CITY OF MILWAUKEE

DEPARTMENT OF PUBLIC WORKS

INFRASTRUCTURE SERVICES DIVISION
STREET AND BRIDGES UNIT
STRUCTURAL DESIGN

REHABILITATION

OF THE

PLEASANT STREET LIFT BRIDGE

OVER THE

MILWAUKEE RIVER

LOCATED IN

MILWAUKEE, WI

JOB NUMBER : BR100070104

OFFICIAL NOTICE NUMBER : 86 DATE : JUNE, 2012

CITY OF MILWAUKEE, WISCONSIN

DEPARTMENT OF PUBLIC WORKS

INFRASTRUCTURE SERVICES DIVISION

Specifications

Governing

REHABILITATION
OF THE
PLEASANT STREET LIFT BRIDGE
OVER THE
MILWAUKEE RIVER

Milwaukee, Wisconsin

Job No. BR100070104

JUNE, 2012

TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS	PAGE NO.
SECTION 00 01 01 – PROJECT TITLE PAGE	00 01 01/1
SECTION 00 01 07 – COVER PAGE	00 01 07/1
SECTION 00 01 10 – TABLE OF CONTENTS	00 01 10/1
INSTRUCTIONS FOR PROCUREMENT	
SECTION 00 11 14 – CITY OF MILWAUKEE GENERAL OFFICIAL NOTICE	00 11 14/1
SECTION 00 11 17 – CITY OF MILWAUKEE SPECIFIC OFFICIAL NOTICE	00 11 17/1
SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS	00 21 13/1-2
CONDITIONS OF THE CONTRACT	
SECTION 00 72 00 – GENERAL CONDITIONS	00 72 00/1-9
SECTION 00 73 01 – INSPECTION CHARGES	00 73 01/1
SECTION 00 73 02 – INCENTIVE/DISINCENTIVE FOR COMPLETION OF WORK	00 73 02/1-2
SECTION 00 73 43 – MINIMUM WAGE SCALE	00 73 43/1-34
SECTION 00 83 00 – PARTIAL PAYMENTS FOR STORED MATERIALS	00 83 00/1
DIVISION 1 – GENERAL REQUIREMENTS	
SECTION 01 11 00 – SUMMARY OF WORK	01 11 00/1-4
SECTION 01 22 00 – UNIT PRICES	01 22 00/1-2
SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES	01 26 00/1-2
SECTION 01 31 13 – PROJECT COORDINATION	01 31 13/1-2
SECTION 01 31 19 – PROJECT MEETINGS	01 31 19/1-2
SECTION 01 33 01 – SUBMITTALS/PERMITS	01 33 01/1-3
SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS	01 50 00/1-2
SECTION 01 60 01 – MATERIALS AND EQUIPMENT	01 60 01/1
SECTION 01 70 01 – CLEANING AND PROJECT CLOSE-OUT	01 70 01/1-3
SPECIAL PROVISIONS	
SEE SPECIAL PROVISIONS TABLE OF CONTENTS	

CITY OF MILWAUKEE GENERAL
OFFICIAL NOTICE TO CONTRACTORS

Separate sealed bids for each project will be received until 10:30 a.m. of the bid opening date at which time bids will be publicly opened and read for furnishing all material and doing all work for each project in accordance with the requirements of the respective Official Notice on the bid form furnished in accordance with plans, specifications, contract documents, and proposed form of contract on file in the office of the Department of Public Works, Frank P. Zeidler Municipal Building, Room 507, Milwaukee, Wisconsin 53202.

PROSPECTIVE BIDDERS ARE TO CAREFULLY EXAMINE AND REVIEW ALL CONTRACT DOCUMENTS AND MATERIALS IN SAID OFFICE BEFORE SUBMITTING BID.

Affidavits of No Interest must accompany the bids, and the failure of prospective bidders to comply with these requirements may disqualify the bid.

The Contractor/Lessee agrees to comply with all applicable requirements of the American with Disabilities Act of 1990, 42 U.S.C. Section 12101, Et. Seq. the TDD Number for Public Works is (414) 286-2025.

As a part of the bid each bidder shall submit a full and complete list of all the proposed subcontractors and the class of work to be performed by each, which list shall not be added to nor altered without the written consent of the Commissioner of Public Works.

All Contractors and subcontractors are required to furnish or have on file a certificate of insurance in accordance with the insurance provisions of the General Specifications.

All Contractor(s) and subcontractor(s) are subject to the prevailing wage rates and hours of labor as prescribed by the Common Council of the City of Milwaukee consistent with provisions of Section 66.293 of the Wisconsin Statutes.

Copies of the actual work classifications and wage and fringe benefit rates enforced on this project are available in Room 516 of the Frank P. Zeidler Municipal Building.

Corporate surety will be required on performance and payment bonds for all projects listed in the following Official Notice. All applicable charter and statutory provisions and ordinances, all the provisions of this official notice, invitation to bid, general and detailed specifications, special provisions, proposal, schedule of fixed prices, addendum and plans for this project and all other contract documents set forth in the invitation to bid will be incorporated and made part of the contract as if therein set forth in full.

Tie bids, when the lowest ones, will be decided by the Commissioner of Public Works.

The Commissioner of Public Works reserves the right to reject any or all bids.

END SECTION 00 11 14

CITY OF MILWAUKEE SPECIFIC
OFFICIAL NOTICE NO. 86

Sealed bids will be opened on **July 17, 2012** at 10:30 A.M. for the **REHABILITATION OF THE PLEASANT STREET LIFT BRIDGE**, located in Milwaukee, Wisconsin 53202.

Bid Security Required:	Bond, Certified Check, Cashier's Check or Cash to accompany bid: 10% of Contractor's Base Bid
Completion Date:	August 2, 2013
Liquidated Damages, per diem:	$2,500.00

THE MINORITY, WOMAN, SMALL BUSINESS ENTERPRISE REQUIREMENT FOR THIS CONTRACT IS 20%. **(5.57% African-American, 14.43% SBE)**

THE RESIDENT PREFERENCE PROGRAM PARTICIPATION REQUIREMENT FOR THIS PROJECT IS 20%.

THE APPRENTICESHIP REQUIREMENTS FOR THIS CONTRACT ARE TWO (2).

Plans and specifications will be furnished to the prospective bidders upon payment of a $10.00 non-refundable fee in Room 507, Frank P. Zeidler Municipal Building, 841 North Broadway, Milwaukee, Wisconsin 53202.

A $10.00 per set additional non-refundable fee is required to obtain bid documents by mail.

Contractor must comply with all provisions of the CITY OF MILWAUKEE GENERAL OFFICIAL NOTICE TO CONTRACTORS published above.

THE CONTRACTOR SHALL SPECIFICALLY NOTE THE MINORITY, WOMAN, SMALL BUSINESS ENTERPRISE, RESIDENCY AND APPRENTICESHIP FORMS FOR THIS PROJECT. IF THE FORMS ARE NOT FILLED OUT PROPERLY, IT WILL BE CAUSE FOR REJECTION OF THE BID.

THE TRAINING INCENTIVE **WILL NOT** APPLY TO THIS PROJECT.

Plans and project manual for this project may be viewed in the Infrastructure Services Division, Structural Design Unit, Room 907, Frank P. Zeidler Municipal Building, 841 North Broadway, Milwaukee, Wisconsin.

END SECTION 00 11 17

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.1 SUMMARY

A. See also Instructions to Bidders in the "General Specifications" of the Department of Public Works, City of Milwaukee, Wisconsin, dated January 31, 1992, and all subsequent addenda.

1.2 BID FORM

A. Submit a unit price for each item of work as indicated on the drawings and specified herein, complete in every respect.

B. Bids will not be accepted in any form except on the bid form included with these specifications.

C. The Contractor must recognize and abide by the right of the Owner (City of Milwaukee) to accept or reject any or all bids in the best interests of the City.

1.3 CONTRACT AWARD

A. In case of discrepancy between the total Base Bid indicated in the proposal and that obtained by adding the products of the quantities of work and the unit prices, the unit prices shall govern. Any errors found in the total Base Bid indicated will be corrected, and the contract award shall be made to the lowest responsible bidder based on the corrected total Base Bid.

B. The Commissioner of Public Works will award the contract based on the Base Bid only.

1.4 CONTRACT BREAKDOWN

A. Shortly after the award of the contract, each Contractor shall submit a list showing the cost breakdown of the items in his contract. This list will be used as a basis for estimates of work completed for partial payment.

1.5 SITE VISIT

A. All Contractors shall visit the site, consult the drawings and specifications, be familiar with the work of other Contractors and determine for himself all conditions affecting the work.

B. Failure by a Contractor to be familiar with the project shall <u>not</u> release him from any obligation under this contract to complete the work in strict conformity with the plans and specifications and all City, State and Federal codes or regulations pertaining to the work.

1.6 TIME FOR COMPLETION

A. The time allowed for completion is stated in the Specific Official Notice and shall start with the date on the Notice to proceed which will be sent to the Contractor directly following the signing of the

contract. The time allowed includes the time required for fabricating and procuring material and doing the work at the Pleasant Street Lift Bridge.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 00 21 13

SECTION 00 72 00 – GENERAL CONDITIONS

PART 1 – GENERAL

1.1 DEPARTMENT OF PUBLIC WORKS GENERAL SPECIFICATIONS

A. Provisions of the Department of Public Works General Specifications dated January 31, 1992, and all subsequent addenda, shall apply to all contractors and subcontractors working on the project. Copies of the General Specifications may be obtained from the Department of Public Works General Office, Room 516, Frank P. Zeidler Municipal Building, 841 North Broadway, Milwaukee, Wisconsin.

1.2 DEFINITIONS

A. Commissioner: Commissioner of Public Works

B. Division: Infrastructure Services Division.

C. City Engineer: The City Engineer of the Infrastructure Services Division.

D. Project Inspector: The authorized representative of the Commissioner assigned to make detailed inspection of any or all portions of the work and materials thereof.

E. Addenda: Writing or graphic instruments issued prior to the execution of the contract which modify or interpret the bidding documents, including drawings and specifications by additions, deletions, clarifications or corrections. Addenda will become part of the contract documents when the contract is executed.

F. Contract Drawings: Drawings of the work to be done as listed hereafter in the List of Drawing Sheets.

G. Base Bid: Amount of money stated in the Bid Form as the sum of which the bidder offers to perform the work.

H. Additive Alternate: Additional amount of money stated in the Bid Form as the sum of which the bidder offers to perform the alternate work.

1.3 CONTROL OF WORK AND MATERIALS

A. Detail and Shop Drawings: Shop drawings and other additional drawings which may be required for each branch of the work shall be prepared by each respective contractor unless otherwise directed by the City Engineer. Prints shall be the same size as contract documents when practical. Prints of each drawing shall be submitted to the City Engineer for approval before proceeding with the work. Changes ordered by the City Engineer shall be made and revised prints submitted as above. The City Engineer's approval of drawing shall not relieve the contractor of responsibility for errors.

B. Primary Lines and Grades: Will be established by the Contractor.

C. Construction Lines and Grades: The Contractor must bear sole responsibility for the correct transfer of all construction lines and grades from the primary lines and grade points. He shall take such measurements from existing work as may be necessary to insure the proper construction of his work.

D. Material Orders and Shipping Statements: The Contractor shall furnish to the City Engineer at least two (2) copies of all material orders and shipping statements. Itemized weights of the materials and individual units of finished work shall be shown.

E. Weighing of Materials and Fabricated Units: The weighing of materials and fabricated units such as structural steel, casing, etc., when required, shall be done in the presence of the Commissioner's representative. The Contractor shall be responsible for eth satisfactory weighing of such materials and units.

F. Consignment and Delivery of Materials: The materials for the work shall be consigned to the contractor and he shall be responsible for the delivery of all materials required for the completion of the contract.

1.4 SAMPLES AND TESTS

A. Method of Sampling: Samples of materials proposed or furnished for work may be taken by the Commissioner at any time; at the point of manufacture, point of delivery, or site of work. They will be selected, as far as practicable, in accordance with standard methods of sampling such materials as specified in the standard of the American Society of Testing and Materials. All sampling shall be done by authorized representatives of the Commissioner. Selections will be in an orderly and systematic manner, insuring samples representative of the lot.

B. A.S.T.M. Standards: Wherever the abbreviation A.S.T.M. is used in connection with the number of a standard specification, the specification referred to shall be the standard of the American Society for Testing and Materials, designated by that number, including all revisions in affect on the date of award of the contract. Should a revised or amended standard be issued by the American Society for Testing and Materials which, in the opinion of het Commissioner, conflict with or causes undesirable changes in the standards referred to herein, the Commissioner reserves the right, by means of addenda to the specifications, to continue under the provisions of the pertinent standard referred to herein.

C. Cost of Test Specimens and Samples: All test specimens of metals and all samples of non-metals required for tests shall be furnished by the Contractor without cost to the City.

D. Cost of Tests: All tests on test specimens of metals will be made at the expense of the Contractor and the original test on samples of non-metals will be made at the expense of the City. In all cases, the testing procedure will be in accordance with standard A.S.T.M. tests for such materials. Subsequent tests of non-metals requested by the Contractor, or when such tests are permitted by A.S.T.M. Specification and approved by the Commissioner or subsequent tests ordered by the Commissioner will be made at the expense of the Contractor.

1.5 PROJECT COORDINATION

A. Contractors are required, so far as possible; to arrange work and to dispose of materials so as not to interfere with the work or storage of materials of other contractors or City forces engaged upon the work.

B. Contractor shall give full cooperation to other trades and furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

C. Where the work of a contractor will be installed in close proximity to the work of other trades, or where there is evidence that the work of a contractor will interfere with the work of other trades, he shall assist in working out space conditions to make satisfactory adjustments.

D. If a contractor installs work before coordinating it with other trades or so as to cause interference with work of other trades, he shall make necessary changes in his work to correct the condition without extra charge.

E. Contractors are required to join their work to that of others in a proper manner, and in accordance with the spirit of the plans and specifications, and to perform the work in the proper sequence in relation to that of other contractors, and as may be directed by the Project Inspector.

1.6 TECHNICAL SPECIFICATIONS AND DRAWINGS

A. All contractors shall have complete sets of plans and specifications on the job site at all times.

B. Anything mentioned in the Technical Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Technical Specifications shall be as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in drawings or Technical Specifications, the matter shall be immediately submitted to the City for decision. Said discrepancy shall <u>not</u> be adjusted by the contractor.

1.7 SAFETY REGULATIONS

A. All work shall be done in accordance with the safety requirements set up by the Wisconsin Administrative Code Rules and the Occupational Safety and Health Administration (OSHA).

1.8 CODE RULES

A. The rulings, regulations and laws of the following shall be complied with in the completion of this project:

1. Wisconsin Administrative Code
2. Occupational Safety and Health Administration (OSHA)
3. Plumbing and Drainage Codes of the City of Milwaukee

4. City of Milwaukee Building Codes
5. Ordinances of the City of Milwaukee

1.9 APPROVALS

A. Wherever the words “or equal”, or “approved equal”, or similar terms are used, it shall mean as approved by the Commissioner of Public Works or his agent. All drawings, bulletins, and data necessary for an approval shall be submitted in quadruplicate to the City Engineer. Such approval shall apply to design only and shall in no way relieve this contractor from his responsibility for the full performance of his contract. Evaluation of “or equal” products will be made at the time of shop drawing submission.

1.10 GENERAL SPECIFICATIONS

A. When the General Specifications of the Department of Public Works are in conflict with any other specification referenced herein, the General Specifications of the Department of Public Works shall govern.

1.11 SAVINGS CLAUSE

A. If any clause, item or other part of these specifications shall be deemed illegal or in conflict with code only that item or clause shall be deemed null and void within the specifications. All other items will remain in effect.

1.12 CONSTRUCTION PROGRESS MEETINGS

A. The City reserves the right to schedule periodic construction progress meetings requiring the attendance of the contractors’ and subcontractors’ representatives as deemed necessary by the City.

1.13 MATERIAL HAULING

A. All trucks involved in the hauling of removals, granular backfill, crushed aggregate, bituminous concrete pavement or any other construction material subject to spillage, either by wind or vibration, to or from the project on any highway or street shall be equipped with tail gates, adequate sideboards and canvas covers which will seal the truck box against spillage.

B. The Contractor shall not perform work on nor haul materials of any kind along or across any portion of the project or adjacent streets on any holidays unless he shall notify and receive permission from the City Engineer.

1.14 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

A. The Contractor shall remove existing bridges, and other structures or parts thereof within the roadway right-of-way, which are replaced or which interfere with new construction, unless otherwise provided in the contract. Such removal shall be incidental to other bid items, unless a

separate bid is taken on removal of old structures as hereinafter provided, or unless portions of existing structure units fall within the limits of the excavation for structures.

B. Structures beyond the limits of the right-of-way shall remain in place unless otherwise specified in the contract.

1.15 PLANS AND WORKING DRAWINGS

A. The approved plans will be supplemented by such working drawings and computations as are necessary to adequately control the work. It is mutually agreed that all authorized alterations of the approved plans shall be in writing. No changes shall be made on any plan or drawing after the same has been approved by the City Engineer, except by direction of the City Engineer.

B. Working drawings for structures shall be furnished by the contractor and shall consist of such detailed plans and computations as may be required for the prosecution of the work and which are not included in the plans furnished by the engineer. Such working drawings shall be approved by the engineer. Plans may also be required and in such cases shall be likewise subject to approval, unless approval is waived by the City Engineer.

C. It is expressly understood, however, that approval by the City Engineer of the contractor's working drawings does not relieve the contractor of any responsibility for accuracy of dimensions and details or conformity of his working drawings with the approved plans and specifications.

D. The contract price shall include the cost of furnishing all working drawings and the contractor will be allowed no extra compensation for such drawings.

1.16 CONFORMITY WITH PLANS AND SPECIFICATIONS

A. All work performed and all materials furnished will be in reasonably close conformity with the lines, grades, cross sections, dimensions and material requirements shown on the plans or indicated in the specifications. It shall be finished to produce quality work and appearance within limits of precision reasonably expected of good construction.

B. Specific specification values and prescribed tolerance amounts or limits or minimum or maximum values may be specified. Whenever such tolerances or ranges are specified, the production and processing of material or performance of the work shall be so controlled that the material or work will substantially meet the specific value or fall substantially within the specified range or limits and shall only occasionally be of borderline quality or dimensions.

C. Whenever tolerances, limits or minimum and maximum values are not specified, reasonable and accepted standards or established manufacturing or construction tolerances will be permitted.

D. The lines, grades, typical sections, and dimensions shown on the plans are subject to adjustment by the engineer during construction, but any deviation of a character not contemplated or provided for in the plans, specifications or working drawings that may be required by the exigencies of construction or otherwise will be determined by the engineer and authorized by him in writing.

E. In the event the engineer finds materials which are incorporated in the work, or the finished product in which the materials are used, to be not within reasonably close conformity with the plans and specifications, he will then make a determination whether or not reasonably acceptable work has been produced and can be accepted and remain in place. If the engineer determines that reasonably acceptable work has been produced and can be accepted and remain in place, he will document the basis of acceptance by contract modification or as provided elsewhere in these specifications which will provide for an appropriate adjustment in the contract price for such work or materials, either as he deems necessary to conform to his determination based on engineering judgment, or as specifically provided for elsewhere in these specifications.

F. In the event the engineer finds that the materials, the finished product in which the materials are used, or the work performed are not in reasonably close conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by and at the expense of the contractor.

1.17 COORDINATION OF PLANS, SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

A. These specifications, the supplemental specifications, the plans, special provisions and all supplemental documents are essential parts of the contract and a requirement occurring in one is binding as though occurring in all. They are intended to be cooperative, to describe and provide for a complete work. In the event of a discrepancy between the drawing and the figured dimensions thereon, the figured dimensions, unless obviously incorrect, shall govern over scaled dimensions. In the case of a discrepancy between the supplemental specifications and these specifications, the supplemental specifications shall govern; between the plans and these specifications or the supplemental specifications, the plans shall govern; and between the special provisions and these specifications, supplemental specifications or the plans, the special provisions shall govern.

B. The contractor shall take no advantage of any apparent error or omission in the plans or specifications, and the engineer shall be permitted to make such corrections and interpretations, as may be deemed necessary for the fulfillment of the intent of the plans and specifications.

1.18 PERSONAL LIABILITY OF PUBLIC OFFICIALS

A. In carrying out any of the provisions of this contract or in exercising any power or authority granted to them thereby, there shall be no personal liability upon the Department, its agents and employees, it being understood that in such matters they act as agents and representatives of the City. Any right of action by the contractor against the Department, or its agents or employees, is hereby expressly waived.

1.19 CONTRACTOR'S RESPONSIBILTIY FOR UTILITY PROPERTY AND SERVICES

A. The contractor shall give notice to the proper authorities in charge of street, gas and water pipes, electric and other conduits, railroad, poles, manholes, catch basins, sewers and all other property that may be affected by the contractor's operations, at least three days excluding Saturday, Sunday and legal holidays, before breaking ground.

B. The contractor shall not hinder or interfere with any persons in the protection of such property, or with the operations or utilities, at any time. The contractor must obtain all necessary information in regard to existing utilities. He shall protect such utilities from damage and unnecessary exposure.

C. The contractor must also obtain all necessary information in regard to the planned installation of new utilities and make proper provision and give proper notification so that new utilities can be installed at the proper time without delay to the contractor or unnecessary inconvenience to the owner. The location of new underground utilities, planned to be installed concurrently with the highway improvements, shall not be covered with pavement prior to the installation of such facilities.

1.20 MEASURMENT OF QUANTITIES

A. General: All work completed under the contract will be measured by the engineer according to United States standard measure. The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

The completed work will be measured for final payment by the engineer, as specified for the various items elsewhere in these specifications, to determine the quantities of such items of work performed, except when agreements have been made providing for compensation on the basis of plan quantities as hereinafter provided or when contract change orders have been executed providing for other methods of measurement. The contractor will be paid for the actual amount of work performed in accordance with the contract, as shown by the final measurements or upon the basis of plan quantities.

If the contractor and the engineer agree in writing that the quantities of certain items or portions of items of work as set forth in the contract or on the plans, as originally drawn or subsequently corrected or revised, are in substantial agreement with the actual quantities of work performed, compensation therefore will be made based on the quantities set forth in the contract or on the plans, as originally drawn or subsequently corrected or revised, without measurement thereof, and the contractor shall accept such compensation as full payment for such items or portions of items.
When standard manufactured items are specified such as fences, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, unit weight, sections dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

B. Volume: All materials which are specified for measurement by the cubic yard in the vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. No allowance will be made for the settlement of material in transit.

The measurement of the material, the type and size of vehicle, the determination of capacity and the marking of the vehicle for identification shall conform to the requirements of Subsection 617.2 of the standard specification.

When permitted elsewhere in these specifications, or in the special provisions, material specified to be measured by the cubic yard may be weighed and the weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the engineer and shall be agreed to by the contractor before such method of measurement of pay quantities is used.

C. Weight: All aggregates and bituminous mixtures which are specified for measurement by the ton (2,000 lbs.) shall be weighed on platform scales or other approved scales, furnished by and at the expense of the contractor. Said scales shall be satisfactory to the engineer and they shall be tested by the engineer or by authorized testing firms or agencies as often as the engineer may deem necessary to ensure their accuracy.

When materials are weighed in the hauling vehicle, gross weights shall be measured by the ton may be measured by the cubic yard and the cubic yards will be converted to tons for payment purposes. Factors for conversion from volume measurement to weight measurement will be determined by the engineer and shall be agreed to by the contractor before such method of measurement of pay quantities is used.

1.21 GUARANTEE

A. The contractor shall guarantee to replace or repair promptly at his own expense, as directed by the Commissioner of Public Works or his agent, all workmanship or materials in which defects may develop within one (1) year from the date of final acceptance of his work. This guarantee includes all damage done by the operator due to faulty equipment, poor installation or poor construction. The City shall also receive any extended guarantees or warranties normally supplied by any vendor or manufacturer for material or equipment incorporated in the work.

1.22 ENVIRONMENTAL PROTECTION

A. The Contractor shall establish and carry out a program for immediate removal of debris during the bridge rehabilitation in order to prevent the accumulation of unsightly, deleterious and/or potentially polluting materials in the river

B. Utilize construction methods which will minimize local erosion or siltation.

C. Place excess dredged or excavated materials in a confined area in such a manner as to preclude the return of polluted materials to the river by surface runoff or by leaching.

D. Place excess dredged or excavated materials in a confined area in such a manner as to preclude the return of polluted materials to the river by surface runoff or by leaching.

E. Take special care to avoid any spillage of oil, fuels, or any other types of pollutants while working within or along the banks of the river.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 00 72 00

SECTION 00 73 01 - INSPECTION CHARGES

PART 1 – GENERAL

1.1 INSPECTION CHARGES

A. The Contractor will be charged a fee for inspection for each and every day such inspection is required after the time allowed for completion has expired.

B. The amount of the fee for inspection shall be $500 per day.

C. The date of completion is stated in the Specific Official Notice and shall start with the date on the Notice to Proceed which will be sent to the Contractor directly following the signing of the contract. The time allowed includes the time required for fabricating and procuring material and doing the work at the site.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 00 73 01

SECTION 00 73 02 – INCENTIVE/DISINCENTIVE FOR COMPLETION OF WORK

PART 1 – GENERAL

1.1 SCOPE

A. This item shall consist of either an incentive payment or a disincentive pay reduction as specified in this section.

B. The Contractor shall complete all of the work necessary to permanently reopen the Pleasant Street Lift Bridge without restrictions to any portion of bridge prior to 12:01 AM August 3, 2013, or within such extended time as may be allowed.

C. Under this Incentive/Disincentive plan, no time extensions will be granted for adverse weather conditions; for delays in material deliveries; or for labor disputes unless it can be shown that such disputes are industry wide.

D. Each day shall be defined as a twenty-four (24) hour period beginning at 12:01 AM.

E. Incentive payments will not be considered as part of the money value of the work completed for computing time extensions.

1.2 INCENTIVE PAYMENT

A. The contractor shall be entitled to an incentive payment for completion of all of the work necessary to permanently reopen the bridge for traffic vehicular and pedestrian traffic and all mechanical and hydraulic components of the bridge should be acceptably completed prior to 12:01 AM, August 3, 2013 or such extended time as may be allowed.

