0700.S FENCE SAFETY	200.000 LF		.		.
0320	619.1000 MOBILIZATION	1.000 EACH		.		.
0330	628.1905 MOBILIZATIONS EROSION CONTROL	2.000 EACH		.		.
0340	628.1910 MOBILIZATIONS EMERGENCY EROSION CONTROL	1.000 EACH		.		.
0350	628.2006 EROSION MAT URBAN CLASS I TYPE A	20.000 SY		.		.
0360	628.7015 INLET PROTECTION TYPE C	1.000 EACH		.		.
0370	638.2102 MOVING SIGNS TYPE II	4.000 EACH		.		.
0380	638.4000 MOVING SMALL SIGN SUPPORTS	1.000 EACH		.		.

CONTRACT: 20130611009

PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71

FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0390	643.0100 TRAFFIC CONTROL (PROJECT) 01. 4065-15-70	1.000 EACH		.		.
0400	643.0100 TRAFFIC CONTROL (PROJECT) 02. 4180-07-71	1.000 EACH		.		.
0410	643.0100 TRAFFIC CONTROL (PROJECT) 03. 9210-14-71	1.000 EACH		.		.
0420	643.0300 TRAFFIC CONTROL DRUMS	2,251.000 DAY		.		.
0430	643.0410 TRAFFIC CONTROL BARRICADES TYPE II	286.000 DAY		.		.
0440	643.0420 TRAFFIC CONTROL BARRICADES TYPE III	345.000 DAY		.		.
0450	643.0705 TRAFFIC CONTROL WARNING LIGHTS TYPE A	690.000 DAY		.		.
0460	643.0715 TRAFFIC CONTROL WARNING LIGHTS TYPE C	1,039.000 DAY		.		.
0470	643.0900 TRAFFIC CONTROL SIGNS	2,234.000 DAY		.		.
0480	643.1050 TRAFFIC CONTROL SIGNS PCMS	28.000 DAY		.		.

CONTRACT: 20130611009
PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71
FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0490	646.0600 REMOVING PAVEMENT MARKINGS	380.000 LF		.		.
0500	647.0566 PAVEMENT MARKING STOP LINE EPOXY 18-INCH	15.000 LF		.		.
0510	647.0766 PAVEMENT MARKING CROSSWALK EPOXY 6-INCH	67.000 LF		.		.
0520	649.0400 TEMPORARY PAVEMENT MARKING REMOVABLE TAPE 4-INCH	400.000 LF		.		.
0530	690.0150 SAWING ASPHALT	21.000 LF		.		.
0540	690.0250 SAWING CONCRETE	84.000 LF		.		.
0550	ASP.1T0A ON-THE-JOB TRAINING APPRENTICE AT $5.00/HR	2,000.000 HRS	5.00000		10000.00	
0560	ASP.1T0G ON-THE-JOB TRAINING GRADUATE AT $5.00/HR	1,320.000 HRS	5.00000		6600.00	
0570	SPV.0060 SPECIAL 01. BARRIER GATE BASE	2.000 EACH		.		.
0580	SPV.0060 SPECIAL 02. BOLLARD POSTS	2.000 EACH		.		.

CONTRACT: 20130611009
PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71
FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0590	SPV.0105 SPECIAL 01. MASON STREET BRIDGE ELECTRICAL WORK, B-05-134	LUMP	LUMP			.
0600	SPV.0105 SPECIAL 02. WALNUT STREET BRIDGE ELECTRICAL WORK, B-05-269	LUMP	LUMP			.
0610	SPV.0105 SPECIAL 03. TAYCO STREET BRIDGE ELECTRICAL WORK, B-70-097	LUMP	LUMP			.
0620	SPV.0105 SPECIAL 04. MASON STREET BRIDGE CCTV SYSTEM, B-05-134	LUMP	LUMP			.
0630	SPV.0105 SPECIAL 05. WALNUT STREET BRIDGE CCTV SYSTEM, B-05-269	LUMP	LUMP			.
0640	SPV.0105 SPECIAL 06. TAYCO STREET BRIDGE CCTV SYSTEM, B-70-097	LUMP	LUMP			.
0650	SPV.0105 SPECIAL 07. MASON STREET BRIDGE MACHINERY WORK, B-05-134	LUMP	LUMP			.
0660	SPV.0105 SPECIAL 08. REMOVING RETRACTABLE BOLLARD TRAFFIC BARRIER SYSTEM	LUMP	LUMP			.
0670	SPV.0105 SPECIAL 09. SURVEY PROJECT 4065-15-71	LUMP	LUMP			.

CONTRACT: 20130611009
PROJECT(S): 4065-15-71, 4180-07-71, 9210-14-71
FEDERAL ID(S): N/A, N/A, WISC 2013308

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0680	SPV.0105 SPECIAL 10. MASON STREET BRIDGE STEEL THRIE BEAM, B-05-134	LUMP	LUMP			.
	SECTION 0001 TOTAL					.
	TOTAL BID					.

PLEASE ATTACH SCHEDULE OF ITEMS HERE