B. The incentive payment shall be paid at a rate of $5,000 per calendar day for each day or portion thereof, of completion prior to 12:01 AM, August 3, 2013. The maximum amount of incentive payment shall not exceed $70,000.

1.3 DISINCENTIVE PAY REDUCTION

A. Should the contractor fail to complete all of the work necessary to reopen the bridge for vehicular and pedestrian traffic without restrictions for traffic prior to 12:01 AM, August 3, 2013 or within such extended time as may be allowed, the contractor shall be liable to the City of Milwaukee for a pay reduction in the amount of $5,000 per day or portion thereof, for each calendar day after 12:01 AM, August 3, 2012 that work remains incomplete.

B. If contract time expires prior to completing the work necessary to open the bridge for traffic, liquidated damages as given in bidding requirements (Section 00 11 17) will be affixed in addition to the disincentive pay reduction.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 00 73 02

6/15/11

MINIMUM WAGE SCALE

RESOLVED, By the Common Council of the City of Milwaukee, that building and construction trades workers in the construction industry employed upon public work projects done by contract for the City of Milwaukee, either new construction or repair work, upon any roads, bridges, sewers, streets, alleys, buildings, or any other public work, shall be paid no less than the hourly wage rates and fringe benefits which prevail in the Milwaukee metropolitan area for the same type of work or for closely related work. (FILE NUMBER 68-1317)

Prevailing hours of labor for all classes of laborers and mechanics means no more than ten (10) hours per day nor more than forty (40) hours per week and may not include any hours worked on a Saturday, Sunday, or one of six holidays. ALL work performed in excess of these prevailing hours must be paid at a rate of at least 1-1/2 times the hourly basis rate of pay (plus fringe benefits). *Fringe Benefits must be paid on ALL hours worked for ALL job classifications*.

If a contractor or subcontractor anticipates employing a person or persons in classifications, trades, or occupations that are not set forth in the Minimum Wage Scale, then that contractor or subcontractor is required to apply to the Commissioner of Public Works PRIOR to the bid opening date set forth in the official notice for the project for a special wage determination containing the classification(s) and associated wage and benefit rate(s). Special wage determinations requested after the bid opening date MAY be issued at the discretion of the Commissioner of Public Works' Office if it is satisfied that a special classification is used as a prevailing practice in the City of Milwaukee.

The Prime Contractor must provide each subcontractor with a copy of the Minimum Wage Scale with the appropriate classifications and rates for the type of work to be performed. The Minimum Wage Scale, including this cover sheet, must be physically included in the subcontract agreement between the prime and subcontractor.

Bidders are required to utilize the Wisconsin Department of Workforce Development's "Dictionary of Occupational Classifications and Work Descriptions" to determine the appropriate job classifications/wage rates for their employees prior to bidding and ***to insure employees are paid for those job duties they actually perform.*** *This document can be found on their website at dwd.wisconsin.gov; type "dictionary" in the search box.* All disputes and/or controversies regarding the proper classification of any laborer, worker, or mechanic employed on a City project will be referred to the State of Wisconsin Department of Workforce Development for final resolution and disposition.

ss. 66.0903(8), Wis. Stats.

Any contractor, subcontractor, or agent thereof, who fails to pay the prevailing rate of wages determined by the department under this subsection or pays less than 1-1/2 times the hourly basic rate of pay for all hours worked on the project in excess of prevailing hours of labor determined under this subsection, shall be liable to the employees affected in the amount of their unpaid minimum wages or their unpaid overtime compensation and an additional amount as liquidated damages.

Each contractor, subcontractor, or agent thereof participating in a project covered by this subsection shall keep full and accurate records clearly indicating the name and trade or occupation of every laborer, workman, or mechanic employed by him in connection with the project and an accurate record of the number of hours worked by each employee and actual wages paid therefor.

NOTICE TO ALL CONTRACTORS AND SUBCONTRACTORS:

EFFECTIVE 1/1/2010, DUE TO CHANGES IN WISCONSIN PREVAlLING WAGE LAW, SEC. 66.0903 -

IN ADDITION TO THE PREVAILING WAGE REPORTING REQUIREMENTS ALREADY IN PLACE FOR CITY OF MILWAUKEE DPW CONTRACTS:

ALL CONTRACTORS AND SUBCONTRACTORS ON A PREVAILING WAGE PROJECT ARE *ALSO* REQUIRED TO FILE CERTIFIED PAYROLLS OR COLLECTIVE BARGAINING AGREEMENTS ELECTRONICALLY WITH THE STATE OF WISCONSIN DEPARTMENT OF WORKFORCE DEVELOPMENT (DWD)

INSTRUCTIONS AND FURTHER DETAILS CAN BE FOUND ON THE DWD'S WEBSITE EXPLAINING THE REQUIREMENTS
http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm

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PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Wis. Stats.
Issued On: 01/13/2012
Amended On: 03/02/2012

DETERMINATION NUMBER:	201200107
EXPIRATION DATE:	Prime Contracts MUST Be Awarded or Negotiated On Or Before 12/31/2012. If NOT, You MUST Reapply.
PROJECT NAME:	ALL PUBLIC WORKS PROJECTS UNDER SEC. 66.0903, STATS.-CITY OF MILWAUKEE
PROJECT LOCATION:	MILWAUKEE CITY, MILWAUKEE COUNTY, WI
CONTRACTING AGENCY:	CITY OF MILWAUKEE-DEPT OF PUBLIC WORKS

CLASSIFICATION:	Contractors are responsible for correctly classifying their workers. Either call the Department of Workforce Development (DWD) with trade or classification questions or consult DWD's Dictionary of Occupational Classifications & Work Descriptions on the DWD website at: dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm.
OVERTIME:	Time and one-half must be paid for all hours worked: - over 10 hours per day on prevailing wage projects - over 40 hours per calendar week - Saturday and Sunday - on all of the following 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. Apply the time and one-half overtime calculation to whichever is higher between the Hourly Basic Rate listed on this project determination or the employee's regular hourly rate of pay. Add any applicable Premium or DOT Premium to the Hourly Basic Rate before calculating overtime. A DOT Premium (discussed below) may supersede this time and one-half requirement.
FUTURE INCREASE:	When a specific trade or occupation requires a future increase, you MUST add the full hourly increase to the "TOTAL" on the effective date(s) indicated for the specific trade or occupation.
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, whevenever such pay is applicable.
DOT PREMIUM:	This premium only applies to highway and bridge projects owned by the Wisconsin Department of Transportation and to the project type heading "Airport Pavement or State Highway Construction." DO NOT apply the premium calculation under any other project type on this determination.
APPRENTICES:	Pay apprentices a percentage of the applicable journeyperson's hourly basic rate of pay and hourly fringe benefit contributions specified in this determination. Obtain the appropriate percentage from each apprentice's contract or indenture.
SUBJOURNEY:	Subjourney wage rates may be available for some of the trades or occupations indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer interested in using a subjourney classification on this project MUST complete Form ERD-10880 and request the applicable wage rate from the Department of Workforce Development PRIOR to using the subjourney worker on this project.

This document **MUST BE POSTED** by the **CONTRACTING AGENCY** in at least one conspicuous and easily accessible place **on the site of the project** . A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document **MUST** remain posted during the entire time any worker is employed on the project and **MUST** be physically incorporated into the specifications and all contracts and subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-6861.

The following statutory provisions apply to local governmental unit projects of public works and are set forth below pursuant to the requirements of s. 66.0903(8), Stats.

s. 66.0903 (1) (f) & s. 103.49 (1) (c) "PREVAILING HOURS OF LABOR" for any trade or occupation in any area means 10 hours per day and 40 hours per week and may not include any hours worked on a Saturday or Sunday or on any of the following holidays:

1. January 1.
2. The last Monday in May.
3. July 4.
4. The first Monday in September.
5. The 4th Thursday in November.
6. December 25.
7. The day before if January 1, July 4 or December 25 falls on a Saturday.
8. The day following if January 1, July 4 or December 25 falls on a Sunday.

s. 66.0903 (10) RECORDS; INSPECTION; ENFORCEMENT.
(a) Each contractor, subcontractor, or contractor's or subcontractor's agent performing work on a project of public works that is subject to this section shall keep full and accurate records clearly indicating the name and trade or occupation of every person performing the work described in sub. (4) and an accurate record of the number of hours worked by each of those persons and the actual wages paid for the hours worked.

s. 66.0903 (11) LIABILITY AND PENALTIES.
(a) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided under subd. 2., 3., whichever is applicable.
2. If the department determines upon inspection under sub. (10) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages within a period specified by the department in the order.
3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.
5. No employee may be a party plaintiff to an action under subd. 3. unless the employee consents in writing to become a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.

BUILDING OR HEAVY CONSTRUCTION

Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

SKILLED TRADES

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
101	Acoustic Ceiling Tile Installer	33.43	19.31	52.74
102	Boilermaker	31.09	21.87	52.96
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add $.50 on 6/01/2012; Add $1.45/hr on 6/01/2013 Premium Increase(s): 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.	35.58	16.37	51.95
104	Cabinet Installer	29.06	15.16	44.22
105	Carpenter Premium Increase(s): 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.	33.43	19.31	52.74
106	Carpet Layer or Soft Floor Coverer	31.68	18.55	50.23
107	Cement Finisher	30.87	16.33	47.20
108	Drywall Taper or Finisher Future Increase(s): Add $2.20/hr on 6/1/2012	28.97	17.74	46.71
109	Electrician Future Increase(s): Add $1.40/hr on 6/1/2012. Add $1.60/hr on 6/1/2013. Premium Increase(s): 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.	31.54	20.95	52.49
110	Elevator Constructor	43.79	25.48	69.27
111	Fence Erector	27.00	0.00	27.00
112	Fire Sprinkler Fitter	36.82	19.03	55.85
113	Glazier	32.25	16.20	48.45
114	Heat or Frost Insulator	33.28	22.45	55.73

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
115	Insulator (Batt or Blown)	23.62	11.55	35.17
116	Ironworker	31.31	21.54	52.85
117	Lather	31.68	18.41	50.09
118	Line Constructor (Electrical)	35.97	18.08	54.05
119	Marble Finisher	31.16	16.27	47.43
120	Marble Mason	35.53	15.92	51.45
121	Metal Building Erector	21.05	7.82	28.87
122	Millwright	28.30	23.29	51.59
123	Overhead Door Installer	26.53	0.00	26.53
124	Painter Future Increase(s): Add $2.20/hr on 6/1/2012. Premium Increase(s): Add $.20/hr for paperhanging; Add $.35/hr for bridge, iron and drywall; Add $.75/hr for spraying and sandblasting; Add $.60/hr for EIFS work; Add $1.00/hr for lead based paint removal.	28.97	17.74	46.71
125	Pavement Marking Operator	26.00	0.00	26.00
126	Piledriver	28.11	23.94	52.05
127	Pipeline Fuser or Welder (Gas or Utility)	30.52	18.84	49.36
129	Plasterer	20.13	1.03	21.16
130	Plumber	36.97	17.47	54.44
132	Refrigeration Mechanic	37.21	19.04	56.25
133	Roofer or Waterproofer Future Increase(s): Add $.50/hr. effective 06/01/2012	29.40	15.05	44.45
134	Sheet Metal Worker	37.20	16.37	53.57
135	Steamfitter	38.26	19.49	57.75
137	Teledata Technician or Installer Premium Increase(s): 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.	24.65	15.67	40.32
138	Temperature Control Installer	29.63	19.17	48.80
139	Terrazzo Finisher	18.00	5.35	23.35
140	Terrazzo Mechanic	31.16	16.27	47.43

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
141	Tile Finisher	23.76	16.05	39.81
142	Tile Setter	29.95	15.64	45.59
143	Tuckpointer, Caulker or Cleaner Premium Increase(s): 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.	34.35	15.92	50.27
144	Underwater Diver (Except on Great Lakes)	36.20	18.81	55.01
146	Well Driller or Pump Installer	25.32	15.30	40.62
147	Siding Installer	36.60	16.37	52.97
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	27.42	15.10	42.52
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	28.78	15.16	43.94
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	17.80	9.00	26.80
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	23.38	12.48	35.86
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.30	10.97	32.27

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	32.32	16.75	49.07
203	Three or More Axle Future Increase(s): Add $1.75/hr on 6/1/2012; Add $1.85/hr on 6/1/2013. Premium Increase(s): 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.	22.50	16.19	38.69
204	Articulated, Euclid, Dumptor, Off Road Material Hauler	33.32	17.60	50.92
205	Pavement Marking Vehicle	19.25	10.84	30.09
207	Truck Mechanic	24.91	15.35	40.26

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer Premium Increase(s): Add $.11 for mortar mixer, fork lift operator, air and electric equipment and power buggy operators; Add $.22 for jackhammer operator, certified welder, gunite machineman.	28.82	15.61	44.43
302	Asbestos Abatement Worker	21.58	17.83	39.41
303	Landscaper	12.50	2.20	14.70
310	Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	19.14	15.53	34.67
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased) Premium Increase(s): DOT PREMIUMS: Pay two times the hourly basic rate on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	17.24	15.00	32.24
314	Railroad Track Laborer	17.00	1.06	18.06

HEAVY EQUIPMENT OPERATORS
SITE PREPARATION, UTILITY OR LANDSCAPING WORK ONLY

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
501	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfgr's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Crane, Shovel, Dragline, Clamshells; Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Grader or Motor Patrol; Master Mechanic; Mechanic or Welder; Robotic Tool Carrier (With or Without Attachments); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor (Scraper, Dozer, Pusher, Loader); Trencher (Wheel Type or Chain Type Having Over 8 Inch Bucket).	32.32	18.18	50.50
502	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Environmental Burner; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Jeep Digger; Screed (Milling Machine); Skid Rig; Straddle Carrier or Travel Lift; Stump Chipper; Trencher (Wheel Type or Chain Type Having 8 Inch Bucket & Under).	33.32	17.60	50.92

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
503	Air Compressor (&/or 400 CFM or Over); Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Greaser; High Pressure Utility Locating Machine (Daylighting Machine); Mulcher; Oiler; Post Hole Digger or Driver; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack.	32.32	17.59	49.91
504	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	36.20	18.81	55.01
505	Work Performed on the Great Lakes Including Crane or Backhoe Operator; Assistant Hydraulic Dredge Engineer; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder; 70 Ton & Over Tug Operator. Premium Increase(s): Add $.50/hr for friction crane, lattice boom or crane certification (CCO).	37.45	19.45	56.90
506	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.	26.80	18.52	45.32
507	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

HEAVY EQUIPMENT OPERATORS
EXCLUDING SITE PREPARATION, UTILITY, PAVING LANDSCAPING WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
508	Boring Machine (Directional); 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; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Premium Increase(s): Crane Operators with CCO certification add $.50/hr. Cranes with boom length over 200 ft. not exceeding 300 ft. OR lifting capacity over 200 ton not exceeding 300 ton add $.50/hr. Over 300 ton OR 300 ft. add $.01/hr. per foot OR ton whichever is greater.	39.16	19.10	58.26

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
509	Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Boring Machine (Horizontal or Vertical); Caisson Rig; 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; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Pile Driver; Versi Lifts, Tri-Lifts & Gantrys (20,000 Lbs. & Over). Premium Increase(s): Crane Operators with CCO certification add $.50/hr.	38.66	19.10	57.76
510	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type). Premium Increase(s): Crane Operators with CCO certification add $.50/hr.	38.16	19.10	57.26
511	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantrys (Under 20,000 Lbs.); Grader or Motor Patrol; High Pressure Utility Locating Machine (Daylighting Machine); Manhoist; Material or Stack Hoist; Mechanic or Welder; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tining or Curing Machine; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Premium Increase(s): Crane Operators with CCO certification add $.50/hr.	38.16	19.10	57.26
512	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames.	37.47	19.10	56.57

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
513	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Boatmen (NOT Performing Work on the Great Lakes); Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Elevator; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Forklift; Generator (&/or 150 KW or Over); Greaser; Heaters (Mechanical); Loading Machine (Conveyor); Oiler; Post Hole Digger or Driver; Prestress Machine; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack.	30.44	19.10	49.54
514	Gas or Utility Pipeline, Except Sewer & Water (Primary Equipment). Future Increase(s): Add $2/hr. on 1/1/2013.	34.89	19.68	54.57
515	Gas or Utility Pipeline, Except Sewer & Water (Secondary Equipment).	31.26	17.40	48.66
516	Fiber Optic Cable Equipment	25.74	15.85	41.59

SEWER, WATER OR TUNNEL CONSTRUCTION

Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).

SKILLED TRADES

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
103	Bricklayer, Blocklayer or Stonemason	35.53	15.92	51.45
105	Carpenter Premium Increase(s): 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.	33.43	19.31	52.74
107	Cement Finisher Future Increase(s): Add $1.86 on 6/1/12; 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 Increase(s): 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.	27.14	19.22	46.36
109	Electrician Future Increase(s): Add $1.40/hr on 6/1/2012. Add $1.60/hr on 6/1/2013. Premium Increase(s): 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.	31.54	20.95	52.49
111	Fence Erector	27.00	0.00	27.00
116	Ironworker Premium Increase(s): 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.	31.31	22.22	53.53
118	Line Constructor (Electrical)	35.97	18.08	54.05
125	Pavement Marking Operator	26.00	0.00	26.00
126	Piledriver	28.11	23.94	52.05
130	Plumber	36.18	16.86	53.04
135	Steamfitter	35.81	19.04	54.85
137	Teledata Technician or Installer	24.65	15.17	39.82

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
143	Tuckpointer, Caulker or Cleaner	34.30	15.47	49.77
144	Underwater Diver (Except on Great Lakes)	36.20	18.81	55.01
146	Well Driller or Pump Installer	24.22	14.80	39.02
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	27.42	15.10	42.52
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	28.78	15.16	43.94
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	17.80	9.00	26.80
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	23.38	12.48	35.86
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.30	10.97	32.27

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	23.00	8.64	31.64
203	Three or More Axle	17.54	13.41	30.95
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.75/hr on 6/1/2012; Add $1.85/hr on 6/1/2013. Premium Increase(s): 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.	22.50	16.19	38.69
205	Pavement Marking Vehicle	19.25	10.84	30.09
207	Truck Mechanic	17.54	13.41	30.95

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer Future Increase(s): Add $1.73/hr on 6/4/2012. Premium Increase(s): Add $1.92 for bottomman; Add $2.03 for concrete manhole builder, bracer, jointman, or pipelayer; Add $4.83 for blaster. Add $2.00 for all tunnel work under 15 lbs. compressed air; Add $2.00 for 0-30 lbs. compressed air; Add $3.00 for over 30 lbs. compressed air.	27.72	15.61	43.33

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
303	Landscaper	12.50	2.20	14.70
304	Flagperson or Traffic Control Person	22.50	12.90	35.40
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.09	14.40	31.49
314	Railroad Track Laborer	17.00	1.06	18.06

HEAVY EQUIPMENT OPERATORS
SEWER, WATER OR TUNNEL WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
521	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; 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; Master Mechanic; Pile Driver. Premium Increase(s): Crane Operators with CCO certification add $.50/hr. Cranes with boom length over 200 ft. not exceeding 300 ft. OR lifting capacity over 200 ton not exceeding 300 ton add $.50/hr. Over 300 ton OR 300 ft. add $.01/hr. per foot OR ton whichever is greater.	39.16	19.10	58.26
522	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Boring Machine (Directional); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Spreader & Distributor; 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); Milling Machine; Skid Rig; Telehandler; Traveling Crane (Bridge Type). Future Increase(s): Add $2.05/hr on 6/4/2012. Premium Increase(s): Add $.25/hr for operating tower crane.	33.91	18.55	52.46

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
523	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Boring Machine (Horizontal or Vertical); Bulldozer or Endloader (Over 40 hp); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Manhoist; Material or Stack Hoist; Mechanic or Welder; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add $2.05/hr on 6/4/2012. Premium Increase(s): Add $.25/hr for operating tower crane.	32.96	18.55	51.51
524	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Environmental Burner; Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Hoist (Tugger, Automatic); Grout Pump; Jeep Digger; Lift Slab Machine; Mulcher; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Tining or Curing Machine; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames.	30.89	18.12	49.01
525	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Loading Machine (Conveyor); Post Hole Digger or Driver; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $2.05/hr on 6/4/2012. Premium Increase(s): Add $.25/hr for operating tower crane.	30.51	18.55	49.06
526	Boiler (Temporary Heat); Forklift; Greaser; Oiler.	29.44	18.10	47.54
527	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	36.20	18.81	55.01

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
528	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.	36.20	18.81	55.01
529	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.	26.80	18.52	45.32
530	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.	26.80	18.52	45.32

AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION

Includes all airport projects (excluding buildings) and all projects awarded by the Wisconsin Department of Transportation (excluding buildings).

SKILLED TRADES

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
103	Bricklayer, Blocklayer or Stonemason	32.66	15.92	48.58
105	Carpenter Premium Increase(s): 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.	33.43	19.31	52.74
107	Cement Finisher Future Increase(s): Add $1.86 on 6/1/12; 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 Increase(s): 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.	29.33	17.03	46.36
109	Electrician	31.64	23.78	55.42
111	Fence Erector	35.62	0.00	35.62
116	Ironworker	31.31	21.54	52.85
118	Line Constructor (Electrical)	35.97	18.08	54.05
124	Painter	27.87	14.39	42.26
125	Pavement Marking Operator	27.87	14.39	42.26
126	Piledriver Premium Increase(s): Add $.65/hr for Piledriver Loftsman; Add $.75/hr for Sheet Piling Loftsman. 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.	29.56	24.96	54.52
133	Roofer or Waterproofer	28.85	14.60	43.45
137	Teledata Technician or Installer	24.65	15.17	39.82
143	Tuckpointer, Caulker or Cleaner	34.30	15.47	49.77
144	Underwater Diver (Except on Great Lakes)	36.20	18.81	55.01

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	33.87	16.10	49.97
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY Premium Increase(s): 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.	29.64	14.64	44.28
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.18	13.07	38.25
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	23.38	12.48	35.86
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.30	10.97	32.27

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle Future Increase(s): Add $1.75/hr on 6/1/2012; Add $1.85/hr on 6/1/2013. Premium Increase(s): 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.	22.35	16.19	38.54
203	Three or More Axle	24.91	15.63	40.54
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1.75/hr on 6/1/2012; Add $1.85/hr on 6/1/2013. Premium Increase(s): 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.	22.50	16.19	38.69
205	Pavement Marking Vehicle	23.84	14.70	38.54
206	Shadow or Pilot Vehicle	24.76	15.35	40.11
207	Truck Mechanic	24.91	15.63	40.54

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer Future Increase(s): Add $1.60/hr on 6/1/2012: Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014. Premium Increase(s): Add $.15/hr for air tool operator, joint sawer and filler (pavement), vibrator or tamper operator (mechanical hand operated), chain saw operator and demolition burning torch laborer; Add $.35/hr for bituminous worker (raker and luteman), formsetter (curb, sidewalk and pavement) and strike off man; Add $.50/hr for line and grade specialist; Add $.65/hr for blaster and powderman; Add $2.01/hr for topman; Add $2.46/hr for bottomman; Add $3.23/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).	24.34	17.85	42.19
302	Asbestos Abatement Worker	22.00	16.86	38.86
303	Landscaper	23.71	15.03	38.74
304	Flagperson or Traffic Control Person Future Increase(s): Add $1.60/hr on 6/1/2012; Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014. Premium Increase(s): 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.	20.83	17.85	38.68
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.09	14.40	31.49
314	Railroad Track Laborer	17.00	1.06	18.06

HEAVY EQUIPMENT OPERATORS
AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
531	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 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	34.22	18.90	53.12
532	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 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	33.72	18.90	52.62

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
533	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 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	33.22	18.90	52.12

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
534	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. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	32.96	18.90	51.86
535	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. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	32.67	18.90	51.57
536	Fiber Optic Cable Equipment.	24.39	15.45	39.84
537	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	36.20	18.81	55.01

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
538	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.	36.20	18.81	55.01
539	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.	26.80	18.52	45.32
540	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.	26.80	18.52	45.32

LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION

Includes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or agricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

SKILLED TRADES

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
103	Bricklayer, Blocklayer or Stonemason	35.53	15.92	51.45
105	Carpenter	29.06	15.16	44.22
107	Cement Finisher	27.57	16.33	43.90
109	Electrician Future Increase(s): Add $.50/hr. effective 06/04/2012. Premium Increase(s): 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.	28.74	17.86	46.60
111	Fence Erector	27.00	0.00	27.00
116	Ironworker	31.31	21.54	52.85
118	Line Constructor (Electrical)	35.97	18.08	54.05
124	Painter	28.47	16.74	45.21
125	Pavement Marking Operator	26.00	0.00	26.00
126	Piledriver	28.11	23.94	52.05
133	Roofer or Waterproofer	28.85	14.60	43.45
137	Teledata Technician or Installer	24.65	15.17	39.82
143	Tuckpointer, Caulker or Cleaner	34.30	15.47	49.77
144	Underwater Diver (Except on Great Lakes)	36.20	18.81	55.01
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	35.42	12.90	48.32
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	28.78	14.42	43.20
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.18	13.07	38.25
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	23.38	12.48	35.86
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.30	10.97	32.27

TRUCK DRIVERS

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	15.00	0.00	15.00
203	Three or More Axle	20.00	6.00	26.00
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.	31.89	17.98	49.87
205	Pavement Marking Vehicle	19.25	10.84	30.09
206	Shadow or Pilot Vehicle	15.00	0.00	15.00
207	Truck Mechanic	20.00	6.00	26.00

LABORERS

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer	21.73	17.04	38.77
303	Landscaper	22.96	15.37	38.33
304	Flagperson or Traffic Control Person Future Increase(s): Add $1.60/hr on 6/1/2012; Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014. Premium Increase(s): 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.	23.55	13.45	37.00
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.09	14.40	31.49
314	Railroad Track Laborer	17.00	1.06	18.06

HEAVY EQUIPMENT OPERATORS
CONCRETE PAVEMENT OR BRIDGE WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
541	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; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	34.22	18.90	53.12
542	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 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; Crane, Tower Crane Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or 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 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	33.72	18.90	52.62

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
543	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); 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); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; 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.	31.89	18.22	50.11
544	Backfiller; 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 (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; 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); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	33.22	18.90	52.12

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
545	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; 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.	30.42	17.58	48.00
546	Fiber Optic Cable Equipment.	24.39	15.45	39.84
547	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	36.20	18.81	55.01
548	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.	36.20	18.81	55.01
549	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.	26.80	18.52	45.32
550	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.	26.80	18.52	45.32

HEAVY EQUIPMENT OPERATORS
ASPHALT PAVEMENT OR OTHER WORK

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
551	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; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.	38.06	18.10	56.16

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
552	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 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; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or 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 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): 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).	33.72	18.90	52.62
553	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; 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; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Laser/Screed; Concrete Slipform Placer Curb & Gutter Machine; 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; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; 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); 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.	31.52	17.50	49.02

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
554	Backfiller; 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. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.	32.67	18.55	51.22
555	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); 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. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.	32.67	18.55	51.22
556	Fiber Optic Cable Equipment.	24.39	15.45	39.84

RESIDENTIAL OR AGRICULTURAL CONSTRUCTION

Includes single family houses or apartment buildings of no more than four (4) stories in height and all buildings, structures or facilities that are primarily used for agricultural or farming purposes, excluding commercial buildings. For classification purposes, the exterior height of a residential building, in terms of stories, is the primary consideration. All incidental items such as site work, driveways, parking lots, private sidewalks, private septic systems or sewer and water laterals connected to a public system and swimming pools are included within this definition. Residential buildings of five (5) stories and above are NOT included within this definition.

SKILLED TRADES

Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
101	Acoustic Ceiling Tile Installer	27.00	1.16	28.16
102	Boilermaker	31.09	21.87	52.96
103	Bricklayer, Blocklayer or Stonemason	26.22	13.80	40.02
104	Cabinet Installer	26.00	2.33	28.33
105	Carpenter	31.68	7.03	38.71
106	Carpet Layer or Soft Floor Coverer	21.40	6.01	27.41
107	Cement Finisher	28.00	10.10	38.10
108	Drywall Taper or Finisher Future Increase(s): Add $2.20/hr on 6/1/2012	28.97	17.74	46.71
109	Electrician	31.10	6.01	37.11
110	Elevator Constructor	43.79	25.48	69.27
111	Fence Erector	17.64	4.66	22.30
112	Fire Sprinkler Fitter	36.39	16.97	53.36
113	Glazier	36.23	8.04	44.27
114	Heat or Frost Insulator	29.04	19.73	48.77
115	Insulator (Batt or Blown)	11.00	2.51	13.51
116	Ironworker	23.05	4.06	27.11
117	Lather	28.15	15.14	43.29
119	Marble Finisher	31.16	16.27	47.43
120	Marble Mason	35.53	15.92	51.45
121	Metal Building Erector	15.19	2.00	17.19
123	Overhead Door Installer	23.00	8.00	31.00
124	Painter	23.00	2.81	25.81

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
125	Pavement Marking Operator	26.00	0.00	26.00
129	Plasterer	30.36	7.15	37.51
130	Plumber	37.42	17.92	55.34
132	Refrigeration Mechanic	25.00	0.51	25.51
133	Roofer or Waterproofer Future Increase(s): Add $.50/hr. effective 06/01/2012	29.40	15.05	44.45
134	Sheet Metal Worker	28.15	15.14	43.29
135	Steamfitter	32.59	11.05	43.64
137	Teledata Technician or Installer	19.23	5.32	24.55
138	Temperature Control Installer	22.00	2.64	24.64
139	Terrazzo Finisher	18.00	5.35	23.35
140	Terrazzo Mechanic	31.16	16.27	47.43
141	Tile Finisher	23.96	15.50	39.46
142	Tile Setter	27.00	1.91	28.91
143	Tuckpointer, Caulker or Cleaner	32.50	1.62	34.12
146	Well Driller or Pump Installer	27.60	0.00	27.60
147	Siding Installer	16.00	0.00	16.00

TRUCK DRIVERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
201	Single Axle or Two Axle	16.25	2.25	18.50
203	Three or More Axle	17.00	7.63	24.63
205	Pavement Marking Vehicle	19.25	10.84	30.09
207	Truck Mechanic	19.00	1.75	20.75

LABORERS

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
301	General Laborer	17.50	6.16	23.66
302	Asbestos Abatement Worker	17.00	2.21	19.21
303	Landscaper	11.00	2.07	13.07
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.09	14.40	31.49

HEAVY EQUIPMENT OPERATORS
RESIDENTIAL OR AGRICULTURAL CONSTRUCTION

CODE	Fringe Benefits Must Be Paid On All Hours Worked TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY $	HOURLY FRINGE BENEFITS $	TOTAL $
557	Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type); Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; 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; Crane, Shovel, Dragline, Clamshells; Forestry Equipment, TImbco, Tree Shear, Tub Grinder, Processor; Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type); WInches & A-Frames.	32.56	10.76	43.32
558	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Backfiller; Belting, Burlap, Texturing Machine; Boiler (Temporary Heat); Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & LIght Equipment); Concrete Finishing Machine (Road Type); Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Jeep Digger; Lift Slab Machine; Mulcher; Oiler; Post Hole Digger or Driver; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Roller (Rubber Tire, 5 Tons or Under); Screed (Milling Machine); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Stump Chipper; Telehandler; Vibratory Hammer or Extractor, Power Pack.	17.40	0.44	17.84

********** END OF RATES **********

END OF SECTION 00 73 43

SECTION 00 83 00 - PARTIAL PAYMENTS FOR STORED MATERIALS

PART 1 – GENERAL

1.1 As stated in the General Conditions, the Commissioner of Public Works may grant an estimate of the amount of properly stored fabricated or manufactured materials and components specified, previously paid for by the Contractor. Said payments will be made in accordance with "Procedure Rules of the Commissioner of Public Works for Progress Estimates".

1.2 For inspection of properly stored materials located outside Milwaukee County, the City shall be reimbursed by the Contractor for all transportation costs, travel time wages, meals and lodging, overtime and incidental expenses for City employees performing said inspection.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 00 83 00

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. The Contractor for this work shall refer to the "General Specifications" of the Department of Public Works dated January 31, 1992 and all subsequent addenda, as he shall be held responsible for all requirements listed herein. The Contractor shall visit the site, consult the drawings and specifications, be familiar with the project, and determine for himself all conditions affecting the work.

B. Failure by a Contractor to be familiar with the project shall not release him from any obligation undertaken under the contract to complete the work in strict conformity with the plans and specifications and all City, State or Federal codes or regulations pertaining thereto.

C. The State of Wisconsin Department of Transportation, Division of Highways, Standard Specifications for Highway and Structure Construction – 2012 Edition Part 2 through Part 7, revised by these specifications and included in the special provisions.

D. The drawings accompanying these specifications illustrate the nature and intent of the work and with the specifications form a part of the contract documents. Wherever the clauses "as shown", "as directed" or similar expressions are used, it shall be understood that reference to drawings is made.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. It is understood that the submittal of a proposal shall include all labor, materials, equipment and incidentals necessary for completion of the work required, including that which may not be directly shown on the drawings or in the specifications but are necessary for proper operation and approval.

B. The contractor shall locate and be responsible for all lines, elevations and measurements of the structure and other work executed by the Contactor under the contract. The Contractor must exercise proper precaution to verify areas to be worked on the drawing before laying out work and will be held responsible for any error resulting from failure to exercise such precaution.

C. Contractor shall verify grades, lines, levels, locations and dimensions as shown on drawings and report any errors or inconsistencies to the Engineer before commencing work or fabrication of materials. Starting of work by the Contractor shall imply acceptance of existing conditions.

1.3 DEFINITIONS

A. The word provide, when used in this specification shall mean that the provider shall furnish and install complete the referenced item or items.

1.4 DESCRIPTION OF PROJECT

A. This project involves furnishing and installing, complete in every detail, and every aspect whether specified or not, all structural steel, poured-in-place concrete, approach span repairs and deck replacement, mechanical equipment, hydraulic equipment, painting, and additional work as detailed in the contract drawings and specifications required for the completion of the rehabilitation of the Pleasant Street Lift Bridge. This work involves, but is not limited to, the following:

1. A navigable waterway for the duration of the project
2. Temporary support system to maintain bridge in lifted position
3. Demolition of the specified bridge and related components
4. Structural steel
5. Poured-in-place concrete
6. Reinforcing steel
7. Mechanical equipment
8. Hydraulic equipment
9. Electrical service to bridge, traffic barriers, control desk, and related work
10. Incidental related work

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 HOURS OF WORK

A. The contractor shall coordinate hours of work with the City of Milwaukee.

B. The hours of work shall be between 7:00 AM and 7:00 PM.

3.2 EXAMINATION OF SITE

A. All existing conditions, elevations and dimensions shall be verified at the site by the Contractor. Prior to submitting his proposal, the Contractor shall visit the site, consult the drawings and specifications and determine for himself all conditions affecting the work.

B. Contractor shall become acquainted with the location of concealed services, utilities, structures, overhead conduits and piping, etc. which may be encountered or be affected by the Contractor's work, and shall be responsible for any damage caused by neglect to provide proper precautions or protection.

C. Information pertaining to existing conditions that appear on the drawings is based on original construction. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing or that unforeseen developments may not occur. They are merely provided to assist the Contractor in the investigation of conditions.

D. Contractor shall obtain complete data at the site and inspect the area that is to receive the work before proceeding with fabricating, assembling, fitting, or erecting his work.

E. The Contractor shall notify the Engineer in case of discrepancies between existing work and drawings, and defects in such surfaces that are to receive the Contractors work. The Engineer will direct such work or surfaces to be remedied.

F. Damage to the structure not documented prior to the rehabilitation work will be the Contractor's responsibility to repair.

3.3 SUPERVISION OF WORK

A. The Contractor shall provide all necessary supervision, scheduling, planning and control to perform the work and coordinate the work of all trades on the project.

B. The contractor shall furnish the services of an experienced superintendant at all times when work is being performed.

C. The superintendant shall be constantly in charge of the installation of the work together with all subcontractors, skilled workman, helpers, and labor required to perform the work.

D. The Contractor shall be thoroughly acquainted with and be responsible for the various Subcontractors' work so that it is properly coordinated and supervised to the satisfaction of the Commissioner of Public Works or his representative.

E. Upon written notice to the Contractor of the lack of such coordination and supervision, the Commissioner of Public Works may authorize such services as may be required and deduct the cost of this service at an hourly rate of $75.00 per hour per person from the contract for the work.

3.4 STORAGE OF MATERIALS

A. The contractor shall assume full responsibility for the protection and safekeeping of products stored on the premises.

B. The contractor shall store materials within the confines of his work space or in other areas or locations negotiated by the Contractor.

C. Materials are to be so stored as to assure the preservation of their quality and fitness for the work. When considered necessary, materials shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground, and they shall be placed under cover. Materials stored at the site shall not damage the structure in any way. Oil, grease, or gasoline spills shall be cleaned up immediately.

D. Stored materials shall be located so as to facilitate prompt inspection.

3.5 PROTECTION AND REPAIRS

A. The Contractor shall continuously maintain adequate protection of all his work and materials, whether worked or unworked, on or off the site of the project, and shall protect the work and

materials of all other Contractors and the City of Milwaukee's property from damage arising in connection with their contracts.

B. The Contractor shall be responsible for any damages caused by his operations to vehicles, landscaping, persons or property. The contractor, during all operations shall take precautions necessary for the full protection of traffic, parked vehicles, property upon and in the vicinity of the structures and utilities.

C. Whenever damage or destruction of property of any character resulting from neglect, misconduct or omission due to the manner or method of execution or non-execution of the work or caused by defective work or the use of improper materials, the Contractor shall be held responsible and not released until the work shall have been corrected, completed, and the requirements and intent of these documents complied with.

D. All damages of each and every kind resulting from neglect or refusal of the Contractor to protect such work materials, and property during erection, construction and completion of the project shall be made good by the Contractor to the satisfaction of the City.

E. No damaged or imperfect materials, equipment accessories, etc., will be accepted. All materials, equipment, accessories, etc. furnished or installed by this Contractor must function perfectly and as designed. If any argument should arise in regard to this requirement, the City will replace the parts and deduct the costs from the contract price.

F. The Contractor shall repair all damages that he, any of his employees or his subcontractors may do to any other work or any other parts of the bridge structure. Repairs must be done in a neat and workmanlike manner to match existing construction and must meet with the approval of the Commissioner of Public Works or his representative.

G. If any faults are found with the Contractor's work, he shall repair or replace any of the parts he has furnished or installed as directed without any additional costs to the City of Milwaukee.

H. The Contractor shall restore, repair, refinish or replace, as part of this contract any surfaces that are damaged or left incomplete or unsightly as a result of the removal of existing equipment.

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 11 00

SECTION 01 22 00 – UNIT PRICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Cleaning and Project Closeout, and other Division 1 Specifications Sections apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services.

1.4 EXTRA WORK

A. Extra work shall be performed in accordance with the Department of Public Works General Specifications Section 2.6.0 “Extra Work and Credits”

1.5 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, labor, insurance, overhead, profit, and applicable taxes.

B. Measurement and Payment:

1. All work completed under the contract will be measured by the Engineer according to United States standard measure. The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

2. The completed work will be measured for final payment by the Engineer, as specified for the various items elsewhere in these specifications, to determine the quantities of such items of work performed, except when agreements have been made providing for compensation on the basis of plan quantities as hereinafter provided or when contract change orders have been executed providing for other methods of measurement. The Contractor will be paid for the actual amount of work performed in accordance with the contract, as shown by the final measurements or upon the basis of plan quantities.

3. If the Contractor and the Engineer agree in writing that the quantities of certain items or portions of items of work as set forth in the contract or on the plans, as originally drawn or

subsequently corrected or revised, are in substantial agreement with the actual quantities of work performed, compensation therefore will be made based on the quantities set forth in the contract or on the plans, as originally drawn or subsequently corrected or revised, without measurement thereof, and the contractor shall accept such compensation as full payment for such items or portions of items.

4. When standard manufactured items are specified such as fences, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, unit weight, section, dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

C. The items listed in the bid documents shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not listed in the bid form shall be deemed to be a part of the item which it is most closely associated with and shall be included in the cost of the unit shown on the bid form. Payment for the unit shown on the bid form shall be considered to cover the cost of all labor, material, equipment and performing all operations necessary to complete the work in place. The unit of measurement shall be the unit shown on the bid form. Payment shall be based upon the actual quantity multiplied by the unit prices. Where work is to be performed at a lump sum price, the lump sum shall include all operations and elements necessary to complete the work. No payment will be made for any material wasted, unused, rejected, or used for the convenience of the Contractor.

D. Quantities and measurement of work completed shall be agreed to by both the Contractor and Project Inspector prior to submission of progress payment(s).

E. The Owner reserves the right to add or remove quantities of work from the project after the project is awarded.

F. Final payment and release of retainage will be processed following final acceptance by the Engineer. Payment will only be released once all contract requirements are fulfilled and punch-list items are marked as acceptably completed. Punch-list work is incidental to the project quantities.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 22 00

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, special provisions, and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for handling and processing contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. The engineer will issue supplemental instructions authorizing minor changes in the work, not involving adjustment to the contract sum or contract time.

1.4 CHANGE ORDERS

A. Change orders shall be requested and processed in accordance with Department of Public Works General Specifications, Chapter 2.1.26 and as herein specified.

B. The Contractor shall submit all change order requests to the City in a timely manner. Each request should include a description of the proposed change, the reason for the change, and a complete breakdown of the proposed cost including supporting information to substantiate the claim.

C. The Contractor shall include with the change order request the impact, if any, the proposed change will have on the Contractor's schedule. If a time extension to the schedule is requested, then the Contractor shall include supporting information to substantiate the claim.

D. All change order requests shall be submitted as soon as possible after the above information can be compiled. Change order requests submitted after one month of occurrence may not be granted.

E. Change orders requested to be paid on a time and material basis shall have all work documented on a daily basis. Contractor's superintendent and the Project Inspector shall sign off on a daily basis all labor hours and materials used and charged to the change orders.

F. Approval of the change order work and method and/or amount of payment shall be approved prior to Contractor proceeding with change order as outlined in the Department of Public Works General Specification.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 26 00

SECTION 01 31 13 – PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. The General Contractor shall assume and take responsible charge of the project and shall coordinate the work of each Subcontractor so as to complete the project in an orderly and timely manner.

B. Each Contractor shall:

1. Coordinate the work of his own employees

2. Expedite his work to assure compliance with schedules.

3. Coordinate the work with that of other Contractors and City of Milwaukee.

1.3 SPECIAL REQUIREMENTS

A. The required time of completion.

1. The Contractor shall complete all work by August 3, 2013.

B. This project has special requirements regarding the coordination of the work because of the specialized work involved and because of Milwaukee River must remain navigable at all times by marine traffic.

C. To meet these special requirements the General Contractor shall submit a plan for the lift span temporary structure shoring prior to the onset of rehabilitation. This plan will be reviewed and is subject to approval by the City.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 COORDINATION PROCEDURES

A. Cooperate with the City and other persons of all trades engaged in the work in such a manner and to such extent as will best facilitate the work of each and the prompt completion of the work.

B. Maintain progress of the work, order materials and let subcontracts promptly, and schedule and expedite work so as to avoid delay.

C. Notify other Contractors, trades and City of Milwaukee whose work is in any way connected to, combined with, or influenced by the Contractor's work and allow them reasonable time to complete their work.

D. Carefully examine the drawings and specifications to ascertain the extent of the work of all trades.

E. Coordinate access to and use of the site, and storage of materials on the site with the subcontractors.

F. Coordinate Contractor's work with adjacent work and cooperate with all other trades so as to facilitate the general progress of the project. Afford all other trades every reasonable opportunity for the installation of their work and for the storage of their material. In no case exclude from the premises or work, any other Contractor or Subcontractor or their employees; nor interfere with any Contractor or Subcontractor in the execution or installation of his work.

G. Perform work in proper sequence in relation to that of other trades. Pay all costs caused by defective or ill-timed work.

H. Arrange work and dispose of materials so as not to interfere with the work or storage of materials of other Contractors and join his work to that of others in accordance with the intent of the drawings, special provisions, and specifications.

I. Notify the City of unforeseen conditions found in the field.

3.2 EXAMINATION OF DRAWINGS

A. Examine all drawings together with the specifications, or special provisions applicable to the contract.

B. After examination of the contract documents, bring to the attention of the City any questions with regard to the intent of these documents, in a timely manner, prior to commencing with the work.

PART 4 - MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 31 13

SECTION 01 31 19 – PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for project conferences and meetings, including, but not limited to, the following:

1. Pre-Construction Conference

2. Progress Meetings

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 1 Section 01 31 13 “Project Coordination” for procedures for coordinating project meetings with other construction activities.

2. Division 1 Section 01 33 01 “Submittals/Permits” for submitting the contractor’s construction schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION CONFERENCE

A. Soon after award of contract and prior to the start of construction, the Contractor shall attend a Pre Construction Conference with representatives of the City.

B. The Contractor shall have at the conference responsible representatives from subcontractors who are to furnish the required materials and perform work on the project.

C. The purpose of the conference is to discuss in detail the plans and specifications. The discussion shall include but is not limited to:

1. Schedule
2. Equipment
3. Material storage
4. Inspection requirements
5. Inspection reports
6. Protection procedures for the structure adjacent facilities, environment, and personnel

D. The Contractor shall submit the construction schedule to the Engineer at this conference. It must include all of the Contractor's work and all the work of subcontractors. Copies of this schedule shall be submitted to the City for review. The schedule shall include the following:

1. List of starting and completion dates for each major item

2. Running schedule of a week-by-week charting and allowing for charting of:

   a. Expected progress on major items
   b. Actual progress on major items
   c. Critical path items

E. Contractor shall describe in detail when each portion of the work is to be accomplished and subcontractors shall participate in the discussion. The Engineer will serve to interpret the contract documents should such questions arise.

F. Any other questions that the Contractor/Subcontractors have about the work or its scheduling shall be raised at this conference.

G. Requirements for contract administration and construction operations will be defined for participants.

H. Time, date and place of the conference will be determined by the Engineer.

3.2 PROGRESS MEETINGS

A. Weekly progress meetings will be held at the project site by the City's representative for the purpose of coordinating and expediting the work progress.

B. Attendance at progress meetings by the Contractor is mandatory. These meetings shall also be attended by representatives of each Subcontractor who is either working at the site or is affected by work being done at the site.

C. Contractors shall give written reports of progress on the project, discuss the work schedule for the coming period and present all conflicts, discrepancies, or other difficulties for resolution.

D. The Contractor shall submit an updated construction schedule at each progress meeting with the expected progress of major items, actual progress on major items and critical path items outlined. A short narrative should be written describing the cause of any delays and intended action to remedy delays. On a monthly basis, provide an overall project schedule tracking the actual progress of major and critical path items, expected progress of remaining major and critical path items, and anticipated completion date.

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 31 19

SECTION 01 33 01 – SUBMITTALS AND PERMITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, special provisions, and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. This section includes administrative and procedural requirements for submittals and permits required for performance of the work.

B. The rulings, regulations and laws of the following shall be complied with in the completion of this project.

1. United States Department of Labor – Occupational Safety and Health Administration (OSHA)
2. Wisconsin Department of Workforce Development
3. City of Milwaukee Building Code
4. Wisconsin Administrative Code
5. Ordinances of the City of Milwaukee
6. National Electrical Code
7. American Association of State and Highway Transportation Officials (AASHTO)
8. Federal Navigation Regulations including U.S. Coast Guard Regulations

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SUBMITTALS AND SAMPLES

A. Comply with the requirements of the Department of Public Works General Conditions and as follows:

1. Forward submittals not more than 30 calendar days after the Award of Contract for all materials to be used on the project. No work, indicated on any one shop drawing, hardware list, etc., shall be started until such information has been approved.

2. Include with each submittal a transmittal letter signed by the Contractor containing the following:

   a. Name of Contractor
   b. Name of Project
   c. List of Submittals with Specification Section references
   d. Name of Manufacturer or Supplier
   e. Additional information as required for the items being provided.

3. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.

   a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

4. Processing: No specific time periods are established herein for submittals or for the engineers review. To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.

   a. Allow up to 21 days for initial review. Allow additional time if the Engineer must delay processing to permit coordination with subsequent submittals.
   b. If an intermediate submittal is necessary, process the same as the initial submittal.
   c. Allow up to 21 days for reprocessing each submittal.
   d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.

5. Questions on the plans and project specifications during the contract bidding phase should be directed to:

   Mr. Jerrel Kruschke
   Civil Engineer
   Infrastructure Services Division
   Room 907, Frank P. Zeidler Municipal Building
   841 North Broadway
   Milwaukee, WI 53202
   (414) 286-0468

   All correspondence including submittals, payment requests (4 copies), change order proposals, construction time letters (delays, suspensions), and any construction related matters shall be addressed as follows:

   Construction Supervisor
   Infrastructure Services Division
   Room 701, Frank P. Zeidler Municipal Building
   841 North Broadway
   Milwaukee, WI 53202

   Note: A Specific Construction Supervisor will be assigned to the project prior to the start of construction and contact information will be shared at the preconstruction conference.

   All correspondence concerning the following items; Minority, Woman, Small Business Enterprise program Reports, Residency Preference Program, Apprentice Program, Wage and Hour Reports, Insurance Certificates, Subcontractor Approval Forms, and all affidavits should be sent to:

Ms. Barbara A Trible
Department of Public Works
Room 507, Frank P. Zeidler Municipal Building
841 North Broadway
Milwaukee, WI 53202
(414) 286-3309

B. Approvals: Wherever the words “or equal” or “approved equal” or similar terms are used, it shall mean as approved by the Commissioner of Public Works or agent. All shop drawings, bulletins, manufacturer’s cut sheets and data necessary for an approval shall be submitted with four (4) copies sent to the City Engineer. Three (3) copies are required for the City’s use, and one (1) copy will be returned to the Contractor.

C. Approval shall apply to general conformance only, and shall in no way relieve this Contractor from his/her responsibility for the full performance of contract.

3.2 CODES AND PERMITS

A. The contractor shall obtain and pay for all permits, charges, fees and licenses, if any are necessary for the prosecution of the work.

B. The contractor shall comply with all laws, ordinances, rules and regulations bearing in the conduct of the work including the giving of notices.

C. The cost of special equipment, enclosures, protective coverings, etc., as may be required to comply with codes and ordinances shall be included in the appropriate price bid for the work.

D. If any material or work is specified contrary to such rules or omitted from the specifications or drawings but required by such rules, it shall be altered as required by the contractor to meet these rules and regulations.

E. Attention is directed to the Milwaukee County Air Pollution Control Ordinances and the Department of Natural Resources relative to the specific sections which are applicable to sandblasting and spray painting.

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 33 01

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. This section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.

B. Temporary utilities may include, but are not limited to, the following:

1. Water service and distribution
2. Temporary electric power and light
3. Temporary heat
4. Ventilation
5. Telephone service

C. Support facilities may include, but are not limited to, the following:

1. Temporary enclosures
2. Hoists and scaffolding
3. Temporary project identification signs and bulletin boards
4. Waste disposal services
5. Construction aids and miscellaneous services and facilities

D. Security and protection facilities may include, but are not limited to, the following:

1. Barricades, warning signs, and lights
2. Enclosure fence for the site
3. Environmental protection

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY OR TRIAL USAGE

A. The owner shall have the right to make temporary or trial usage of any mechanical device, machinery, apparatus, equipment, work, material, or construction supplied under contract before final completion or acceptance of the work, and the same shall not be construed as evidence of acceptance of the work by the owner.

3.2 TEMPORARY POWER

A. The Contractor shall provide all power required, and be responsible for payment for all utility bills beginning at the start date for the duration of the project.

1. OSHA regulations require that employers use either ground fault circuit interrupters or an assured equipment grounding conductor program in addition to any other regulation or equipment ground connectors.

3.3 TEMPORARY LIGHTING

A. Temporary lighting shall be provided and maintained by the Contractor.

B. Furnish, install, and maintain temporary lighting during construction.

1. Lighting shall be sufficient to enable all trades to complete their work. Illumination in all areas shall meet or exceed State Code requirements. (See IND 35.38). Provide at least one 200 watt lamp for each 400 square feet of floor space.

2. Remove the temporary lighting when the job is completed.

3.4 BULLETIN BOARD

A. Furnish and maintain a 4-feet 0-inch by 4-feet 0-inch bulletin board for the posting of wage employment data, etc.

3.5 FIELD OFFICE

A. The location of a field office shall be coordinated with the City of Milwaukee for the Rehabilitation of the Pleasant Street Lift Bridge.

PART 4 –MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 50 00

SECTION 01 60 01 – MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 MATERIALS

A. Furnish materials of the type, qualities and characteristics specified. The specification of a trade name and catalog number is intended to establish quality, type, character and operating characteristics of the material required. Materials by other manufacturer's meeting the approval of the Engineer of equal specifications will be considered excepting as may be specifically stated otherwise. Evaluating of other manufacturer's products will be made at the time of shop drawing submission. Samples and/or demonstrations may be requested.

B. Materials and equipment shall be delivered adequately protected, in merchantable condition and in original unbroken packages if normally packaged. They shall be stored and handled so as to protect and maintain their merchantable condition. Packages shall have stamped on them the date of manufacture and shelf life, if applicable.

C. The Commissioner of Public Works or his representative shall have the right to reject material not in compliance with specifications as well as damaged material and the Contractor shall remove such material from the construction site when as directed.

1.2 MATERIAL STORAGE

A. Storage areas are available within the Contractor's occupancy limits.

B. Refer to Section 01 11 00 Summary of Work, Storage of Materials.

1.3 EQUIPMENT

A. Internal combustion engine and compressors shall be equipped with mufflers to reduce noise to a minimum, and shall not be operated in enclosed areas without adequate ventilation.

B. All materials and work procedures used shall be in accordance with all air pollution control regulations in effect at the work site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 60 01

SECTION 01 70 01 – CLEANING AND PROJECT CLOSE-OUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, special provisions, and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

B. Article 2.5.4 of the General Specifications of the City of Milwaukee Department of Public Works shall be supplemented as specified hereafter.

1.2 SUMMARY

A. This section includes administrative and procedural requirements for cleaning and project closeout including, but not limited to, the following:

1. Project record document submittal
2. Submittal of warranties
3. Final cleaning

1.3 AS-BUILT DRAWINGS

A. At the completion of work and prior to final payment, the contractor shall provide the City with a marked up set of "as-built" drawings showing all changes or variations from contract drawings, including those specified on change order drawings heretofore issued. Contractors providing buried or concealed piping, conduit or similar items shall locate such items by dimensions and elevations.

B. Marked up sets of prints will be acceptable providing they are in first class condition for record purposes. Each contractor shall be responsible for accuracy of record drawings.

1.4 GUARANTEE

A. This Contractor shall guarantee to replace or repair promptly at his own expense, as directed by the Commissioner of Public Works or his agent, all workmanship, materials, or equipment in which defects may develop within a minimum one (1) year warranty period from the date of final acceptance of his work excepting as may be hereinafter specified. This guarantee includes all damage done by the City due to faulty equipment, poor installation or poor construction caused by the Contractor. The City shall also receive any extended guarantees or warranties normally supplied by any vendor or manufacturer for material or equipment incorporated in the work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SAFETY CLEANING

A. Safety cleaning: Each Contractor is responsible for safety cleaning, which includes but is not limited to the following:

1. Work areas, passageways, stairs, must be kept free of debris and scrap.

2. Form and scrap lumber shall have nails withdrawn or bent over and lumber shall be stacked or removed.

3. Spills of paint, oil, grease, or other liquids shall be removed immediately.

3.2 PROGRESS CLEANING

A. Prime Contractor and subcontractor shall remove his rubbish and debris from the site promptly upon its accumulation.

B. Combustible waste shall be stored in fire resistive containers and disposed of regularly.

C. Oily, flammable or hazardous wastes such as caustics, acids, harmful dusts, etc., shall be stored in appropriate covered containers.

D. The Contractor is not allowed to wash debris or other harmful contaminants into the Milwaukee River or down drains that would be discharged into City Sewers. Filters shall be inserted in the drain where it is likely debris may accumulate.

3.3 DISPOSAL

A. All demolished materials required for this work shall be carefully collected and removed from site.

B. No burning or rubbish or debris will be allowed at the site. No rubbish shall be thrown from heights without proper protection. When dust will be generated or flying debris is likely to occur, provide dust tight chutes or other means to control dust.

C. Containers: Contractor shall provide mobile industrial type waste containers in the number and size required, placed at adequate locations to handle debris or provide other methods of disposing of debris.

3.4 FINAL CLEANING

A. Complete final cleaning immediately prior to substantial completion.

B. Contractors shall expedite or perform thorough cleaning, sweeping, and washing of work to remove from work area and equipment under his contract, all foreign matter, dust, debris, spots and soil, so as to put all such work and equipment including finishes, in a complete and finished condition ready for acceptance and use intended.

C. Remove debris from drains and flush clean.

D. Employ trained experienced workmen for the final cleaning.

3.5 CHARGES

A. If Prime Contractors do not remove rubbish or clean the project site as specified above, the City reserves the right to have work done by others at Contractor's expense.

B. Employees of the City who are required to clean up any rubbish will record all hours involved to complete such work.

C. The cost incurred by the City for this special cleaning shall be charged against the contract price of the Contractor as determined by the City.

PART 4 - MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION 01 70 01

Special Provisions

Table of Contents

Article	Description	Page #
1.	General.	3
2.	Scope of Work.	3
3.	Prosecution and Progress.	3
4.	Traffic.	11
5.	Work Restrictions.	11
6.	Protection of Workers.	12
7.	Labeling and Disposal of Waste Material.	12
8.	Public Convenience and Safety.	12
9.	Coordination with Businesses.	12
10.	Work Done by Others.	12
11.	Field Facilities.	13
12.	Shop Drawings and Submittals.	13
13.	Removing Old Structure Over Waterway With Minimal Debris, Item 203.0600.S.	16
14.	Expansion Device (B-40-406).	18
15.	Steel Grid Floor Open (2-1/2 Inch).	19
16.	Painting Epoxy System (B-40-406).	22
17.	Preparation and Coating of Top Flanges (B-40-406), Item 517.0900.S.	25
18.	Concrete Staining (B-40-406), Item 517.1010.S.	26
19.	Structure Repainting General.	28
20.	Structure Repainting Recycled Abrasive (B-40-406), Item 517.1800.S.	29
21.	Negative Pressure Containment and Collection of Waste Materials (B-40-406), Item 517.4500.S.	32
22.	Portable Decontamination Facility, Item 517.6001.S.	34
23.	Lightweight Concrete Masonry, Item SPV.0035.01.	35
24.	Remove and Replace Access Hatch, Item SPV.0060.01.	36
25.	Recondition Existing Counterweight, Item SPV.0060.02.	37
26.	Remove and Replace Existing Hydraulic Jack Pedestal, Item SPV.0060.03.	38
27.	Bearing Maintenance (B-40-406), Item SPV.0060.04.	39
28.	Remove and Replace Concrete Beam SPV.0060.05	40
29.	Bridge Structural Steel, Item SPV.0085.01.	41
30.	Remove and Replace Bridge Railing SPV.0090.01	45
31.	Marine Dock Fender SPV.0090.02	46
32.	New Cast Stone Coping, Item SPV.0090.03	47
33.	Tuck Pointing, Item SPV.0090.04	49
34.	Epoxy Crack Sealing, Item SPV.0090.05	52
35.	Lift Span Roadway Joints, Item SPV.0105.01.	54
36.	Lift Span Sidewalk Joints, Item SPV.0105.02.	55
37.	Remove and Replace Pier Railing, Item SPV.0105.03.	56
38.	Counterweight Balancing Calculations, Item SPV.0105.04.	57
39.	Refurbishing Existing Name Plates, Item SPV.0105.05.	58

40. Field Verification Survey, Item SPV.0105.06. 59
41. Bridge Hydraulic System, Item SPV.0105.07 61
42. Bridge Operator's House, Item SPV.0105.08 90
43. Bridge Machinery - General 106
44. Counterweight Machinery, Item SPV.0105.09 122
45. Equalizer Machinery, Item SPV.0105.10 125
46. Span Guides, Item SPV.0105.11 130
47. Electrical Control Equipment, Item SPV.0105.12 132
48. Traffic Control Equipment, Item SPV.0105.13 147
49. Utility Service Work, Item SPV.0105.14 155
50. Modify Existing Northeast Railing SPV.0105.15 168
51. Remove and Replace Safety Cages SPV.0105.16 170
52. Replace Copper Gutter and Flashing, Item SPV.0105.17 171
53. Temporary Lift Span Shoring, Item SPV.0105.18. 175
54. Fiberglass Sidewalk Floor Plates, Item SPV.0165.01. 176
55. Galvanized Abrasive Perforated Plates, Item SPV.0165.02. 179
56. Repair Planters, Item SPV.0165.03 180

SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for the Pleasant Street Lift Bridge over the Milwaukee River, City of Milwaukee, Milwaukee County, 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, 2012 Edition, as published by the department, and these special provisions. The City considers only City and department standard specifications, supplemental specifications and interim supplemental specifications issued directly from the City as valid for this contract.

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.

The City of Milwaukee is referred as the City and Wisconsin Department of Transportation is referred as the Department in this specification.

2. Scope of Work.

The work under this contract shall consist of the rehabilitation of Structure B-40-406 including major rehabilitation of structural, mechanical, and hydraulic, electrical elements of the bridge, approach roadway work to match the bridge deck profile, sidewalk and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

3. Prosecution and Progress.

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

Provide the start date to the engineer in writing within a month after executing the contract but at least 14 calendar days before the pre-construction conference. Upon approval, the engineer will issue the notice to proceed within 10 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 City's scheduled resources.

Coordinate construction activities so that all work on this contract is completed by the project's completion date.

The City of Milwaukee will be responsible for raising, lowering and opening the existing bridge to river traffic, until the contractor is permitted to begin rehabilitating the bridge.

Provide the proposed sequence of operations, methods of handling traffic, method of operation in the Milwaukee River so as to minimize interference with river traffic, plans for cleanup of the Milwaukee River should spills of oil, soil or debris from abutment and pier rehabilitation construction or other types of pollutants be accidentally discharged into it, and a program of debris removal to prevent accumulation of unsightly debris in the water course in writing within fourteen days before the pre-construction conference. Submit revisions in traffic handling to the engineer for approval at least 48-hours in advance of making any changes in traffic operations.

The contractor will be responsible for all utility bills beginning at the start date for the duration of the project.

The contractor will be responsible to find the staging area during construction by occupying the work area on the bridge, approaches or by negotiating with the adjacent property owners for the construction staging.

Notify the following personnel within the specified time period prior to commencing any construction operations:

1. Obtain permission from the engineer a minimum of 48 hours prior to any construction schedule change.

2. The Coast Guard has determined that the project will not require a Coast Guard permit as there would be no changes to alter the permitted navigational clearances or character of the bridge; however it does require a letter of authorization to proceed. Once the contract is awarded the contractor is required to coordinate efforts with the U.S. Coast Guard – Commander (OBR), Ninth Coast Guard District, 1240 East 9th Street, Room 2019, Cleveland, Ohio 44199-2060, telephone (216) 902-6084, fax (216) 902-6088 at least 30 days in advance of any construction over the waterway. Allow an additional 5 days for mail processing once the package has been received by at the U.S. Coast Guard facility. Primary contacts at the U.S Coast Guard are:

Name:	Phone:	Email:
Lee Soule	(216) 902-6085	Lee.D.Soule@uscg.mil
Scot Striffler	(216) 902-6087	Scot.M.Strifflen@uscg.mil
Blair Stanifer	(216) 902-6086	William.B.Stanifer@uscg.mil

Provide the Coast Guard with a schedule and timeframe for removal and replacement of the lift span and describe any temporary construction aids and work within the limits of the Milwaukee River to receive the U.S. Coast Guard authorization. The Coast Guard notification requirement is based on anticipated beginning of reconstruction of the lift span and any work that affects the operation of the bridge or navigation within the Milwaukee River throughout the duration of the project.

During the project (due to unforeseen project requirements) if the contractor needs to alter the original plan as it affects the navigation of the waterway the contractor will have to provide a minimum of 2 weeks advance notice to the Coast Guard prior to altering the original plan. Copy the engineer on all correspondence with the Coast Guard.

The contractor will have to maintain a clearance of at least 25'-6" above the City of Milwaukee Datum under the lift span at all times for the navigational traffic. The barges, if needed for construction, will have to be positioned outside the navigational waterway unless the minimum two weeks prior notice is given to the Coast Guard.

The scaffolding or containment should not be installed more than 2'-0" under the steel girders on the approach fixed spans. The contractor will have to provide temporary lighting to denote the low clearance of the scaffolding or containment on the approach fixed spans and the lift span.

The contractor will have to follow the "Nationwide Permits General Conditions" as given in US Army Corps of Engineers website:
http://www.usace.army.mil/CECW/Documents/cecwo/reg/nwp/nwp_2007_final.pdf

Maintain river traffic at all times during the rehabilitation of the lift span on the bridge. Keep the lift span properly secured in the open position during non-working hours. Schedule work so that construction operations do not take place at the peak of the navigation season.

Once work has started on the contract, work continually until the contract work is complete. The contract will not be considered complete until all items on the contract are completed. Obtain approval from the engineer at least 24-hours in advance if work on Saturday, Sunday or nationally recognized legal holidays is desired. Notify the engineers as soon as possible, but no later than 12:00 P.M. the day before of scheduling changes after approval has been obtained.

Maintain or provide where necessary, as directed by the engineer, pedestrian access to adjacent properties, businesses, riverwalks, and at bus stops. Provide adequate temporary sidewalk and bridging between the curb and right-of-way line over freshly paved concrete or other obstructions on the sidewalk area at entrances to building or as direct by the engineer.

Maintain vehicular access to all business and commercial properties at all times except as noted in traffic control plans and specifications.

Inform property owners at least 48-hours prior to removing a driveway approach, which serves that property. Schedule sidewalk and driveway approach removal and replacement so that the time lapse between the removal and replacement is minimal.

Use equipment having vacuum or water-spray mechanisms to eliminate the dispersion of dust when performing roadway-cleaning operations. Provide suitable, self-contained particulate collectors, if vacuum equipment is used, to prevent discharge from collection bin into the atmosphere.

The DNR recommends that all in-water construction activity be avoided from March 15 to June 15 to protect endemic fish population during spawning activities. It is also necessary to maintain an unobstructed passageway through to construction area at these locations at all times to allow for continuous fish movements.

There is potential for bird nesting under the Pleasant Street Bridge. The International Migratory Bird Act protects international migratory birds such as seagulls, swallows, and terns. The Department of Natural Resources recommends that the bridge roof and exterior be checked twice daily and empty nests be removed. It is a violation of federal law to disturb nests if eggs or fledgling young are present. Please contact Brian Nelson, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services at (920) 324-4514 if eggs or fledgling young are present.

If swallow nests are present, do not remove or destroy them when the swallows are nesting or rearing their young. The nesting season for swallows has been established as May 1 through August 30. Apply for a depredation permit from the US Fish and Wildlife Service for work that may disturb or destroy occupied nests during the nesting period. The need for a permit may be avoided by removing the existing bridge superstructure prior to nest occupation by swallows, and clearing the nests from and installing a suitable netting device on the remaining existing superstructure prior to nesting activity to prevent the swallows from nesting. The cost for preventing nesting shall be included in the cost of Removing Old Structure Over Waterway with Minimal Debris.

State Threatened species are present in the project area. They are:

Luxilus chrysocephalus	Striped Shiner	Fish
Moxostoma valenciennesi	Greater Redhorse	Fish

Please follow in-water work restrictive dates to avoid impacts to these species.

Boat and Gear Disinfection Protocol

Boat and trailer cleaning guidelines to prevent the spread of aquatic invasive species have been widely distributed to the public through a variety of publications, pamphlets, signs, etc. The guidelines consist of a nationally-accepted set of prevention steps. While disinfection is **not** a required prevention step for the general public, some boaters may be interested in the disinfection procedures followed by the WI DNR. Please note: the first three steps (Inspect and Remove, Drain, and Dispose) listed below are required.

The following steps shall be taken every time a boat, equipment or gear is moved between waters to avoid transporting invasive species and/or pathogens:

- **Inspect** and **remove** aquatic plants, animals, and mud from your boat, trailer, equipment and gear.
- **Drain** all water from your boat, motor, live well, bilge, transom wells, as well as from your equipment and gear, including but not limited to tracked vehicles, barges, silt or turbidity curtain, hoses, sheet pile and pumps.
- **Dispose** of unwanted aquatic plants and animals in an appropriate way.
- **Disinfect** your boat, equipment and gear by either:
- **Washing** with ~212ºF water (steam clean), OR
- **Drying** thoroughly for 5 days after cleaning with soap and water and/or high pressure water, OR
- **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 (>104ºF) application.

Safety Precautions for Disinfectant Use:
Virkon-A:

1. Receive and be required to read a copy of the Virkon-A Materials Safety Data Sheet (MSDS) for the product.
2. Wear chemical splash goggles.
3. Wear a face shield where the possibility exists for face contact due to splashing or spraying of the material.
4. Wear impervious clothing to prevent contact with skin. (gloves, pants, jacket, hood, and boots) or a Tyvek style full body suit.

In addition, all employees who handle or mix Virkon-A in powder form and prefer to wear a dust mask respirator when handling powder, may do so in compliance with the DNR Respiratory Protection Program Handbook MC 9180.5 Voluntary Use requirements.

Bleach:
Follow precautions 2, 3, and 4 (above).

- Chlorine Wear eye protection, rain gear, and gloves if spraying. Stay upwind of the spray. Will break down in sunlight and when in contact with organic material. Is corrosive to metal and rubber. Is toxic to fish at these concentrations so rinse well after disinfection or neutralize with sodium thiosulfate. For neutralizing chlorine, spray sodium thiosulfate in an 800 ppm solution (3 grams per gallon of water) on all surfaces after the disinfection period is over. Rinse with water from the next lake to remove any remaining sodium thiosulfate.
- Virkon Aquatic This is a disinfectant in the peroxygen (hydrogen peroxide) family. It is a powder. It is 99.9% biodegradable and breaks down to water and oxygen and is not corrosive at the working dilution. Wear dust mask if mixing powder and eye protection, rain gear and gloves if spraying. Stay upwind of spray.

Sources of disinfectants

Chlorine - Household bleach (5.25% chlorine) can be purchased from a grocery or convenience store. HTH is granular chlorine (70% calcium hypochlorite) and can be purchased from a pool supply company.

Sodium Thiosulfate - Commonly used to neutralize chlorine and iodine. It should be available at a pool supply company or from a chemical supply company.

Virkon Aquatic is available from Western Chemical. It is the same formulation, but without the perfume and dye, and the label addresses specific fish pathogens. Their phone is 1-800-283-5292.

Disinfection measures must be taken prior to moving boats, equipment and other gear from one waterbody to another. They are not needed daily when sampling the same waterbody or for law enforcement equipment in emergency situations. In cases where boats and gear return to state hatcheries, disinfection should be done in a location away from ponds and water supplies to prevent disinfectant or untreated water from entering those areas. Every effort should be made to keep the disinfection solution and rinse water out of surface waters.

To the extent practicable, equipment and gear used on waters known to be infested with invasive species and viruses should not be used on other non-infested waters. The following are some helpful hints to consider when planning your work in water.

- Organize your sampling so the work in infested waters is always done last.
- If a high percentage of your work is done in waters with invasive species, consider dedicating certain gear to be used only in those waters.
- Depending on the type of work you are doing, it may be possible to work with lake volunteers and use their boats to collect samples. That way only your gear needs to be disinfected.

The following methods are provided to assist staff when disinfecting equipment and gear commonly used by department staff.

Nets

Organic debris should be removed prior to disinfection. Power washing is not required, but nets could be sprayed with a garden hose to remove debris. Nets may be steam cleaned, washed and dried thoroughly for five days or treated with a disinfection solution. Nets should be placed in the disinfection solution for the appropriate contact time for the solution being used. After rinsing, the nets can be used immediately, or hung to dry.

Personal protective gear, including rain gear, gloves, boots/waders

Scrub personal protective gear with the disinfection solution. After scrubbing, the gear should be kept wet with the disinfection solution for the appropriate contact time. Rinse with clean water or water from the next waterbody. Alternatively, personal gear may be steam cleaned or dried thoroughly for five days after cleaning with soap and water.

Dip nets, measuring boards and other sampling gear

Remove any organic material from sampling gear. There are several options for disinfecting smaller gear. *Dissolved oxygen probes and other sensitive electronic sampling gear may be damaged by disinfection solution and should only be rinsed with clean water*. For other gear used in water choose one of the following options:

- Option one: The gear can be sprayed with the disinfection solution and a wet surface maintained for the appropriate contact time. The gear should be rinsed with clean water or water from the next waterbody before it is used again.
- Option two: Fill a tub with disinfection solution and place all equipment in the tub for the appropriate contact time. The gear should be rinsed with clean water or water from the next waterbody before it is used again.
- Option three: Use a completely new set of gear for each waterbody during the work day and disinfect all gear at the end of the day using option one or two.

Boats, trailers, and live wells

Remove organic material from boats, trailers, and live wells. Drain water from live wells, bilges and pumps. The outside and inside of the boat, trailer, live wells, bilges, and pumps should be sprayed with the disinfection solution and left wet for the appropriate contact time. The inside of the live wells, bilges and pumps should be made to contact the solution for the appropriate contact time as well. Run pumps so they take in the disinfection solution and make sure that the solution comes in contact with all parts of the pump and hose. The boat, trailer, bilges, live well, and pumps should be rinsed with clean water or water from the next waterbody after the appropriate contact time. *Every effort should be make to keep the disinfection solution and rinse water out of surface waters.* Pull the boat and trailer off the ramp and onto a fairly level area and away from street drains to minimize potential runoff into surface waters.

Motors

After removing from the water, tip the motor to the down position and start the motor for several seconds or turn motor over several times to dispel water from the cooling system. Alternatively and especially for motors moored in water for several days or more, emerge the lower unit in a bucket of disinfectant and run the motor to ensure contact with all internal parts and allow for the appropriate contact time. Or, rig up a short (6-foot) piece of garden hose to lower unit muffs. A pail of the disinfectant can be set in the back of the boat and gravity fed to the lower unit to run the disinfectant through the motor. Allow solution to remain in motor for the appropriate contact time. The hose will need to be primed to start the gravity flow because the lower unit does not create enough suction to prime the hose. A non-corrosive (Virkon Aquatic) is recommended for use to protect the impeller. Rinse with clean water or water from the next waterbody.

Heavy Equipment

For heavy equipment steam-cleaning is an effective method of disinfection.

To minimize the environmental impact the contractor should take the appropriate precautions. Some of them are listed below.

1. Do not knock concrete, steel, or other debris in to the waterway during the removal process. If intact concrete slab is not adequate to contain debris barges, falsework, or similar devices should be employed.

2. Any demolition must not result in permanent or long-term deposition of debris in the waterway. Material that inadvertently enters the water should be removed.

3. Maintenance activities may not result in the discharge or deposition of materials (for example paint, sand or abrasives, metal or chemicals) into the waterway.

4. Heavy equipment must not be used below the ordinary high water mark during construction or for maintenance.

5. Dust, dirt, and concrete debris accumulating in the work areas during structure removal and construction shall be removed at periodic intervals to prevent discharge of these materials into the river.

6. Grinding slurry should be contained and should not be allowed to drain to any wetland or storm sewer inlets.

7. If site dewatering is required, sediment-laden water shall be pumped into an adequate sediment basin prior to discharge to a storm sewer, or wetland.

8. Comply with TRANS 207 storm water design standards for storm water control during the project. Provide WDNR with a storm water management/erosion control plan two weeks prior to beginning of construction. It should address what actions and measures will be employed during construction to prevent downstream migration of potential pollutants and to protect water quality.

9. Measures shall be taken to control fugitive dust emissions generated during construction.

10. Excess material or spoils should be stockpiled and steel sizing, separation of rebar from concrete should be performed in upland areas, preferably on paved or impervious surfaces and an adequate distance away from wetlands and storm sewer inlets.

The contractor should not place any fills in waterways for work pads. Also grinding slurry should be contained and should not be allowed to drain to any wetlands or storm sewer inlets.

All construction activities should occur in an environmentally sound manner. This includes the proper disposal of all demolition material that cannot be recycled.

4. Traffic.

Pleasant Street over the Milwaukee River will be closed to through traffic during construction operations under this contract. Provide access to properties adjacent to the bridge and approaches, unless noted in the traffic control plan, except for minimum time necessary to undertake construction activities in the immediate vicinity of the property.

Maintain pedestrian access at all times to the entrances to the properties as shown on the plans and directed by the engineer. Maintain pedestrian access to the river walk in the northwest and southwest quadrants of the project at all times. These entrances and access to the riverwalk northwest and southwest quadrants may be restricted and closed only as necessary to accommodate construction operations with the approval of the engineer.

All posting of parking restrictions required to facilitate construction operations will be provided by the City of Milwaukee, Infrastructure Services Division, or as directed by the engineer. Contract James Brown at (414) 286-3276, at least three working days prior to the start of construction operations.

5. Work Restrictions.

Comply with all local ordinances that apply to local street work operations, including those pertaining to working during Night Time hours. Furnish any ordinance variance issued by the municipality or required permits to the engineer, in writing, 3 days prior to performing such work. Do not operate motorized construction equipment from 7:00 PM until the following 7:00 AM, unless prior written approval is obtained from the Engineer.

Maintain or provide where necessary pedestrian access to adjacent properties, businesses, recreation areas, and bus stops as directed by the engineer.

Provide adequate temporary sidewalk and bridging between the curb and right-of-way line over freshly paved concrete or other obstructions in the sidewalk area at entrances to buildings, as directed by the engineer.

Do not remove any existing trees, street light poles, hydrants and other utility poles without the written approval of the engineer. Conduct an on-site visit prior to biding to determine any special measures required for proper clearance between the trees, hydrants, poles, and the construction equipment.

Inform property owners and tenants at least 48 hours prior to removing a driveway approach that serves a property. Schedule sidewalk and driveway approach removal and replacement so that the time lapse between removal and replacement is minimal.

Construct driveway approaches as shown on the plans. Do not close or remove any approaches without sufficient notice given to the occupants of the premises to remove their vehicles prior to driveway removal or closing of the driveway approach access.

If the contractor can make other access arrangement, agreed to in writing and signed by the contractor and the property owner serviced by the driveway, other sequencing will be allowed when approved by the engineer.

6. Protection of Workers.

Handle and manage all spent materials from paint removal operations as "hazardous." In this regard, direct attention to subsection 107.1 of the standard specifications on Safety, Health, and Sanitation.

Provide and require all employees to wear all personal protective equipment required for the environment to which the workers are subjected, and provide medical monitoring as required for those employees in the work area. The requirement includes, but is not limited to, air-supplied respirators, eye protection, ear protections, fall protection, protective clothing and other such items. Provide for the decontamination of workers and authorized persons in the work area so that no lead contamination leaves the work area on the bodies or clothing of those persons.

7. Labeling and Disposal of Waste Material.

Properly label the hazardous waste materials generated from the construction site and dispose that material by following the guidelines of the Environmental Protection Agency. Unlike standard Wisconsin Department of Transportation let projects, the Contractor will be responsible to find suitable landfill and the cost of Labeling and Disposal of Waste Material will be paid as an incidental to the Negative Pressure Containment and Collection of Waste Materials B-40-406.

8. Public Convenience and Safety.

Revise standard spec 107.8(6) as follows:

Check for and comply with local ordinances governing the hours of operation of construction equipment. Do not operate motorized construction equipment from 7:00 PM until the following 7:00 AM, unless prior written approval is obtained from the engineer.

9. Coordination with Businesses.

The Contractor will arrange and conduct a meeting between the City, the contractor, local officials and business people to discuss the project schedule of operations including vehicular and pedestrian access during construction operations. Hold the first meeting prior to the start of work under this contract and additional meetings held thereafter when there is an impact to an adjacent property owner or a change in traffic pattern.

10. Work Done by Others.

All electrical work from the disconnect switches to the bridge distribution system will be done by the City crews. Contractor is responsible for providing traffic gates, control

desk, and electrical control equipment. See Electrical Control Equipment Special Provision for additional details.

11. Field Facilities.

Replace standard spec 642.2.2.1 (1) with the following:

Provide the field office with up to three communication services, designated as follows: 1-voice, 1-fax, and 1-high speed Internet connection for computer(s) at setting no less than 384 K and up to 1 MB. The high speed Internet connection must utilize either DHCP or PPPoE as the connection method and may be combined with the fax service.

Provide two programmable touch-tone telephones of which one will be a cordless type operating at no less than 2.4 GHz and one will have an answering machine unless voice mail service is available. The telephones and the communication services are for the sole purpose of the City staff.

12. Shop Drawings and Submittals.

A Description

This special provision describes specific requirements for shop drawings and other submittals.

B Materials

B.1 General

Submit construction drawings, erection diagrams, shop details, catalog data, test data, and other pertinent information for review as specified herein, in City specifications, and as specified in other special provisions.

Review by the engineer of shop drawings, methods of installation or contractor's construction details does not relieve the contractor of the responsibility of compliance with the contract specifications; and does not relieve the contractor of the responsibility for providing adequate quality control measures; and does not relieve the contractor of the responsibility for providing proper and sufficient materials, equipment and labor to complete the approved work in accordance with the contract documents.

Unless otherwise stated in the contract documents, do not commence any portion of the work requiring shop drawings or a sample of the work until the submission has been approved by the engineer.

Unless otherwise stated in the contract documents, review of shop drawings, erection plans, and demolition plans will begin only after the submission of a complete set of information required to complete a discrete item of work.

Each individual piece of equipment furnished for a particular item must be compatible with all the other equipment associated with the item. It is the responsibility of the contractor to make certain that all items furnished for the project are compatible and will

perform the function indicated on the plans and within the specifications. Most of the mechanical and hydraulic equipment is specified by catalog number in order to establish the minimum requirements and special features needed for the project. Compatibility with other specified equipment is not guaranteed. It is the contractor's responsibility to verify the compatibility of all equipment before submitting it for review. The engineer will review the submissions for compliance with the requirements of the special provisions, but not for compatibility.

B.2 Submittal Materials

Submit all data on paper measuring either 8-1/2-inch x 11-inch, 11-inch x 17-inch, or 24-inch x 36-inch as is appropriate. Where appropriate, bind individual sheets measuring 8-1/2-inch x 11-inch into sets with a cover, title sheet, and table of contents.

Submit to the engineer samples of materials for selection of colors, patterns, finishes, etc. for all items which affect the appearance of the bridge and the inside and outside of the bridge houses and other product samples when required by the various articles of the special provisions or the standard specifications. Product samples become the property of the City of Milwaukee unless determined otherwise by the engineer.

B.3 Submitting and Review Process

The review process will consist of two or more steps. The first step is to submit four (4) copies of sets of materials to the engineer, or his designated agent, for preliminary review. The engineer, or his designated agent, will return one copy or set of submitted materials with instruction for correction and re-submittal. When instructed by the engineer, resubmit four (4) copies or sets of materials for further review. When instructed by the engineer, the final step is to submit materials to the engineer, or his designated agent for distribution. The engineer will return one to three (1-3) copies or sets of materials to the contractor with a stamp denoting general conformance to the plans and specifications. The exact review process, number of copies or sets of submittal materials, delivery requirements, and other procedural matters for the complex project will be determined at the pre-construction conference.

Drawings that are not initialed as having been checked or obviously have not been completed or are not clear and legible will not be accepted for review. The contractor will be notified that the subject drawings must be properly completed and resubmitted for review.

The title box of each shop drawing must carry the job number and structure and control section numbers, and the name and address of the fabricator, foundry, or manufacturer. The title sheet of each bound set of product information sheets must carry the job, control, and structure identification numbers, and the name and address of the supplier. Each sheet in a bound set must clearly identify the product or products being used and carry the name of the manufacturer.

A unique drawing and/or sheet number must be placed on each sheet so that similar items with subtle differences will not be confused with one another. When data is returned by

the engineer to the contractor for correction and re-submission, each revised sheet needs to be marked with a revision number, indicating the number of times the sheet has been revised since the first submission and with the date of each revision. Each change on the sheet must also be marked with the appropriate revision number, shown on a small triangle, placed next to the change.

Drawings on data sheets that contain information for items or options other than those intended for use on this project must be clearly marked so as to indicate which items or options are intended for use on this project. Line or cross out those items or options that do not apply, or by circling or highlighting those items or options that do apply. Whatever method is used it must be done in a manner that clearly indicated which items apply to the project.

The contractor is responsible to make sure that everyone, including suppliers, furnishes complete product and shop detail data for review by the engineer. The data must include, but is not limited to, the following:

1. Drawings including information on the exact number of units, exact unit to be furnished, and all of the equipment options to be furnished with the unit. Dimensions, material grades fits, finishes applicable standards (ASTM, AASHTO, ANSI, and other applicable standards) and all other data sufficient to meet the requirements of the contract documents.

2. Complete catalog data and specifications including the name of the manufacturer.

3. Complete installation and maintenance instructions.

4. Drawings and catalog data must indicate the pertinent bid item.

If a submission is incomplete, it may be returned without review or comment. If so, it must be completed before re-submittal. The contractor is advised to keep an accurate record of all shop drawing transmittals and to maintain constant contact with all suppliers to obtain prompt re-submittal of drawings and data returned for correction and completion. Significant time lapses between the return and re-submittals of data could delay the project and shall be avoided.

B.4 Submittal and Review Time

It is the contractor's responsibility to ensure that all shop details and data are submitted for approval in a timely manner. The preparation of construction drawings, shop details compilation of the technical data, transmittals, review, revision, and re-submittals constitutes a time consuming process.

Span balance calculations, balance testing, acceptance testing of in situ equipment or portions of the structure, and other submittals required during construction or operation of the bridge shall be submitted in a timely manner and in accordance with the various articles of the special provisions.

Although no specific time periods are established herein for submittals or for the engineers review, the contractor should anticipate that each review may take up to approximately 21 days. The engineer, or his designated agent, will endeavor to complete each review in the shortest practical time. However the contractor must realize that this is a complex project with many inter-related parts and that instant reviews are generally not practical. Delays in submitting, reviewing, or approving submittals will not be cause for additional compensation.

B.5 Operating and Maintenance Manuals
Submit operation and maintenance manuals required by the contract documents for preliminary review and approval in accordance with Bridge Machinery – General, Bridge Hydraulic System, and Electrical Control Equipment of these special provisions. The number of distribution copies is six (6) unless otherwise required on the plans or in other special provisions.

B.6 As-Built Drawings
Furnish final shop drawings in electronic format and hard copy. Also furnish a copy of all catalogue cuts, parts lists, operating procedures, operating and maintenance manuals, and other data required by the articles of the special provisions clearly marked that these items of work are included in the final work. The words "As-Built" and the date are acceptable for this identification.

C (Vacant)

D (Vacant)

E Payment
The City will not pay for any costs associated with shop drawings or other submittals. Include all costs for preparation, handling, shipping, storage, or other expenses associated with shop drawings, erection drawings, catalog data, test data, calculations, operating manuals, parts lists, maintenance manuals, and "As-Built Drawings" in the costs of the bid items with which the submittals are associated.

The City reserves the right to charge reasonable expenses for the review of submittals where the contractor substitutes items, at his option, for items previously submitted and approved for use in the project. Re-submittals requested by the City will not be back chargeable, except in the cases where the contractor obviously has not addressed previous review comments.

13. Removing Old Structure Over Waterway With Minimal Debris, Item 203.0600.S.

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

203.3.6.2 Removing Old Structure Over Waterway with Minimal Debris

(1) Remove the existing structure B-40-406 over the Milwaukee River in large sections and conforming to the contractor's approved structure removal and clean-up plan. During superstructure removal, prevent all large pieces and minimize the number of small pieces from entering the waterway or wetland. Remove all reinforcing steel, all concrete, and all other debris that falls into the waterway or wetland. The contractor may leave limited amounts of small concrete pieces scattered over the waterway floor or wetland only if the engineer allows.

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

1. Methods and schedule to remove the structure.

2. Methods to control potentially harmful environmental impacts.

3. Methods for superstructure removal that prevent all large pieces and minimize the number of small pieces from entering the waterway or wetlands.

4. Methods to control dust and contain slurry.

5. Methods for removing piers and abutments. If blasting in water, include restrictions that regulatory agencies and the contract require.

6. Methods for cleaning the waterway or wetlands.

(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.

(4) The following items shall be salvaged by the Contractor and returned to the City:

1. All road plates

2. All gate houses and gates

3. The Hydraulic Power Units

4. Hollow metal doors not being reinstalled. Do not salvage the door frame.

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

ITEM NUMBER	DESCRIPTION	UNIT
203.0600.S	Removing Old Structure Over Waterway With Minimal Debris	LS

14. Expansion Device (B-40-406).

A Description

This special provision describes furnishing and installing an expansion device in accordance to standard spec 502, as shown on the plans, and as hereinafter provided.

B Materials

The minimum thickness of the polychloroprene strip seal shall be ¼-inch for non-reinforced elastomeric glands and 1/8-inch for reinforced glands. Furnish the strip seal gland in lengths suitable for a continuous one-piece installation at each individual expansion joint location. Provide preformed polychloroprene strip seals that conform to the requirements ASTM D3542, and have the following physical properties:

Property Requirements	**Value**	**Test Method**
Tensile Strength, min.	2000 psi	ASTM D412
Elongation @ Break, min	250%	ASTM D412
Hardness, Type A, Durometer	60 ± 5 pts.	ASTM D2240
Compression Set, 70 hours @212˚F, max.	35%	D395 Method B Modified
Ozone Resistance, after 70 hrs. at 100˚F under 20% Strain with 100 pphm ozone	No Cracks	ASTM D1149 Method A
Mass Change in Oil 3 after 70 hr. 212˚F Mass Change, max.	45%	ASTM D471

Install the elastomeric strip seal gland with tools recommended by the manufacturer, and with a lubricant adhesive conforming to the requirements of ASTM D4070.

The manufacturer and model number shall be one of the following approved strip seal expansion device products:

Manufacturer	**4-Inch**
D.S. Brown	SSA2-A2R-400
R.J. Watson	RJA-RJ400
Watson Bowman Acme	A-SE400
Commercial Fabricators	A-AS400

Furnish manufacturer's certification for production of polychloroprene represented showing test results for the cured material supplied, and certifying that it meets all specified requirements.

The steel extrusion or retainer shall conform to ASTM designation A 709 grade 36 steel. After fabrication, steel shall be galvanized conforming to the requirements ASTM A123.

Manufacturer's certifications for adhesive and steel shall attest that the materials meet the specification requirements.

15. Steel Grid Floor Open (2-1/2 Inch).

A Description

This work shall be in accordance with the requirements of Section 515 of the WisDOT Standard Specifications except as modified herein.

B Materials

B.1 General

Conform to Section 515 of the Standard Specifications, except as modified herein or noted on the plans. The grid flooring must conform to the requirements of ASTM A709 Grade 36 and have a minimum copper content of 0.2 percent. Hot-dip galvanize the grid flooring and all connection hardware. Do not paint the grid flooring.

The grid flooring consists of panels fabricated from steel. Provide Main Bearing Bars that are 2-1/2" x 5/16". Provide Intermediate Bars that are 1-1/2" x 3/16". Space the Main Bearing Bars and Intermediate Bars at 2-5/16" between bars. Connect the Main Bars to the Intermediate Bars with Serrated Crimp Bars. The Serrated Crimp Bars are 1-1/2" x 3/16". Rivet the Serrated Crimp Bars at all intersections with 3/8" rivets spaced at 5" centers. Extend the top edge of the Serrated Crimp Bars 3/16" above the top edges of the Main Bars and Intermediate Bars. The weight of the total assembly is approximately 19.5 psf.

Hot-dip galvanize the grid deck after all welding is completed. Repair any and all galvanized areas that are damaged by abrasion or other caused in accordance with ASTM A780, using either the "Zinc-Based Solders" or "Zinc-Rich Paints" type of materials. Follow the requirements of Annexes A1 and/or A2.

Submit a welding sequence and welding procedures for all welds to the engineer for review. Include in the welding sequence the methods to prevent and minimize distortions and residual welding stresses in the completed deck.

B.2 Fabrication

Fabricate the grid deck with the following tolerances:

1. Overall Panel Length and Width: Plus zero (+0) to minus one eight (-1/8) inch maximum from the approved shop drawings.

2. Panel Squareness: Diagonal length between extreme corners of a panel shall measure within one-quarter (1/4) inch from each other.

3. Panel Flatness: The transverse camber (width) of panel shall be no more than 0.001 times the width of the panel. The longitudinal camber (length shall be no more than 0.003 times the length of the panel.

4. Sweep: The side bow (sweep) shall be no more than plus or minus one-quarter (±1/4) inch per 10 linear feet in either direction.

5. Main Bar Verticality: The main bar shall be no more than one sixteenth (1/16) inch out of vertical on the full bar height.

6. Cross Bar Verticality: The cross bar shall be no more than one sixteenth (1/16) inch out of vertical on the full height.

7. Main Bar Spacing: Center to Center spacing of the main bar shall be no more than plus or minus one-sixteenth (±1/16) inch from the detailed bar spacing.

8. Cross Bar Spacing: Center to center spacing of the cross bar shall be no more than plus or minus one-sixteenth (±1/16) inch from the detailed bar spacing.

Fabricate the grid on a level solid surface. Monitor the flatness of the grid panel during the fabrication process. Welding of the grid deck must sequenced and controlled to prevent distortions during and after fabrication.

C Construction

Perform all work for this item in accordance with all applicable requirements of the standard specifications in general and section 515 in particular, except as modified herein or as shown on the plans.

Connect the grid flooring to the supporting structure by field bolting as shown on the plans. To facilitate the connection, weld attachment plates to the main bearing bars prior to galvanizing, as shown on the plans.

Assemble the grid flooring units on top of the channels, with the Main Bearing Bars at right angles to them. Fabricate the units to extend the full width of the roadway. Place and bolt the grid units as shown on the plans.

Exercise care to place each unit in its proper position. Measuring in all cases from the same reference point, as otherwise cumulative errors in spacing are likely to appear, making necessary either flame-cutting of the final unit to fit, or inserting additional steel to fill the gap. Splice the units together along all four edges of the individual panels by riveting or bolting bars to form a rigid assembly for the entire lift span grid deck. Field splice trim and splice bars by bolting. Conform to installation tolerances as noted herein.

Place the fabricated floor grid in accordance with the manufacture's specifications as approved by the engineer. Splice all transverse bars.

If it is not practical or possible for the main bars to be in contact with the channel flanges prior to field bolting, shim the main bars at each connection to provide contact between

the grid and the channels. Provide either galvanized or stainless steel shims. Drill holes from connection bolts in the shop to assure proper fit and alignment.

Obtain the engineer's approval prior to any field trimming.

Install the grid deck panels within the following tolerances:

1. Cross bar alignment between adjacent grid deck panels shall be no more than plus or minus one-sixteenth (±1/16) inch.

2. The overall cross bar alignment of grid deck panels from end to end of the lift span shall be no more than plus or minus one-quarter (±1/4) inch.

Support the grid deck in a manner to prevent distortion during transport and storage. Provide adequate support beneath the grid deck panel at the ends of the panel and at intermediate points. Provide intermediate spacing of no more than half the maximum channel spacing. After transport or storage, conform to the allowable tolerance for flatness as noted above.

Support the grid deck panels in a manner to prevent distortion during handling. Avoid dragging the panels over any obstruction that might damage the components of the grid deck or its galvanized coating.

Place and install the grid panels such that no initial stress is induced into the grid deck panel. Do not apply external force to the new grid panel, new structure, or existing structure to fit the component, except to close a cap of less than 1/16 inch between the new deck panel and the new channel. Do not impose undue stresses or distortions of the grid deck during installation. If a gap greater than 1/16 inch exists between the deck panel and the channel, provide shims to close the gap. Remove and replace, at no additional cost to the City, any deck panel that is installed with an undue stress or distortion.

Limit the placement of construction equipment on the movable span. Prior to placement of any construction equipment on the bridge structure, submit calculations that determine the capacity of the deck and span. Clearly define the location of the equipment on the work plans. Engage a Professional Engineer licensed in the State of Wisconsin to prepare the calculations.

D Measurement

The City will measure Steel Grid Floor Open (2-1/2-inch) in accordance with Section 515.4 of the standard specifications.

E Payment

The City will pay for the measured quantity in accordance with Section 515.5 of the standard specifications.

16. Painting Epoxy System (B-40-406).

A Description

This special provision describes steel preparation, shop and field application of the galvanized steel two-coat epoxy system, and repairs to all damaged areas in accordance to standard spec 517 and as hereinafter provided:

This work is applicable to new galvanized steel floor beams, stringers, purlins, steel bracing members, and all new galvanized structural steel in either the lift span or the approach spans.

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 will be chosen by the City of Milwaukee from the following:

1. Paint color similar to Sherwin Williams H&C Concrete Stain – Muddy Gray HC172
2. Three additional colors to be selected by the City of Milwaukee

Coordinate color selections through the engineer. Provide three draw downs of each color for the review by the City of Milwaukee. Final color selection shall be approved by the engineer.

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.

Use one of the qualified paint sources and products given below. An equivalent system may be used with the written approval of the Engineer.

Producer	**Coat**	**Products**	**Dry Film Minimum Thickness (mils)**	**Minimum Time Between Coats (hours)**
Sherwin Williams 1051 Perimeter Drive Suite 710 Schaumburg, IL 60173 (847) 330-1562	Tie	Recoatable Epoxy Primer B67-5 Series/B67V5	2.0 to 4.0	6
	Top	Acrolon 218 HS Polyurethane, B65-650	2.0 to 4.0	N/A
Carboline 350 Hanley Industrial St. Louis, MO 63144 (314) 644-1000	Tie	Rustbond Penetrating Sealer FC	1	36
	Top	Carboline 133 LH	4	N/A
Wasser Corporation	Tie	MC-Ferrox B 100	3.0 to 5.0	8

4118 B Place NW Suite B Auburn, WA 98001	Top	MC-Luster 100	2.0 to 4.0	N/A

Supply the engineer with the product data sheets in accordance with 517.2.4.2 before any coating is applied.

B.2 Steel

Furnish materials conforming to the following:

Structure Steel	Section 506
Pedestrian Railing	Section 511
Other Steel	per the special provisions

Prior to fabrication, blast clean structural steel and pedestrian railings per SSPC-SP 6 and hot dip galvanize according to ASTM A123. Bolts, nuts and washers shall be supplied as factory galvanized according to section 506.2.5 and in accordance with ASTM A153. Clean and zinc coat other steel in accordance with the applicable special provisions.

Steel preparation includes the chamfering of sharp edges. All sharp edges shall be flattened by a single pass of a grinder or suitable device along the sharp edge. Condition any thermal cut edges before blast cleaning by shallow grinding or other cleaning to remove any hardened surface layer. Remove evident steel defects exposed in accordance to AASHTO M 160 prior to blast cleaning.

Grind the welded joints to a smooth finish where shown in the plans. Repair galvanized coating damaged during fabrication as specified in 635.3.4.

C Construction

C.1 General

Supplement 517.3.1.8.1 with the following: After adjoining concrete work, including formwork removal, has been completed, repair all field-damaged areas of newly painted steel. Field apply the 3rd coat (top coat of urethane) in conjunction with the field application of the top coat of urethane to the existing steel.

All edge of flanges, splice plates connections and bolts shall require a stripe coat and back rolled to ensure full paint coverage on sharp edges.

C.2 Cleaning

Prior to applying the urethane field top coating, clean all paint surfaces that are to be repaired and/or top coated using a light water blast, and allow the paint surfaces to dry. Clean painted areas that are damaged in accordance with 517.3.1.3. Prior to any painting, all cleaning shall be approved by the engineer. Field repair and paint all damaged areas in accordance with 517.3.1.8.2. Coating repairs and application of urethane top coating shall be in accordance with weather conditions as specified in 517.3.1.2.

Galvanized surfaces shall be cleaned per SSPC-SP1 to remove chlorides, sulfates, zinc salts, oil, dirt, organic matter, and other contaminants. The cleaned surface should then be brush blast cleaned per SSPC-SP7 to create a slight angular surface profile (1.0-1.5 mils suggested) for adhesion. Blasting should not fracture the galvanized finish or remove any dry film thickness.

C.3 Painting

After cleaning provide a tie coat from an approved coating system that is specifically intended to be used on a galvanized surface. The tie coat shall etch the galvanized rail and prepare the surface for the top coat. Apply a top coat matching the specified color. The tie and top coats should be of contrasting colors. Use a pre-approved top coat that is resistant to the effects of the sun, and is suitable for use in a marine environment.

This work shall be in accordance with ASTM D6386.

C.4 Epoxy System

Replace subsection 517.3.1.5.2(4) of the standard specifications with the following:

The maximum time between coats shall be in accordance with the manufacturer's recommendations except that no more than 60 days may elapse between coats of Epoxy System with the exception of additional time allowed for field application of the urethane top coating.

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).

C.5 Field Painting

Supplement subsection 517.3.1.8.1 of the standard specifications with the following:

After adjoining concrete work, including formwork removal, has been completed repair all field-damaged areas of newly painted steel. Field apply the top coat in conjunction with the field application of the top coat to the steel.

Prior to applying the field top coating, clean all paint surface that are to be repaired or top coated using a light water blast, and allow the paint surface to dry. Clean painted areas that are damaged in accordance with 517.3.1.3. Prior to any painting, all cleaning shall be approved by the engineer. Field repair and paint all damaged areas in accordance with 517.3.1.8.2. Coating repairs and application of top coating shall be in accordance with weather conditions as specified in 517.3.1.2.

D (Vacant)

E Payment
Supplement 517.5 as follows: Payment for the field-applied urethane shall be included in the contract lump sum price for Painting Epoxy Systems (B-40-406).

17. Preparation and Coating of Top Flanges (B-40-406), Item 517.0900.S.

A Description
This special provision describes thoroughly cleaning and coating the top surface and edges of the top flanges, removing loose paint, rust, mill scale, dirt, oil, grease, or other foreign substances until the specified finish is obtained.

B (Vacant)

C Construction
In accordance with SSPC SP-10, blast clean to a near white finish the top surface and edges of the top flanges that have no paint on them, and paint them with one coat of an approved zinc rich primer. No collection of blast waste material is required.

In accordance to SSPC SP-2 or SP-3, clean all areas of rust and loose paint on the top surface and edges of the top flanges, which have paint on them, by wire brushing, grinding or other mechanical means. Wash the top surface and edges of the top flanges and give them one coat of an approved zinc-rich primer.

Where plans call for the cleaning of other painted structural steel including hanger assemblies, bearings, field splices, and connections, clean areas of loose paint and rust by wire brushing, grinding, or other mechanical means as necessary and in accordance to SSPC SP-2, SP-3, or SP-11. Sound paint need not be removed with the exception of an area 12-inches on either side of hanger assembly centerlines. Clean this area to base metal in accordance to SSPC SP-10, or SP-11.

In accordance to SSPC SP-2, or SP-3, thoroughly clean by wire brushing, grinding or other mechanical means as necessary the surface area of exposed steel members that are to be imbedded in the new concrete, and wash and give one coat of an approved zinc rich primer to these areas.

Furnish and erect tarpaulins or other materials to collect all of the spent paint containing material resulting from blasting or hand and power tool cleaning and coating. Minimize dust during all clean-up activities. Collect and store waste material at the end of each work day or more often if needed. Store waste materials in the hazardous waste containers provided. Lock and secure all waste containers at the end of each work day. Cover the container(s) at all times except when adding or removing waste material. Store the containers in an accessible and secured area, not located in a storm water runoff course, flood plain or exposed to standing water. Transportation and disposal of such waste material will be the responsibility of the department.

Damage to existing painted surfaces as a result of construction operations, shall be restored to the approval of the engineer at the contractor's expense.

D Measurement
The City will measure Preparation and Coating of Top Flanges (B-40-406), completed in accordance to the contract and accepted, as a single complete unit of work for the structure.

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

ITEM NUMBER	DESCRIPTION	UNIT
517.0900.S	Preparation and Coating of Top Flanges (B-40-406)	LS

Payment is full compensation for preparing and cleaning the designated surfaces; for furnishing and applying the coating; and for furnishing all labor, tools equipment and incidentals necessary to complete to contract work.

18. Concrete Staining (B-40-406), Item 517.1010.S.

A Description
Furnish and apply a two coat concrete stain to the exposed concrete surfaces of the structure, abutments, piers, bridge house, and retaining walls, as detailed in the plans and as hereinafter provided.

B Materials
B.1 Mortar
Use mortar for sack rubbing the concrete surfaces as given in standard spec 502.3.7.5 or use one of the following products:

Preblended, Packaged Type II Cement:	Tri-Mix by TK Products Thoroseal Pearl Gray by Thoro Products

The mortar shall contain one of the following acrylic bonding admixtures mixed and applied in accordance to manufacturer's recommendations:

Acrylic Bonding Admixture:	TK-225 by TK Products Achro 60 by Thoro Products Achro Set by Master Builders

B.2 Concrete Stain
Use concrete stain manufactured for use on exterior concrete surfaces, consisting of a base coat and a pigmented sealer finish coat. Use the following products, or equal as approved by the City, as part of the two coat finish system:

Tri-Sheen Concrete Surfacer, Smooth by TK Products
Tri-Sheen Acrylic by TK Products

TK-1450 Natural Look Urethane Anti-Graffiti Primers by TK Products
Safe-Cure & Seal EPX by Chem Masters
H + C Shield Plus by Sherwin-Williams

C Construction

C.1 General

Furnish, prepare, apply, cure, and store all materials in accordance to the product manufacturer's specifications for the type and condition of application required.

Match or exceed the stain manufacturer's minimum recommended curing time of the concrete or 28 days, whichever is greater, prior to staining.

C.2 Preparation of Concrete Surfaces

Provide a sack rubbed finish in accordance to standard spec 502.3.7.5, using mortar as indicated above on concrete surfaces with open voids or honeycombing.

Following the sack rubbing, clean all concrete surfaces that are to be coated to ensure that the surface is free of all laitance, dirt, dust, grease, efflorescence, and any foreign material and that the surface will accept the coating material according to product requirements. As a minimum, clean the surface using a 3000-psi water blast. Hold the nozzle of the water blaster approximately 6 inches from the concrete surface and move it continuously in a sweeping motion. Give special attention to smooth concrete surfaces to produce an acceptable surface texture. Correct any surface problems resulting from the surface preparation methods. Grit blasting of the concrete surface is not allowed.

C.3 Staining Concrete Surfaces

Apply the concrete stain in accordance to the manufacturer's recommendations.

Apply the concrete stain when the temperature of the concrete surface is 45º F or higher, or as given by the manufacturer.

The color of the stain shall be similar to Sherwin Williams H&C Concrete Stain – Cemented Deal HC 141. Tint the base coat to match the finish coat; the two coats shall be compatible with each other.

Do not begin staining the structure until earthwork operations are completed to a point where this work can begin without receiving damage. Where this work is adjacent to exposed soil or pavement areas, provide temporary covering protection from overspray or splatter.

C.4 Test Areas

Prior to applying stain to the structure, apply the stain to sample panels measuring a minimum of 48-inches x 48-inches and constructed to demonstrate workmanship in the use of the form liner specified on the structure if applicable. Match or exceed the stain manufacturer's minimum recommended curing time of the concrete or 28 days, whichever is greater, prior to staining. Prepare the concrete surfaces of the sample panels

and apply stain using the same materials and in the same manner as proposed for the structure, including staining of the joints between the stones produced by the form liner if applicable. Do not apply stain to the structure until the City approves the test panels.

C.5 Surfaces to be Coated.
Apply concrete stain to the surfaces in accordance to the plan.

D Measurement
The City will measure Concrete Staining (B-40-406) in area by the square foot of surface, acceptably prepared and stained.

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

ITEM NUMBER	DESCRIPTION	UNIT
517.1010.S	Concrete Staining (B-40-406)	SF

Payment is full compensation for furnishing and applying the two coat system; for preparing the concrete surface; and for preparing the sample panels.

19. 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 paints 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.

D (Vacant)

E (Vacant)

20. Structure Repainting Recycled Abrasive (B-40-406), Item 517.1800.S.

A Description

This special provision describes surface preparation and painting of the existing metal surfaces of the approach, lift span, existing steel stairs, railings, and other areas as shown in the plans in accordance to the manufacturer’s recommendations and as hereinafter provided.

A.1 Areas to be Cleaned and Painted

All structural metal surfaces of:

1. Structure B-40-406 18,000 SF.

Areas are approximate and given for informational purposes only. Determine full extent of painting work and quantity prior to bid

B Materials

B.1 Coating System

Furnish a complete coating system from the department's approved list. The color for the finish coating material shall match the color number shown below in accordance with 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, and the minimum drying time between coats.

Finish Color:

1. The color for the finish coating material for all existing structural steel shall be the same color and semi-gloss finish as provided under bid item Painting Epoxy System (B-40-406).
2. The color for the finish coating material for the existing pedestrian railing on the northwest retaining wall shall be one of the colors described under bid item Painting Epoxy System (B-40-406). Final determination to be made by the City of Milwaukee.

The color of the primer must be such that a definite contrast between it and the color of the blasted steel is readily apparent. There shall be a color contrast between all subsequent coats for the paint system selected. Submit color samples of the primer to the engineer for approval.

C Construction

C.1 Surface Preparation

Prior to blast cleaning, solvent clean all surfaces to be coated in accordance to SSPC-SP1. A No. 10 Near White Blast Cleaning according to Steel Structures Painting Council Specification Ten will be required on all metal surfaces to be painted. Prime the same day all metal surfaces receiving a No. 10 blast or re-blast before application.

The steel grit and any associated equipment brought to the site and used for blast cleaning shall be clean. Remove immediately dirty grit or equipment brought to the site at no expense to the department. Furnish an abrasive that has a gradation such that it will produce a uniform surface profile between 1 to 3 mils on the steel surface, as measured with extra profile course Testex Replica Tape. Use a minimum air pressure for abrasive blasting, measured at the nozzle, of 90 psi.

The abrasive blasting and recovery system shall be a completely integrated self-contained system for abrasive blasting and recovery. It shall be an open blast and recovery system that will allow no emissions from the recovery operation. The recovery equipment shall be such that the amount of contaminants in the clean recycled steel grit shall be less than 1 percent by weight.

Remove by grinding all fins, tears, slivers, and burred or sharp edges that are present on any steel member, or that appear during the blasting operation, and re-blast the area to give a 1 to 3 mils surface profile.

Remove all spent material and paint residue from steel surfaces with a good commercial grade vacuum cleaner equipped with a brush-type cleaning tool, and hand wipe the steel surfaces with a clean soft cloth. The airline used for surface preparation shall have an in-line water trap and the air shall be free of oil and water as it leaves the airline.

Take care to protect freshly coated surfaces from subsequent blast cleaning operations. Thoroughly wire brush damaged primed surfaces with a non-rusting tool, or if visible rust occurs, re-blast to a near white condition. Clean and re-prime the brushed or blast cleaned surfaces within the time recommended by the manufacturer.

C.2 Coating Application

Apply paint in accordance to the manufacturer's recommendations in a neat workmanlike manner. Paint application shall normally be by airless spray.

The engineer may allow the use of conventional spray equipment after satisfactory demonstration by the contractor of the proper technique and handling of that equipment.

Mix the paint or coatings in accordance to the manufacturer's directions to a smooth lump-free consistency. After mixing and during application, continuously stir the paint or coating under constant slow speed agitation by use of a jiffy mixer.

Prior to applying the prime coat, stripe with primer all edges, rivet and bolt heads, nuts and washers by either brush or spray application to provide two coats of primer on these surfaces.

Remove all dry spray by vacuuming, wiping, or sanding if necessary.

If the application of the coating at the required thickness in one coat produces runs, bubbles, or sags; apply a "mist-coating" in multiple passes of the spray gun; separate the passes by several minutes. Where excessive coating thickness produces "mud-cracking", remove such coating back to soundly bonded coating and re-coat the area to the required thickness.

The resultant paint film shall be smooth and uniform, without skips or areas of excessive paint.

The coating is supplied for normal use without thinning. If in cool weather it is necessary to thin the coating for proper application, thin in accordance to the manufacturer's recommendations.

During surface preparation and coating application the ambient and steel temperature shall be between 39 degrees F and 100 degrees F. The steel temperature shall be at least 5

degrees F above the dew point temperature. (This requires the steel to be dry and free of any condensation or ice regardless of the actual temperature of the steel.) The relative humidity shall not exceed 85%.

Paint thickness shall be as follows:

Dry Film Thickness	
Prime Coat	3 mils min.
Intermediate Coat	3 mils
Top Coat	3 mils

Time to recoat shall be according to the manufacturer's recommendations.

The dry film thickness will be determined by use of a magnetic film thickness gage. The gage shall be calibrated for dry film thickness measurement in accordance to SSPC-PA 2. Dry film thickness in each area measured will be based on an average of three gage readings, after calibration of the gage to account for surface profile of the bare steel as a result of surface preparation.

D Measurement

The City will measure Structure Repainting Recycled Abrasive (B-40-406), completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
517.1800.S	Structure Repainting Recycled Abrasive (B-40-406)	LS

Payment is full compensation for preparing and cleaning the designated surfaces; furnishing and applying the paint; and for providing the listed equipment; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

21. Negative Pressure Containment and Collection of Waste Materials (B-40-406), Item 517.4500.S.

A Description

This special provision describes providing a dust collector to maintain a negative air pressure in the enclosure; furnishing and erecting enclosures as required to contain, collect and store waste material resulting from the preparation of steel surfaces for painting, and repainting, including collection of such waste material, and the labeling and storage of waste material in approved hazardous waste containers, all as hereinafter provided.

B (Vacant)

C Construction

Erect an enclosure to completely enclose (surround) the blasting operations. The ground, slope paving, or roadway cannot be used as the bottom of the enclosure. So that there are no visible emissions to the air or ground or water, design, erect, operate, maintain and disassemble the enclosures in such a manner to effectively contain and collect dust and waste materials resulting from surface preparation and paint over spray. Where bulkheads are required, construct them of plywood and properly seal them. Suspend all enclosures over water from the structure or as approved by the engineer.

Construct the enclosure of flexible materials such as tarpaulins or of rigid materials such as covered plywood, or of a combination of flexible and rigid materials. Systems manufactured and provided by Eagle Industries, Detroit Tarps, or equal, are preferred. The tarpaulins shall be lined, either as part of the tarp system or have a separate plastic lining. Maintain all materials free of tears, cuts or holes. The vertical sides of the enclosure shall extend from the bottom of the deck down to the level of the work platform or barge where used for structures over water, and shall be fastened securely to those levels to prevent the wind from lifting them. Bulkheads are required between beams to enclose the blasting area as approved by the engineer. Where bulkheads are required, construct them of plywood and properly seal them. To prevent spent materials and paint over spray from escaping the enclosed area, overlap and fasten together all seams. Place groundcovers under all equipment prior to operations or as approved by the engineer.

To allow proper cleaning, inspection of structures or equipment, and painting, provide safe adequate artificial lighting in areas where natural light is inadequate.

Provide a dust collector so that there are no visible emissions outside of the enclosure and so that a negative air pressure inside the enclosure is maintained. The dust collector shall be sized to maintain the minimum air flow based on the cross-sectional area of the enclosure.

A combination of positive air input and negative air pressure may be needed to maintain the minimum airflow within the enclosure.

Filter all air exhausted from the enclosure to create a negative pressure within the enclosure so as to remove all hazardous and other particulate matter.

As a safety factor for structures over water, provide for scum control. Effectively contain the scum that forms on the water and does not sink in place from moving upstream or downstream by the use of floating boom devices.

If in the use of floating boom devices the scum tends to collect at the devices, contain, collect, store the scum, and do not allow it to travel upstream or downstream beyond the devices. Remove the scum at least once a day or more often if needed.

Collect and store at the bridge site for disposal all waste material or scum collected by this operation, or any that may have fallen onto the ground tarps. Collect and store all waste

material and scum at the end of each workday or more often if needed. Storage shall be in hazardous waste containers. Label each container as it is filled, using the labels provided by the Hazardous Waste Disposal contractor. Check the label and ensure that the project ID, bridge number and EPA ID match the structure. Fill in the generation date when the first material is placed in the container. Secure all containers at the end of each workday. Keep the containers covered at all times except to add or remove waste material. Store the containers in an accessible and secured area, not located in a storm water runoff course, flood plain, or exposed to standing water.

The disposal of waste material will be the Contractor's responsibility.

In a separate operation, recover the recyclable abrasive for future application, and collect the paint and/or corrosion particles for disposal. Sand is not an acceptable abrasive.

D Measurement

The City will measure Negative Pressure Containment and Collection of Waste Materials (B-40-406), completed in accordance with the contract and accepted, as a single complete unit of work for each structure designated in the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
517.4500.S	Negative Pressure Containment and Collection of Waste Materials (B-40-406)	LS

Payment is full compensation for designing, erecting, operating, maintaining, and disassembling the containment devices; providing negative pressure exhaust ventilation; collecting, labeling, and for storing spent materials in hazardous waste containers, and for disposing of the waste containers.

22. Portable Decontamination Facility, Item 517.6000.S.

A Description

This special provision describes furnishing and maintaining weekly or more often if needed, a single unit portable decontamination facility as hereinafter provided.

B Materials

Supply adequate heating equipment with the necessary fuel to maintain a minimum temperature of 68° F in the facility.

The portable decontamination facility shall consist of a separate "Dirty Room", "Shower Room" and "Clean Room". The facility shall be constructed so as to permit use by either sex. The facility shall have adequate ventilation.

The "Dirty Room" shall have appropriately marked containers for disposable garments, clothing that requires laundering, worker shoes, and any other related equipment. Each container shall be lined with poly bags for transporting clothing, or for disposal. Benches shall be provided for personnel.

The "Shower Room" shall include self-contained individual showering stalls that are stable and well secured to the facility. Provide showers with a continuous supply of potable hot and cold water. The wastewater must be retained for filtration, treatment, and/or for proper disposal.

The "Clean Room" shall be equipped with secure storage facilities for street clothes and separate storage facilities for protective clothing. The lockers shall be sized to store clothing, valuables and other personal belongings for each worker. Benches shall be provided for personnel.

Supply a separate hand wash facility, either attached to the decontamination facility or outside the containment.

C Construction
Properly contain, store, and dispose of the wastewater.

D Measurement
The City will measure Portable Decontamination Facility by the unit acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
517.6001.S	Portable Decontamination Facility	Each

Payment is full compensation for furnishing and maintaining a portable decontamination facility.

23. Lightweight Concrete Masonry, Item SPV.0035.01.

A Description
This special provision describes furnishing and installing lightweight concrete on portions of the lift span adjoining the approach span in accordance with Section 502 of the standard specification, as shown on the plans, and as herein provided.

B Materials
The lightweight concrete masonry should weigh between 105-115 lbs and the compressive strength of the lightweight concrete at 28 days should be a minimum of 4,000 psi. Submit the concrete mix design for the engineer’s approval prior to using the material for the project. Assure the strength and weight of the concrete by performing a

minimum of three batch mixes and submit along with the concrete mix design for approval to assure the requirements as given above.

The high strength coated bar steel reinforcement should follow the standard specifications as given in Section 505 of the standard specifications.

C (Vacant)

D Measurement
The City will measure Lightweight Concrete Masonry, completed in accordance to the contract and accepted by the quantity per cubic yard of lightweight concrete properly formed, poured leveled, and cured for the areas as shown on the plans.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.01	Lightweight Concrete Masonry	CY

Payment for Lightweight Concrete Masonry is full compensation for providing concrete, forms and falseworks; for placing, finishing, curing, and protecting; and for including fabricating and testing cylinders, evaluating the maturity, and all other labor, material, equipment, and incidentals to complete the work.

24. Remove and Replace Access Hatch, Item SPV.0060.01.

A Description
This special provision describes furnishing and installing factory fabricated access hatch doors at the northwest corner of Pier 2 and southeast corner of Pier 1 located at elevation +4.00 as shown on the plans and as specified herein.

B Materials
Remove the existing access hatch door from both piers. Repair the surrounding concrete next to the hatch door frames as shown in the plans and to install the new hatch door and the frame.

Access Hatch assembly shall be Neenah Foundry model R-6665-0NH or approved equal. The access hatch shall be cast aluminum and the lid shall be gasketed.

A steel snap lock with fixed handle shall be mounted on the topside of the cover.

C Construction
Submit shop drawings and manufacturer’s product data for all materials in this specification.

All materials shall be delivered in manufacturer’s original packaging.

Store materials in a dry, protected, well-ventilated area.

Mounting surfaces shall be straight and secure. Substrates shall be of proper width.

Install in accordance with the plans, shop drawings, and manufacturer's installation instructions.

Ensure that the installation is watertight.

D Measurement
The City will measure Remove and Replace Access Hatch by each individual access hatch installation installed and acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.01	Remove and Replace Access Hatch	Each

Payment is full compensation for removing existing access hatch, installing new reinforcing steel, repairing the surrounding concrete next to the hatch, and furnishing and installing a complete new access hatch as shown on the plans and as herein specified; and fur furnishing all material, labor, tools, equipment, and incidentals necessary to complete the work.

25. Recondition Existing Counterweight, Item SPV.0060.02.

A Description
This special provision describes the reconditioning of the counterweight from both piers of the bridge as shown on the plans and as herein provided. It includes pressure washing the counterweight pits following the rehabilitation.

B Materials
Provide balancing blocks in accordance with the standard specifications and these special provisions. Balancing blocks shall be coated in accordance with Painting Epoxy System.

C Construction
All existing balancing blocks and debris shall be removed from the top of the counterweight. The counterweight shall be power washed clean prior to installing new balancing blocks. The existing steel balancing blocks may be salvaged and reused.

The balancing calculations have to be submitted and approved prior to the reconditioning of the counterweight. The additional steel or concrete for the counterweights will be determined by the revised counterweight balancing calculations. Provide new galvanized and painted steel plates to the dimensions shown on the plans for placement on top of the

counterweights. Provide new additional steel or cast iron balance block as needed for adjustment of the lift span. All painting shall be in accordance with Painting Epoxy System (B-40-406).

D Measurement
The City will measure Recondition Existing Counterweight by each acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.02	Recondition Existing Counterweight	Each

The reconditioning of existing counterweight includes removing existing debris and existing balancing blocks, providing painted galvanized steel plates and new painted cast iron balance blocks as needed, and pressure washing and disposing of washed up fluids in the counterweight pits. Payment is full compensation for providing all materials and furnishing all equipment, tools, labor, and incidentals necessary to complete the work in accordance with the contract.

26. Remove and Replace Existing Hydraulic Jack Pedestal, Item SPV.0060.03.

A Description
This special provision describes the removal and replacement of the hydraulic jack pedestal in entirety from both piers of the bridge as shown on the plans and as herein provided.

B Materials
Provide concrete and steel reinforcement in accordance to Section 502 and 505 of the standard specification and these special provisions.

C Construction
Remove the existing hydraulic jacks from both counterweight pit areas in entirety. Take necessary precautions while removing the reinforced concrete hydraulic jacks so that the pit floor and walls do not get damaged during the removal process. Also preserve, sandblast, and epoxy coat the existing dowel bars that will be incorporated into the new pedestal.

Perform the reconstruction of the hydraulic jack pedestal as shown on the plans and in accordance to the applicable requirements of the standard specifications in general, and Section 501, 502, 505, and 509 in particular. Also provide hydraulic jack anchor bolts as recommended by the manufacturer.

D Measurement
The City will measure Remove and Replace Existing Hydraulic Jack Pedestal by each acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.03	Remove and Replace Existing Hydraulic Jack Pedestal	Each

The removal and replacement of hydraulic jacks will be paid for at the contract bid price, which price shall be payment in full for providing all materials and furnishing all equipment, tools, labor, and incidentals necessary to complete the work in accordance with the contract.

27. Bearing Maintenance (B-40-406), Item SPV.0060.04.

A Description
This special provision describes removing the expansion and fixed bearings at the piers for the lift span, furnishing and installing new bearing base plate shims, blast cleaning and painting the bearing components, reassembling the bearings to provide full contact bearing for the new lift span, and for installing caulk around the perimeter of the bearings in accordance with the plans and as hereafter provided.

B Materials
Furnish a complete epoxy coating system from the department's approved product list. The color of epoxy shall be white and the urethane coating material shall match the color for the finish coating material for all existing steel bearings shall be the same color and semi-gloss finish as provided under bid item Painting Epoxy System (B-40-406). 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.

Bearing base plate shims shall be stainless steel.

C Construction
C.1 General
Raise and support the existing steel girder and remove the bearing plate and existing shim pack. Leave the top plate as is, attached to the girder bottom flange. Keep and sandblast existing anchor bolts at the beam seat. Replace the bottom shim pack with new stainless steel full width shims. Blast-clean all bearing components while disassembled to a near white finish and paint all bearing components with one of the coating systems specified above. Install existing rehabilitated bottom bearing plate using existing anchor bolts and new nuts and washers, and reassemble the bearing assembly. As required, use adequate

containment methods to contain material resulting from preparation of painted steel surfaces for painting. Remove existing nuts and washers by scoring the nuts and breaking them apart versus torquing off the nuts.

C.2 Coating Application
Apply paint in a neat workmanlike manner, and in accordance to the manufacturer's instructions and recommendations.

D Measurement
The City will measure Bearing Maintenance (B-40-406) as each individual lift span bearing assembly acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.04	Bearing Maintenance (B-40-406)	Each

Payment is full compensation for removing, cleaning, painting, installing new stainless steel shims, and reinstalling bearings, and furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

28. Remove and Replace Concrete Beam SPV.0060.05

A Description
This section describes providing temporary support for existing girders, removing the existing concrete beam, salvaging the existing approach span bearings, sandblasting and coating the existing rebar, and providing the reinforced concrete approach span beam at the locations shown on the plan.

B Materials
All work shall be in accordance with the applicable requirements of Section 502 and section 505 of the standard specifications except as herein modified.

C Construction
C.1 General
Raise the girders high enough to separate the girder from the pier and provide adequate room to perform work under this section. The sole plate shall remain affixed to the girder flange and the base plate shall be removed from the pier and salvaged.

Bearings that have been removed and salvaged shall be reinstalled at the existing location and elevation on the new concrete beam. Sandblasting and painting of the bearings is included under Structure Repainting General.

Provide new anchor bolts for the affected approach span bearings.

Reassemble the bearing assembly on the new anchor bolts.

C.2 Concrete
Remove all concrete within the limits shown on the plans. All work shall be in accordance with the applicable requirements of Section 502 of the standard specifications except as herein modified.

C.3 Steel Reinforcement
Existing reinforcing bars to remain in place must be sandblasted to ensure the surface is clean and free from rust, scale, oil, grease, and similar surface contamination, and slivers, scabs and other surface defects detrimental to proper coating. The reinforcing bars must then be coated with an approved epoxy coating.

New reinforcing steel shall be epoxy coated.

New reinforcing steel adjacent to existing reinforcing steel shall be wire tied in place.

All work shall be in accordance with the applicable requirements of Section 505 of the standard specifications except as herein modified.

D Measurement
The City will measure Remove and Replace Concrete Beam by the unit acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.05	Remove and Replace Concrete Beam	Each

Payment is full compensation for providing temporary support of existing girders, removing and salvaging approach span bearings, removing existing concrete beam to limits shown on the plans, blast cleaning and coating existing reinforcing bars, providing additional epoxy coated reinforcing bars, providing galvanized anchor bolts for approach span bearings, furnishing and placing concrete, installing salvaged approach span bearings, and for furnishing all labor, scaffolding, formwork, tools, materials, equipment, and incidentals necessary to complete the work. No payment will be made for areas which are unnecessarily damaged during the repairs unless authorized by the Engineer. All such damaged areas shall be repaired at the Contractor's expense.

29. Bridge Structural Steel, Item SPV.0085.01.

A Description
This section describes furnishing, fabricating, and erecting all new bridge structural steel on the lift span and approach spans. The work includes, but is not limited to fabrication

and erection of floor beams, stringers, channels, bracing, gusset plates, curb channels, pedestrian railing connection elements, and incidentals such as fill plates and shim packs.

All work shall be in accordance with the applicable requirements of Section 506 of the standard specifications except as herein modified.

B Materials

Use high strength structural steel conforming to ASTM A709, grade 50.

Prior to painting, hot-dip galvanize all new lift span structural steel, including but not limited to floor beams, stringers, channels, bracing, gusset plates, curb channels, sidewalk steel section, fill plates and shims, and other incidental steel.

Use high strength, hot dip galvanized bolts conforming to ASTM A325. Submit the bolt specification and test report to the engineer in accordance with the standard specifications.

The symbols on the plans indicate only the general type of weld required. Submit the proposed weld geometry to be used in fabrication to the engineer for approval. If a fillet weld size is not shown on the plans, size in accordance with AASHTO/AWS requirements for minimum weld size based on material thickness.

Use the electric arc process for all welding. Field welding is not permitted except as specifically shown on the plans.

Paint all new structural steel in accordance with Painting Epoxy System (B-40-406).

C Construction

C.1 General

Perform this work in accordance with all applicable requirements of the standard specification in general, and Section 506 in particular, except as modified herein or as shown on the plans.

Subsection 506.3 of the standard specification applies to this item.

Shims: Unless noted otherwise on the plans, wherever shims are called for on the plans, furnish material such that the total shim pack thickness can be adjusted in increments of 1/32-inch for machinery bases and structural parts that have machined surfaces, or 1/16-inch for structural steel connections for parts not having machined surfaces. The shims shall be galvanized or stainless steel.

Finishing: Finish any welded assembly that is to be finished after all welding is complete. Anywhere the terms “Fin,” “Finish,”, or “Machined,” or the finish symbol (√) appear on the plans, it means that the surface and faying surface must be machined finished. Hand grinding is not permitted.

C.2 Field Erection of Lift Span
Erect the lift span in the open position to the maximum extent practical, so as not to interfere with navigation on the river.

The design of the structure assumes that the structural steel is completely erected before it is allowed to deflect under its dead load. Deflections incurred during various stages of erection are not considered. Therefore the actual erection methods and sequence employed by the contractor may have a substantial effect on the final steel profile. The contractor is responsible for taking all necessary compensatory action to ensure the final alignment and profile of the erected steel, including the grid deck, conforms to the plans. Any corrective work necessary to reposition previously erected steel to achieve acceptable alignment and profile must be approved by the engineer and is performed at no additional cost to the City.

C.3 Vertical and Horizontal Alignment of Lift Span
Survey lift span to verify squareness. In addition, jacking beam of the lift span must be parallel and the proper distance apart. The lifting girders must be in-line and parallel. Take measurements across the channel and back-check them by measuring the diagonal span dimensions. Submit measurements taken to verify squareness to the engineer for review prior to final installation.

The first time the lift span is slowly moved, make a check of all points of minimal clearance or possible interference between the fixed and movable parts of the structure, or as otherwise specified on the plans.

Take great care to assure that the stringers and channels on the lift span are erected the correct distance below the floor lines as shown on the plans, and that the floor grid units, which are supported on them, are at the proper elevation at all points.

Construction requirements pertaining to floor breaks are covered in the bid item for Lift Span Roadway and Sidewalk Joints.

Place the span in operating condition, to the satisfaction of the engineer, upon its final completion. Operate the span sufficiently for the engineer to inspect its operation to his satisfaction. Repair or replace faulty and/or defective work at no additional cost to the City and to the approval of the engineer.

C.4 Construction Details for Machinery Supports
Survey the machinery supports after erection to ensure that all elevations are as required by the specific machinery elements provided. The contractor is alerted that he must calculate all top of machinery support elevations based on information shown on the machinery plans and on the specific dimensions of the machinery parts that are provided for this project.

Top surface of all new supports shall be milled after fabrication to provide a uniform surface. All dimensions as required by AASHTO Section 2.5.17 "Fits and Surface Finishes," or as shown on the plans.

Weldments for machinery base supports shall be neat and shall have all exposed sharp corners and edges removed. Mounting surfaces of the frames shall be straight and flat such that full contact with the equipment being supported or retained is obtained.

All welding required herein or called for on the plans shall be done in accordance with the requirements of AASHTO/AWS D1.5. Weldments shall be stress relieved by heat prior to final machining. The fitting up and welding procedure shall be such that distortion of the work will be a minimum. If necessary to obtain this result, suitable welding fixtures shall be used. The contractor shall submit welding procedures, together with the working drawings to the engineer for approval.

All fillet welds and partial penetration groove welds shall be tested by the magnetic-particle method in accordance with the requirements of Section 6 of AASHTO/AWS D1.5. Radiographic testing shall be used for examination of complete joint penetration groove welds in butt joints and for complete penetration groove welds in T-joints. Corner joints shall be tested by ultrasonic testing. Submit copies of test reports to City.

All complete joint penetration welds shall be tested in accordance with the requirements of Section 6 of AASHTO/AWS D1.5 for each size and type weld. Inspection and testing of welds and basis of acceptance shall be in accordance with the requirements of Section 6 of AASHTO/AWS D1.5.

Field welding will not be permitted unless otherwise shown on the plans.

D Measurement

The City will measure Bridge Structural Steel by the pound acceptably completed. Only new structural steel will be measured for payment. Galvanized Abrasive Perforated Plates and Steel Grid Flooring will be measured and paid for separately. Painting of new structural steel will also be paid for separately. Galvanizing the new structural steel is included in this pay item.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bit item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0085.01	Bridge Structural Steel	LB

Payment is full compensation for furnishing, fabricating, and erecting all new bridge structural steel in conformance with the plans, standard specifications, and this special provision; for hot dip galvanizing all new lift span structural steel as specified; and for

furnishing all labor, materials, tools, equipments, and incidentals necessary to complete the work.

Painting new structural steel is paid for under Painting Epoxy System (B-40-406).

The Galvanized Abrasive Perforated Plates are not included in this item and paid for under Galvanized Abrasive Perforated Plates.

The 2-1/2-inch open grid floor deck is not included in this item and is paid for under Steel Grid Open (2-1/2-Inch).

30. Remove and Replace Bridge Railing SPV.0090.01

A Description
This special provision describes removing the existing railing and supplying, fabricating, and installing the new painted galvanized steel bridge railing on the retaining walls, approach spans, and lift span. The work includes installing the railing gates, hinges, and latches as detailed in the contract drawings.

B Materials
Use hot-dipped galvanized steel conforming to ASTM A500 Grade B for all material unless otherwise noted.

Use A325 hot-dip galvanized bolts for all bolted connections.

C Construction
C.1 General
All work shall be in accordance with the applicable requirements of Section 513 of the standard specifications except as herein modified.

All welding shall be done in accordance with AASHTO/AWS DL5 unless noted otherwise.

Galvanized shims shall be provided and used under base plates where required. Provide 1/8” thick fabric bearing pad under base plates. Caulk around base plate. Vent members as needed to facilitate galvanizing.

Prepare shop drawings in accordance with the special provision for Shop Drawings and Submittals.

C.2 Painting
Painting shall be in accordance with Painting Epoxy System (B-40-406), and the applicable requirements of Section 517 of the standard specifications except as herein modified.

D Measurement
The City will measure Remove and Replace Bridge Railing by the linear foot in place.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.01	Remove and Replace Bridge Railing	LF

Payment is full compensation for the removal of the existing railing, and fabricating, transporting, and erecting the painted galvanized railing; for providing and placing galvanized shims under the bases if required; for providing bearing pads; and for providing and placing galvanized anchor bolts, caulking around base plates, and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance to the contract.

31. Marine Dock Fender SPV.0090.02

A Description
This item consists of all labor, material and equipment required to furnish and place the marine dock fender, including bolts, timber and mounting hardware as indicated on the plans.

B Materials
Rubber fenders shall be made from EPDM Rubber conforming to ASTM D2000 3BA720 B13 C12 D11 F19 L11. Rubber fenders shall be as manufactured by Goodyear Tire and Rubber Company; Uniroyal, Inc.; Longwood Fairprene, Inc., or an approved equal. Size as indicated on the plans. Bolts shall be ASTM A307 with hex heads and nuts, galvanized in accordance with ASTM A153.

C (Vacant)

D Measurement
The City will measure Marine Dock Fender by the linear foot in place.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.02	Marine Dock Fender	LF

Payment is full compensation at the contract unit price per lineal foot, which price is compensation for furnishing and installing the marine dock fender, bolts, timber, and mounting hardware, and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance to the contract.

32. New Cast Stone Coping, Item SPV.0090.03

A Description
Furnish all labor, material and tools required for the satisfactory completion of New Cast Stone Coping where required for the planters at the Pleasant Street Bridge in accordance with the drawings and as set forth in these specifications.

B Materials
B.1 Submittals
Product Data: For each type of product indicated.

Shop Drawings: For cast-stone coping units, showing sizes, profiles, and locations of each cast-stone trim unit required.

Samples: To verify color and finish:

B.2 Quality Assurance
Cast Stone Manufacturer Qualifications: Plant certified by the Cast Stone Institute, the Architectural Precast Association or the Precast/Prestressed Concrete Institute for Group A, Category AT.

B.3 Cast Stone Materials
Comply with ASTM C1364 and the following:

Portland Cement: ASTM C150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C114. Provide natural color or white cement as required to produce cast stone color indicated.

Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33; gradation and colors as needed to produce required cast stone textures and colors.

Fine Aggregates: Natural sand or crushed stone complying with ASTM C33, gradation and colors as needed to produce required cast stone textures and colors.

Color Pigment: ASTM C979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

Admixtures: Use only admixtures specified or approved in writing by the engineer.

> Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
>
> Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.

Air-Entraining Admixture: ASTM C260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.

Water-Reducing Admixture: ASTM C494/C494M, Type A.

Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.

Water-Reducing, Accelerating Admixture: ASTM C494/C494M, Type E.

Reinforcement: Deformed steel bars complying with ASTM A615/A615M, Grade 60. Use galvanized or epoxy-coated reinforcement.

Epoxy Coating: ASTM A775/A775M.

Galvanized Coating: ASTM A767/A767M.

B.4 Cast Stone Fabrication

Provide cast stone units complying with ASTM C1364 using the wet-cast method.

Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C666/C666M, Procedure A, as modified by ASTM C1364.

Fabricate units with sharp arrises and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.

Provide drips on projecting elements unless otherwise indicated.

Fabrication Tolerances:

Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.

Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.

Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.

Location of Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.

Keep units damp and continue curing to comply with one of the following:

No fewer than five days at mean daily temperature of 70 deg F or above.

No fewer than six days at mean daily temperature of 60 deg F or above.

No fewer than seven days at mean daily temperature of 50 deg F or above.

No fewer than eight days at mean daily temperature of 45 deg F or above.

Acid etch units after curing to remove cement film from surfaces to be exposed to view.

Colors and Textures: Match existing.

C Construction
Installation of cast stone coping is specified in bid item Bridge Operator's House.

D Measurement
The City will measure New Cast Stone Coping in length by the linear foot, acceptably completed.

E Payment
The City will pay for the measured quantity at the contract price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.03	New Cast Stone Coping	LF

Payment is full compensation for all materials, labor and incidentals for New Cast Stone Coping, in accordance with the drawings and as set forth in these specifications.

33. Tuck Pointing, Item SPV.0090.04

A Description
Furnish all labor, material and tools required for the satisfactory completion of Tuck Pointing of the bridge operator's house and planters at the Pleasant Street Lift Bridge in accordance with the drawings and as set forth in these specifications.

Included are the following:
Extent of tuck pointing
Raking out joints
Tuck pointing joints

B Materials

B.1 Mortar Materials

As specified in bid item Repair Planters paragraph "Masonry Rebuilding."

B.2 Mixing Mortar for Tuck Pointing

Add only enough water to preblended mortar to mix produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

C Construction

C.1 Extent of Tuck Pointing

Rake out and tuck point masonry joints at the bridge operator's house and planters to the following extent:

All joints in areas indicated on the drawings.

Joints where mortar is missing or that contain holes.

Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.

Cracked joints where cracks are 1/16 inch or more in width and of any depth.

Do not rake out and repoint joints where not required.

C.2 Raking Out Joints

Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.

Remove mortar from joints to depth of 2 times joint width, but not less than that required to expose sound, unweathered mortar.

Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by the engineer.

Notify the engineer of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

C.3 Tuck Pointing Joints

Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.

Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.

When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.

Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

D Measurement

The City will measure Tuck Pointing in length by the linear foot, acceptably completed.

E Payment

The City will pay for the measured quantity at the contract price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.04	Tuck pointing	LF

Payment is full compensation for all materials, labor and incidentals for Tuck Pointing, including raking out and tuck pointing joints to the extent indicated in accordance with the drawings and as set forth in these specifications.

34. Epoxy Crack Sealing, Item SPV.0090.05

A Description

This special provision describes repairing structural cracks in the piers and abutments by the epoxy injection method, in accordance with the requirements of section 509 of the standard specifications, as shown on the plans, directed by the engineer, and as hereinafter provided.

B Materials

Furnish epoxy injection material that is insensitive to the presence of water and is composed of a two-component epoxy resin designed specifically for structurally re-bonding cracks in Portland cement concrete. The epoxy injection material shall conform to the following physical properties at 77 degrees F:

	Mixed		**Unmixed**
	Component A (Resin)	Component B (Catalyst)	
Weight per gallon, lbs.	9.15 ±0.1	8.2 ±0.1	9.15 ±0.1
Viscosity, cps	500-700	120 - 160	275 - 350
Specific Gravity, g/cc	1.128 ±0.012	0.984 ±0.012	1.099 ±0.012
Color Straw	Straw	Straw	Straw
Shelf Life (closed containers)	2 years	2 years	---
Solids by Weight	---	---	100%
Pot Life (200 gram mass)	---	---	12 - 15 mins.
Mixing Ratio (by weight)	80%	20%	---
Mixing Ratio (by volume)	78%	22%	---
Bond Strength	---	---	2000 psi min
Shrinkage Resistance	---	---	ASTM C883
Thermal Compatibility	---	---	ASTM C884

Furnish surface seal material for confining the injected epoxy resin in the cracks that meets the following requirements:

- Adequate strength to hold the injection fittings firmly in place to resist injection pressures and prevent leakage during injection
- Non-sag consistency
- Insensitive to the presence of water
- Controlled cure time
- Two-component epoxy resin
- 100% solids by weight
- Applicable to wet surfaces
- Viscosity should be paste

C Construction

C.1 Injection Equipment

Use equipment to meter and mix the two-epoxy resin components and to inject the mixture into the cracks that is portable and has positive displacement type pumps equipped with an interlock to provide positive ration control of exact proportions of the two components at the nozzle. Use electric or air powered pumps that provide in-line metering and mixing.

Use injection equipment that has automatic pressure control capable of discharging the mixture at any present pressure up to 160 psi (±5 psi), and is equipped with a manual pressure control override.

The equipment shall have the capability of maintaining the volume ration for the mixture prescribed by the manufacturer of the epoxy resin material within a tolerance of ±5% by volume at any discharge pressure up to 160 psi.

The injection equipment shall be equipped with sensors on both the Component A and B reservoirs that will automatically stop the machine when only one component is being pumped to the mixing head.

C.2 Surface Area Preparation

Clean the surface areas adjacent to cracks of all dirt, dust, grease, oil, efflorescence, or other foreign matter, permitted for cleaning.

Install injection ports along the cracks at intervals of four to ten inches, or as appropriate to accomplish full penetration of the injection resin. Center the injection ports over the cracks and secure in place using surface seal material. Where possible, install the injection ports over the widest areas of the cracks.

Apply the surface seal material to the face of the crack between the entry ports. For known through cracks, apply the surface seal material to both faces of the member. Before proceeding with the injection operation, allow sufficient time to elapse for the surface seal material to gain adequate strength.

C.3 Epoxy Injection

Install the epoxy injection resin in accordance with the manufacturer's instructions.

During installation, limit pressures, in general, to 35 psi at the point of entry into the crack.

On vertical cracks, start the injection at the lowest point and continue upward along the crack. While injecting, resin should flow to and out of the next higher port. When this flow is established, cap the lower port and continue the injection until all ports have been injected and flow has been established between them.

Following the same procedures used for vertical cracks, start the injection on horizontal cracks at one end and continue the injection in succession along the crack.

C.4 Finishing and Clean-Up

When cracks are completely filled, cure the epoxy resin for a sufficient length of time so that when the surface seal is removed, there is no draining or runback of the epoxy material from the cracks. Grind, or use other appropriate method, to remove surface seal material, excess epoxy material, and injection ports. No epoxy material shall extend beyond the plane of the surfaces of the in-situ concrete.

D Measurement
The City will measure Epoxy Crack Sealing by the linear foot acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.05	Epoxy Crack Sealing	LF

Payment is full compensation for furnishing and placing the epoxy sealant, including any cleaning before and after injection, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

35. Lift Span Roadway Joints, Item SPV.0105.01.

A Description
This work shall consist of furnishing and installing the roadway section of the lift span joints in accordance with the plans, standard specification, and these special provisions. This work shall include furnishing and installing joint plates, angles, channel sections, compression seals, and joint supports, including welded studs, as shown on the drawing for both the fixed and movable portion of the joints. This work will also include replacing the joint gutter and 6" wrought iron pipe at the joint with painted, hot-dipped galvanized components.

Removal of existing joint will be paid for under the bid item: "Removing Old Structure Over Waterway with Minimal Debris."

B Materials
Structural steel shall be painted hot-dipped galvanized and in accordance with Section 506 of the standard specifications.

Galvanizing shall be in accordance with ASTM A123 and A153.

Performed elastomeric compression joint sealer shall be in accordance with Section 502.2.8 of the standard specification. The installation of the compression joint sealer shall be in accordance with Section 506.3.6.3.2 of the standard specification.

C (Vacant)

D Measurement
The City shall measure the Lift Span Roadway Joints, completed in accordance to the contract and accepted, as a single complete unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.01	Lift Span Roadway Joints	LS

Payment is full compensation for furnishing, fabricating, and installing lift span roadway joints in conformance with the plans, standard specifications, and special provisions; and for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

36. Lift Span Sidewalk Joints, Item SPV.0105.02.

A Description
This work shall consist of furnishing and installing the sidewalk section of the lift span joints in accordance with the plans, standard specifications, and special provisions. This work shall include furnishing and installing joint plates, angles, and channel sections including welded studs, compression seals, and joint supports as shown on the drawing for both the fixed and movable portion of the joints.

Removal of the existing joint will be paid for under the bid item "Removing Old Structure Over Waterway with Minimal Debris."

B Materials
Structural Steel shall be painted hot dipped galvanized and in accordance with Section 506 of the standard specifications.

Galvanizing shall be in accordance with ASTM A123 and A153.

Preformed elastomeric compression joint sealer shall be in accordance with Section 502.2.8 of the standard specifications. The installation of the compression joint sealer shall be in accordance with Section 502.3.6.3.2 of the standard specifications.

C (Vacant)

D Measurement
The City shall measure the Lift Span Sidewalk Joints, completed in accordance to the contract and accepted, as a single complete unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.02	Lift Span Sidewalk Joints	LS

Payment is full compensation for furnishing, fabricating and installing lift span sidewalk joints in conformance with the plans and this special provision; and for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

37. Remove and Replace Pier Railing, Item SPV.0105.03.

A Description

This special provision describes removing existing pier railing and furnishing and installing new steel pipe railings and safety chains in locations of Pier 1 and Pier 2 on the bridge pier level in accordance with Section 513 of the standard specifications and as herein provided.

B Materials

Provide circular steel pipe railing to match the existing railing. Pipe rails shall be ASTM A500 Grade B and shall be hot dipped galvanized. All hardware associated with the rail also must be hot-dipped galvanized or stainless steel.

C Construction

Remove the existing pipe railing on the pier platform in Pier 1 and Pier 2 without damaging the existing concrete. Remove the base plates and anchor bolts of the existing rail posts and patch concrete base as needed. Install the new pipe railing with base plates and anchor bolts similar to the existing railing.

Grind existing anchor bolts until flush with existing surface.
New anchor post spacing and anchor bolt location to be determined by the Contractor. Contractor must verify location to ensure it does not interfere with existing anchor bolt locations.

D Measurement

The City will measure Remove and Replace Pier Railing, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.03	Remove and Replace Pier Railing	LS

Payment is full compensation for removing the existing railing, anchor bolts, and safety chains; providing, fabricating, transporting and erecting the entire railing and all components; for providing and installing special fittings, hardware, fasteners, anchor bolts, and safety chains; for anchoring the rail posts and base plates; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

38. Counterweight Balancing Calculations, Item SPV.0105.04.

A Description

The work covered by this item consists of preparing balancing calculations of the lift span and concrete counterweight and balancing blocks to ensure compliance with the design criteria listed on the plans, specifications, and elsewhere here in for the lift span.

The work includes the calculation and documentation of the dead load and required counterweight to balance the span per the AASHTO guidelines.

B (Vacant)

C Construction

C.1 General

Perform all work in accordance with the 2007 AASHTO Movable Highway Bridge Specification, including interims.

C.2 Calculations

Prepare balance calculations prior to fabrication and construction of new balancing blocks and supplemental counterweight steel based on approved shop drawings and material tests, and submit them to the engineer for review and approval. To permit detailed checking, prepare calculations by grouping material and computing subtotals as directed by the engineer. A Professional Engineer licensed in the State of Wisconsin shall perform the balance calculations.

Compute the quantity and location of balance counterweight required based on the specified balance requirements and the weight. Base these calculations on weights of approved shop details and material tests for the actual material on the lift span. Accurately compute the weight accounting for all material, weld fillets, bolt heads, washers, nuts, paint, and normal overruns on plate thickness, etc.

Develop summary balance tables and show them on the shop drawings. Develop summary tables for all phases of the balance and the proposed imbalances. Account for the temporary balance material, if used, in the summary tables. Submit all summary tables and back-up materials for review by the engineer.

Include a narrative with the outline of the proposed phasing, the duration of the imbalance condition, and all other aspects of the work in accordance with the approved construction schedule. Coordinate this information with the contractor's scheduling requirements and submit to the engineer for review.

Develop weights for new work on the shop drawings for each component.

Update the balance calculations and summary tables through construction and submit to the engineer periodically as required to meet the requirements of these special provisions and in the plans.

Review of the balance calculations, counterweight details, and quantity and location of balance material does not relive the contractor from making such changes in the counterweights and balance material as deemed necessary to balance the lift span. Submit all changes for approval.

After balance block adjustment, submit five copies of the final balance report, similar to the initial report to the engineer. Bind the reports between heavy plastic covers. Include an introductory section giving the name of the bridge, the bridge number, the date of the measurements, weather conditions during measurements, and any other information requested by the engineer.

D Measurement

The City will measure Counterweight Balancing Calculations, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.04	Counterweight Balancing Calculations	LS

Payment is full compensation for all analyses, Professional Engineer Services, and all other balance work described herein or shown on the plans.

39. Refurbishing Existing Name Plates, Item SPV.0105.05.

A Description

The work under this item includes removing, cleaning, refurbishing, and reinstalling the existing nameplates from the bridge house.

B Materials

Provide anchoring devices of similar material to reinstall the existing name plates. New anchors shall be of a material that will not cause electrolysis between the two materials.

C Construction

Remove the existing nameplates prior to beginning any repair work on the bridge house. Do not reinstall until after all repair work has been completed and accepted by the engineer.

Thoroughly clean the removed nameplates of all paint, concrete, and other debris. Polish to an acceptable finish without damaging the name plates or removing or otherwise damaging the inscriptions on the nameplates and as shown in the plan. Cleaning shall be done to the satisfaction of the engineer.

Coat back of existing nameplates to prevent electrolysis from the attachment holes and staining of the concrete substrate. Reinstall at the original location on the bridge house. Use existing anchor bolts to reattach name plates.

D Measurement
The City will measure Refurbishing Existing Name Plates, completed in accordance to the contract and accepted, as a single complete unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.05	Refurbishing Existing Name Plates	LS

Payment is full compensation for removing, cleaning, and reinstalling existing name plates; and for furnishing all labor, tools, materials, and incidentals necessary to complete the work.

40. Field Verification Survey, Item SPV.0105.06.

A Description
This special provision describes performing a field survey of the existing Pleasant Street Lift Bridge for the purpose of establishing current dimensions and elevations to be used in the fabrication and construction of new bridge elements.

All dimensions and elevations shown on the contract plans are based on values found on the plans from the original bridge construction and subsequent bridge rehabilitations. These values should not be construed to be completed true or accurate. They are accurate enough for the design of the rehabilitation and for the establishment of bid quantities. However, the nature of the work involved in this rehabilitation is such that new elements must be constructed and fabricated too much closer tolerances than are needed for design. Shop drawings of the original fabrication can be made available to the contractor.

A Registered Land Surveyor with a minimum of five years of surveying experience, licensed to practice in the State of Wisconsin, shall conduct the field survey under this special provision. Prior to beginning the work, furnish the engineer the name of the surveyor and a copy of his registration certificate.

All survey field notes and sketches shall be kept in a neat orderly fashion so the fabrication and constructors of the new bridge elements can readily interpret them. If, following completion of the survey and submittal of all survey notes and sketches, questions arise regarding the meaning or interpretation of the notes and sketches, provide the necessary clarification and interpretation at no additional cost to the City.

B (Vacant)

C Construction

Conduct the survey in a timely and efficient manner prior to beginning any fabrication or construction of new bridge elements.

The survey shall include the determination of all dimensions and elevations necessary to fabricate and construct the new bridge elements.

It is expected that the results of the survey will correlate very closely with the dimensions and elevations given on the plans and/or shop drawings. If there are any obvious discrepancies of a magnitude that will severely and detrimentally impact the work, discuss with the engineer prior to proceeding.

Submit results of the survey, in the form of field notes, sketches and any other forms of survey documentation to the engineer for review before proceeding with fabrication.

Following the engineer's review, use the survey results to fabricate and construct new bridge elements as shown on the plans.

The survey shall include, but not be limited to, the following:

1. Overall length and width of the bridge.
2. Length of lift girders, floor beams, stringers, purlins, and sidewalk elements.
3. Roadway and sidewalk expansion joints.
4. Spacing of girders, floor beams, stringers, purlins, sidewalk elements.
5. Elevations of lift girders, floor beams, stringers, purlins, and sidewalk elements.
6. All relevant dimensions and elevations of bridge operating machinery necessary for the fabrication of new machinery elements or supporting steel.
7. Documentation of revisions made to the bridge not shown on the original plans/shop drawings and subsequent rehabilitation.
8. Elevation and location of holes and openings in the steel members to accommodate machinery components and cables.

The above list is not to be taken as complete or all inclusive. It is presented as an example of items to be surveyed. It is the contractor's responsibility to determine the full extent of survey necessary.

If it is determined that during the course of the work, additional survey is required, it shall be furnished at no additional cost to the City.

The results of the survey are the contractor's responsibility. These results are to be used in fabrication and erection of new bridge elements. As such, in the event that elements are incorrectly fabricated and do not fit existing spaces or conditions, the contractor is responsible for correction any such errors and repairing or replacing the parts and elements to the satisfaction of the engineer at no additional cost to the City.

D Measurement

The City will measure Field Verification Survey, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.06	Field Verification Survey	LS

Payment is full compensation for conduction the field survey of existing conditions as described herein; for providing clear and concise survey results; for performing any required resurvey or additional survey; and for furnishing all labor, tools, and equipment and incidentals necessary to complete the work.

41. Bridge Hydraulic System, Item SPV.0105.07

A Description

The work under this Section shall consist of furnishing all labor, equipment and materials (including spare parts) as shown on the Plans and specified herein. The work includes designing, supplying, installing, adjusting, painting, lubricating and testing to place in correct, satisfactory operating condition the new bridge hydraulic system for the lift span. Also included is the removal and replacement of the Equipment Room's concrete block wall for the removal and replacement of the existing Hydraulic Power Unit and other equipment from the Equipment Room, as well as miscellaneous structural steel components and coordination with other disciplines as required for complete installation of the Hydraulic System. Coordination with all other work is also required, including coordination with the installation of the electrical system and coordination with structural steel and concrete work, including those removing and replacing the concrete pedestals beneath the bases of the hydraulic jacking cylinders.

The bridge hydraulic system shall meet the requirements for hydraulic systems, components, and associated elements and hydraulically operated equipment for use in movable bridge operation and control, as described herein.

The bridge hydraulic system consists of the following major components:

MK	Item	Total
HPU	Hydraulic Power Unit	1
---	Hydraulic Piping and Supports	1 Lot
---	Hydraulic Jacking Cylinders	2

B Materials

B.1 General

All materials shall meet the minimum requirements specified herein or as specified on the plans. The plans and these specifications show equipment schedules listing the minimum design requirements for the new equipment.

All equipment and materials furnished under the items specified herein shall be brand-new. All equipment, materials and workmanship shall be first class in every particular, and shall be manufactured or rehabilitated and installed to the satisfaction of the Engineer.

The design, workmanship and erection of all machinery and hydraulic components shall meet the applicable requirements of AASHTO 2007 LRFD Movable Highway Bridge Design Specifications and 2011 revisions, hereinafter referred to as the AASHTO Specifications, except as otherwise specified herein or as shown on the plans.

Portions or all of certain recognized industry or association standards or specifications referred to herein as being a requirement of these Special Provisions shall be considered as binding as though reproduced in full herein unless supplemented and/or modified by more stringent requirements of the Contract Documents. Unless otherwise stated, the referenced standard or specification current as of the date of issuance of these Special Provisions shall be used. The following abbreviations are used herein and on the plans to designate specifications and standards for material and workmanship:

AASHTO	American Association of State Highway and Transportation Officials
AGMA	American Gear Manufacturers Association
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	ASTM International (formerly American Society of Testing Materials)
AWS	American Welding Society
DIN	Deutsches Institut fur Normung
JIC	Joint Industrial Council
NEMA	National Electrical Manufacturers Association
NFPA	National Fluid Power Association
NLGI	National Lubricating Grease Institute
OSHA	Occupational Safety and Health Act
SAE	Society of Automotive Engineers
SSPC	Steel Structure Painting Council

Hydraulic equipment shall be designed and assembled in accordance with standard Joint Industrial Council (JIC) and National Fluid Power Association (NFPA) hydraulic practices. Hydraulic power units shall be completely pre-piped, pre-wired, tested, and painted prior to arrival at the job site. Open ports for field piping shall be securely

capped with steel plugs. Changes or modifications in the field are not permitted. Should the power units require piping changes they shall be removed from the bridge, modified, and re-tested in the manufacturer's shop.

B.2 Bridge Hydraulic System Supplier and Installer

As part of this item, the Contractor shall be required to have a designated Bridge Hydraulic System Supplier and Installer attend the pre-construction conference, be present at the site during system installation and train the City's personnel. Training shall be in accordance with the requirements stated under Operation and Maintenance Manuals, Lubrication Chart, and Training.

B.3 Qualifications

Hydraulic system fabrication, installation and startup shall be performed by a qualified Hydraulic System Designer/Manufacturer. This Bridge Hydraulic System Supplier and Installer shall have had at least ten years experience in the design, fabrication, and installation of hydraulic systems of this size and type. Acceptable system suppliers include Bosch/Rexroth, Bethlehem, PA; Dan Krall & Co., Inc., Milwaukee, WI; Oilgear, Milwaukee, WI; or approved equal.

Piping and flushing shall be done under the direction of an NFPA Certified Fluid Power Technician with experience on similar systems, who shall oversee the installation crew. Certification number and experience shall be submitted for review and approval. Installation and adjustment of hydraulic components shall be by personnel with demonstrated skill in this type of work.

B.4 Warranty and Quality Control

All manufacturers shall warrant all products and associated hardware to be free of defects in material and workmanship for a period of five (5) years from the date of final acceptance of the completed bridge contract. Final Acceptance shall be in accordance with the City Specifications. Any defect within this period shall be repaired or replaced by the Manufacturer or Vendor, at total cost to the Manufacturer or Vendor, including labor, parts, and transportation.

The Contractor shall provide letters to the suppliers with copies to the Engineer, identifying the scheduled date of final acceptance of the bridge and therefore the date the warranty shall begin. If the date of final acceptance is extended, it shall be the Contractor's responsibility to extend the commencement of the warranties from the suppliers at no cost to the City.

The City reserves the right to receive on demand, at no cost to the City, a test report from an independent laboratory certifying the equipment furnished meets the requirements of these specifications.

The City reserves the right to reject an entire shipment of material covered by this specification if an item or items are found to be defective within a 30-day period following receipt of materials.

B.5 General Requirements
All components of the Bridge Hydraulic System shall be properly sized and selected such that no oscillation or vibration occurs during the operation cycle. The entire cycle shall be smooth regardless of operator command or weather conditions.

B.6 Submittal Requirements
Shop drawing submittals shall be made in accordance with Section 110. The Contractor shall submit complete pressure drop calculations based on the equipment proposed to be used by the Hydraulic Supplier to the Engineer for review. In addition, complete submittal data for the hydraulic system shall be submitted to the Engineer for review during the shop drawing process.

Minimum submittal requirements shall include the following:

1. Hydraulic schematic with bill of materials.

2. Certified dimensional prints for the hydraulic cylinders, hydraulic power unit, its manifolds, reservoir, etc., with all components to scale, plus certified dimensional prints for all separately mounted components.

3. HPU layout, dimensions, and component configuration.

4. Equipment layout showing clearances between equipment and bridge structure.

5. Engineering and performance data of all items supplied, including material specifications, pump efficiencies, component catalog cuts, etc.

6. Power unit electrical terminal cabinet, electrical relay cabinet (furnished separately under Electrical Control Equipment), and HPU panel wiring diagrams. (See requirements for electrical equipment submittals, below.)

7. Initial hydraulic fill and field flushing procedure.

8. Hydraulic fluid specifications.

9. Calculations for design of jacking cylinder body and mounts and of all factors of safety required by this specification.

10. Assembly drawings for hydraulic power unit, jacking cylinders, and their supports.

11. Complete piping layouts and details, including fittings, lengths, supports, clamps, calculations for factors of safety for all hydraulic plumbing, etc.

12. Complete system power analysis, including component sizing calculations and pump efficiency ratings for flow and pressure for normal modes of operation.

13. The Contractor shall submit shop drawings of all fabricated components of the Bridge Hydraulic System, including power unit structural framing and assembly, reservoir, mechanical actuating components mounted thereon, jacking cylinders and cylinder attachments, to the Engineer for review and approval prior to fabrication.

14. The Contractor shall submit shop drawings detailing the dimensions of the supporting structures, the procedure for the alignment of the cylinder supports, and a full installation procedure. The CONTRACTOR shall submit for approval, in shop drawing format, the method to be used to locate the brackets. All procedures shall be submitted to the Engineer for review prior to the start of the work. Support brackets shall be aligned in all directions and dimensions to within 0.050 inches.

15. The Contractor shall submit a plan for flushing the entire Bridge Hydraulic System at completion of assembly to the Engineer for approval. The Bridge Hydraulic System shall not be installed until plan approval is received.

Electrical submittals related to the Bridge Hydraulic System shall include:

1. Dimensioned panel layout drawings with all components to scale. All components shall be labeled and referenced to a bill of materials.

2. Manufacturer's data sheets for all components (disconnects, switches, timers, fuses, circuit breakers, heat trace, etc.)

3. Schematic drawings showing wire numbers and field wiring.

4. Engraving schedule for nameplates.

5. Submittal data for each motor shall include horsepower, voltage, amps (full load and locked rotor), motor speed, NEMA frame size, insulation class, temperature rise, service factor, and optional equipment (encoders, thermal switch, space heater, etc.). Provide torque / speed performance graph.

B.7 Operation and Maintenance Manuals, Lubrication Chart, and Training

The Contractor shall furnish Maintenance and Operation Manuals giving complete instructions relative to assembly, installation, operation, adjustment, alignment, lubrication, maintenance, disassembly of the new Bridge Hydraulic System. Complete parts lists and assembly drawings shall be provided as part of the Manuals. Manuals shall be furnished concurrently with working drawings, for review and approval by the Engineer.

A lubrication chart showing the location of all components requiring periodic lubrication or maintenance shall be included in the Manuals and shall also be furnished and installed near the hydraulic power unit. This shall include specific procedures for sampling and testing the hydraulic fluid to detect all types of contamination, including hose particles as well as wear metal particles and water, and recommended periods for testing. All procedures are subject to review and approval by the Engineer. The mounted lubrication chart shall be 24" x 36" in size, and shall contain permanent black letters on a white

background. The chart shall be mounted on a rigid backing, covered with clear, rigid plastic sheeting, shall be weather-proof, and shall be mounted in locations easily visible to bridge personnel stationed at the HPU.

Training with regard to periodic maintenance required, on the basis of the lubrication chart provided, and troubleshooting procedures to be followed in the event of a malfunction, shall be provided to up to four City maintenance personnel to be designated by the City. The training session shall include a basic discussion regarding hydraulic operation of the lift span and a detailed discussion of the function and operational characteristics of each component or feature of system provided. The training session shall include demonstration of the lift span in all modes of operation, and of conditions and functions that may occur when the span is at rest. Safety procedures discussed shall include protection of hydraulic components and features, to prevent damage, as well as necessary procedures for the protection of operating and maintenance personnel against injury. A demonstration of manual operation to lower the span using the Instruction Plates provided under BRIDGE HYDRAULIC SYSTEM shall be performed during the training session. Certificates of Completion stating the name of the bridge and the training covered shall be issued to each participant who completes the training.

B.8 Capacities and Speeds

Capacities shown for the materials specified herein are based on an operating time to lift and lower the span of 60 seconds in each direction, using both pairs of motors and pumps, including basic acceleration and deceleration times of 10 seconds to and from full speed, and the following conditions and assumptions. Net load to lift at the jacking cylinders, after counterweight is deducted, is approximately 82,000 lbs. including dead load friction, inertia, rope bending, unbalance, wind load, and ice load. Two hydraulic jacking cylinders with a minimum 6.3” minimum diameter rod shall be used to lift the span on this basis. Basic fluid flow and pressure at the jacking cylinders shall be as required to meet the speed and load requirements for lifting the span using the pumps and lowering the span under an unbalanced condition of 44,000 lbs. Total system efficiency shall be determined, based on the equipment selected for the basic design, including all AASHTO required loads, lift span friction, and all losses beyond the pump from hydraulic components and piping. The bridge hydraulic system shall take all requirements into account in the design of the fixed displacement pumps and electric motors.

All equipment capacities shall be selected on the basis of the two pumps and motors operating at full capacity. Stainless steel pipe of the sizes indicated shall be used to the greatest extent possible to minimize pressure drop. Hydraulic fluid line sizes shown on the Plans shall not be decreased, and shall be increased if required to improve efficiency. The Contractor shall submit calculations to verify the design, using capacities and efficiencies of the equipment proposed by the Contractor.

B.9 Coatings

External surfaces of the HPU (including mounted components), piping, and cylinder assemblies, except for machined parts in sliding contact, shall be primed and coated in

accordance to the requirements for the structural steel as stated elsewhere in the specifications. Surface preparation and application of coatings shall be in accordance with the coating manufacturer's recommended procedures and the applicable Steel Structures Painting Council (SSPC) Specifications. Final coat paint color(s) shall be as directed by the Engineer.

B.10 Weldments

Weldments for machinery base supports and cylinder brackets furnished shall be neat and shall have all exposed sharp corners and edges removed. Mounting surfaces of the support frames shall be straight and flat such that full contact with the equipment being supported or retained is achieved.

All welding required herein or called for on the plans shall be done in accordance with the requirements of AWS D1.5 and Subsection 506.3.19 of the Standard Specifications. Weldments shall be stress relieved by heat prior to final machining. The fitting up and welding procedure shall be such that distortion of the work will be a minimum. If necessary to obtain this result, suitable welding fixtures shall be used. The Contractor shall submit welding procedures, together with the working drawings for the parts to the Engineer for approval.

All welds shall be inspected in accordance with requirements of AWS D1.5. Location of tests shall be selected at random so as to be typical for each size and type of weld. All weld basis of acceptance shall be in accordance with the requirements of AWS D1.5.

B.11 Mechanical Components for Hydraulic System: Dimensions, Fits, and Finishes

Fabricated mechanical components furnished or rehabilitated under hydraulic work shall meet the requirements for such components as described under the Special Provision BRIDGE MACHINERY - GENERAL. Dimensions of machined parts are the finished dimensions after fabrication and machining. Unless otherwise specified, all dimensions for machine finished surfaces and parts shall be held within a tolerance of 0.010". Fits for cylindrical parts shall also apply to the major dimensions of non-cylindrical parts. Fit, finish, and tolerance of manufactured parts and their mating parts shall conform to AASHTO Specification Article 6.7.8.

B.12 Span Drive

B.12.1 General

The movable span shall be powered by a multi-pump hydraulic power unit (HPU). The HPU shall have electric motors and pumps as shown in the Plans. Hydraulic jacking cylinders shall be provided as specified in the plans and these specifications.

The system shall be redundant such that if one of the main motors or pumps is out of service, the system can be operated at half speed by remaining components of the system. Normal operation of the bridge under all load conditions is with the two main motors and main pumps on the power unit operating. Emergency operation of the bridge will be under the same loading conditions with only one motor and pump on the power unit

operating. Additional redundancy shall be furnished at various components by means of manual operators to supplement electrical control.

Corrosion resistant nameplates shall be provided for each hydraulic component, including jacking cylinders and all functional components on the HPU such as pumps, motors, safety features, indicating and control components, heaters, pressure gauges, test ports, valves, piping, etc. Nameplates shall clearly indicate the function of each device and, in the case of manually operated valves or controls, shall indicate the normal condition (normally open or normally closed) established for each position of the valves or control. Lettering on the nameplates shall be machine-engraved on plastic laminate with white characters on a black background. The nameplates shall be mounted in its respective location in a position that is easily visible to bridge personnel.

Normally closed shutoff valves shall be provided with corrosion resistant red handles. Normally open shutoff valves shall be provided with corrosion resistant green handles. Color markings shall be durably bonded to the handle, and color shall not be subject to removal by normal wear.

Instruction plates for the manual control and emergency bypass of the hydraulic equipment shall clearly indicate the proper procedures and sequences of operations to activate the system, to operate the system, and to secure the system after completion of operation. All modes of operation shall be described, including normal operation, emergency operation, normal stop, emergency stop, power failure, and emergency lowering during electrical system failure. Instruction plates shall contain permanent black letters on a white background. Instruction plates shall be mounted on a rigid backing, covered with clear, rigid plastic sheeting and be weather-proof. Instruction plates shall be mounted in locations easily visible to bridge personnel at the HPU.

Electrical apparatus for controlling the operation of the span shall include an electrical terminal cabinet mounted on the HPU. All other conduits, cabinets, wiring, cables and other equipment required to extend the necessary electric circuits to the HPU terminal cabinet and to separately mounted components shall be furnished under Electrical Work and installed by others.

B.12.2 Hydraulic Power Unit for Span Operation

The hydraulic power unit (HPU) for span operation shall be of simple design and substantial construction. The arrangement of parts shall permit easy erection, hydraulic connection, electrical connection, adjustment, and replacement of defective parts, and shall be accessible for inspection, cleaning, lubrication, maintenance and repairing. The fastening shall be adequate to hold the parts in place under all conditions of service.

All parts, motors, pumps, valves, etc. shall be mounted over an integral drip pan to contain oil spills when servicing or replacing the unit. Drip pans shall be equipped with drain spigots and suitable clearance for drainage and collection. Drip pan material shall be ASTM A666 Type 304 stainless steel.

The entire hydraulic power unit shall be framed for ease of handling using a forklift, and the framing shall also include lifting lugs or lifting eyes to allow movement by come-along. The framing members shall be standard rolled steel shapes such as channels, angles, and wide-flanged beams.

The hydraulic power unit shall be completely pre-wired, in that all components requiring electrical power or control shall be connected to a junction box furnished and installed on the end of the hydraulic unit, in the location shown on the plans.

The hydraulic power unit and all components shall be detailed to provide the intended functions of power and control. Unless otherwise noted, every component or assembly shall be rated for the maximum flow and pressure it will be subjected, or to 3,000 psi, whichever is greater.

The Contractor shall be responsible for selecting components that provide the intended function and meet the specified performance criteria. Any component features not specifically mentioned herein, additional components, or additional piping required to adapt specific components to meet the design intent, including external drains, reducing valves, flow control valves, etc., shall be furnished at no additional cost.

The HPU shall have two identical pump/motor groups, both of which shall be used for normal operation and either one of which can be used separately for emergency operation. The lift span shall be raised under power and lowered by the span unbalanced weight. Manual overrides at the solenoid valves shall also be included should it be necessary to operate the valves without electrical control of the solenoids on an emergency basis. A placard with emergency instructions for immediate shutdown shall be located near the HPU, including a reference to the instruction plates (described above) for emergency lowering operation.

Hydraulic pumps shall be of fixed displacement gear type. Main pumps shall have a net volumetric output as required for the lifting of the span at required speeds at no less than 85% volumetric efficiency at a motor speed of 1725 rpm. Each pump shall be connected to a standard TEFC/NEMA C-faced electric motor. Electric motors shall be in accordance with the requirements as specified under Electrical Work.

If direct coupling of the motors to the pumps is proposed by the Contractor, the pumps and electric motors shall be connected by means of a suitable grid type flexible coupling with misalignment to be no more than the manufacturer's maximum recommendation. Coupling halves shall be keyed to their respective shafts. Coupling set screws shall be secured with a high quality thread locking material. The entire pump/motor assembly shall be mounted on commercially available vibration isolation shock mounts.

Power unit wiring shall conform to standard electrical practices. Seal-tite shall be used between HPU terminal box and HPU electrical components where runs will be less than two feet. For runs over six feet, PVC coated, zinc-coated rigid conduit shall be used in conjunction with seal-tite, keeping seal-tite runs under two feet in length.

B.13 Reservoirs

The hydraulic reservoir shall be fabricated from stainless steel ASTM A276 Type 316. The reservoir shall have a minimum capacity of 2.5 times the maximum flow per minute during normal operation, plus 15%, and shall be filled to the level of 2.5 times the maximum flow per minute when the jacking cylinders are completely retracted and the entire hydraulic span piping system is filled to capacity. The thickness of the wall material for the reservoirs shall be sufficiently designed for all components mounted to the reservoir. The reservoir top shall be designed and constructed to shed any fluid that may collect on the top without draining into the reservoir. In addition, the top surface shall be of such construction that it can be easily wiped to remove contaminating substances.

A minimum of two removable clean out covers shall be installed on the front face of the reservoir on which no components are mounted. Each reservoir shall have suitable baffles to assist in fluid conditioning, and each area between the walls of the reservoir and the baffles, and between the baffles, shall be accessible by use of the clean out portals. A water vapor barrier-type 3-micron breather shall be installed on the sealed reservoir. Breather assembly shall be spin-on type with visual clogging indicator and a 100 cfm capacity. A provision shall be made such that new fluid can only be added to the sealed reservoir by pumping it through the return filter.

In addition to the general features required in all hydraulic reservoirs, the following items shall be incorporated into the hydraulic span drive reservoir. When available on the open market for standard products, all switches shall be furnished with one normally open and one normally closed contact, the extra contact to be considered a spare for future use. The positions or settings of all switches shall be easily adjustable by at least 20 gallons in either direction for level switches, and by at least 30 degrees in either direction for temperature switches:

1. Low level float switches – two positions. These shall include low fluid level indication switch [FS 1], contact to close if fluid level falls below level of 60% of filled capacity (adjustable), and low fluid level interlock switch [FS 2], contact to close if fluid level falls below level of 40% filled capacity (adjustable).

2. High fluid level console indication switch [FS 3], contact shall close if fluid level rises above level of 110% filled capacity (adjustable).

3. Fluid level gauge, with visible level indication over the range of the fluid level switches (between 110% and 40% of normal filled capacity.

4. Fluid temperature gauge (thermometer), with minimum visible range between 30 degrees F and 180 degrees F.

5. High fluid temperature indication switch [TS 1], contact shall close if temperature rises to 140 degrees F.

6. Low temperature indication switch [TS 2], contact shall close if temperature falls below 55 degrees F.

7. Future provisions shall be provided for the addition of a heat exchanger for the reservoir. At a minimum, two ports shall be provided at one end of the reservoir that will allow connection of 1.5 inch diameter tubing at appropriate fluid levels for optimum installation of a commercially available heat exchanger unit. Catalog cuts shall be provided on the proposed unit. A diagram and schedule listing all material required for future heat exchanger installation shall be furnished with the shop drawings.

8. Pump suction butterfly shutoff valves with flex connection and contacts for position indication.

9. Hydraulic oil fill connection that permits oil fill only through a 10 micron filter (return filter).

10. Reservoir drain port with shutoff valve.

11. Fluid sampling port.

In addition, the hydraulic power unit and the remainder of the hydraulic circuits shall have all features shown or indicated on the plans or described herein.

B.14 Manifolds and Subplates

Manifolds and subplates shall be used to house and mount all valving and other components as specified or shown on the plans. Unless otherwise specified or shown, manifolds shall be constructed from corrosion resistant steel or aluminum alloy as required for the specified working pressures. Subplates shall be provided to mount all separately mounted components, as required. In exposed areas under the lift span, hydraulic components shall be provided with removable steel covers with gasket seals for protection.

B.15 HPU Terminal Cabinet

An electrical terminal panel specifically for the hydraulic power unit shall be furnished and installed on the HPU as part of Hydraulic System. The enclosure shall conform to NEMA 12 standards. All components shall be UL listed for the intended application and indoor use.

Switches and indicator lights provided on panel door shall be JIC oil tight type. See plans for panel door layout.

Terminals and fuse holders shall be in accordance with the requirement for Electrical Work.

B.16 Bridge Hydraulic System Operating Components
All main system valves and other operating components shall be rated for intended flow and pressure. ANSI standard sub-plate mounted valves shall be used for ease of servicing.

B.16.1 Cam Operated Proportional Flow Control Valve Assemblies
The main speed control valves shall be cam operated proportional flow control valves capable of controlling smooth starts and stops, and capable of providing the entire amount of fluid required for smooth acceleration, deceleration, and operation of the jacking cylinders. Cam operated valves shall be as manufactured by Parker/Manatrol, Cleveland, OH; Bosch/Rexroth, Bethlehem, PA; ZATRAN, Elyria, OH; or approved equal.

The main spool of each valve shall be a metering control spool, spring loaded to the normally closed position. As the cam depresses the plunger, flow through the valve shall gradually increase in a linear manner to a full open condition. As the cam is withdrawn to allow the plunger to extend under spring loading, flow through the valves shall gradually decrease to a full closed condition. Engineering data, including a chart of flow characteristics at various plunger positions and pressures, shall be submitted for approval. Valve plungers shall be actuated by means of hydraulic actuators with wedge shaped rod end attachments to be used as cams, as shown on the plans.

Modular assemblies for subplate mounting of all these components shall be provided as shown on the plans to provide slow and fast speeds in sequence. These assemblies shall consist of subplate(s) for nominal Slow and Fast speeds, with cam operated flow control valves, hydraulic cylinder actuators with wedge shaped rod end cam attachments, and mechanical limit switches at the ends of stroke for both actuators. Protective covers of 10 gauge (min.) steel shall be furnished and bolted over the assembled components to protect them from damage, and to protect personnel from injury during operation. The assemblies may also include the solenoid operated directional control valves controlling the hydraulic cam actuating cylinders, and their adjustable flow controls.

The actuators and rod-attached cams, cam operated valves, and the limit switches for each speed shall be fully installed and aligned on the subplate(s) in the shop. The assemblies shall be fully tested in the shop to ensure proper operation. The positions of the cams and the limit switches shall also be field adjustable to the extent necessary to ensure full actuation and retraction of the cam operated valve, with electrical indication fully adjustable from both ends within the range of stroke.

One or two cam-operated valves may be used to provide the flow required within each nominal speed range, for both fast and slow speeds. Flow through the valves shall be fully reversible for raising and lowering the span at the required speeds. The valves shall have the operating stroke dimensions shown on the plans. Any changes required for the cam actuators, cams, limit switch arrangements, or any other components because of differences in capacity or stroke shall be made by the Contractor at no cost to the City.

B.16.2 Cam Actuating Cylinders

Double acting hydraulic cylinder actuators with special wedge-shaped rod end attachments shall be furnished and installed as part of the cam actuated valve assemblies for the control of the cam operated flow control valves. The actuators shall be aligned with the cam operated valves so that the cam operated valves open gradually to full flow from the closed position as the actuator extends, and close gradually from the open position to the closed-to-flow position as the actuator retracts.

Actuators shall be at least 1.5 in. diameter bore x 3 in. stroke, with rod diameter and all components suitable to withstand the cam loading to be applied. The rod diameter shall be limited so that the effective pressure area of the piston while retracting is at least 75% that of the pressure area when extending.

Actuator rods shall not rotate as the actuator rod extends or retracts, and shall have the capability to withstand side loading of the actuator rod as it extends while actuating the cam operated valve. Rod end attachments shall be specially machined to the dimensions shown on the plans for this purpose. The position of the cam attachments on the rod ends shall be adjustable by means of the threaded end of the rod and the use of a jam nut.

Cam Actuating Cylinders shall be as manufactured by Bosch/Rexroth Corporation, Bethlehem, PA; Air-Dro Cylinders, Decatur, AL; or approved equal.

B.16.3 Flow Control Valves

Adjustable flow control valves shall be furnished and installed in the locations shown on the plans. For the cam actuating cylinder control, the flow control characteristics shall be such that the slow speed cam actuator can be adjusted to extend over 0 to 5 seconds, and such that the full speed cam actuator can be adjusted to extend over a period of 0 to 5 seconds. In other locations, the adjustment shall range from zero to the full flow required in that portion of the circuit. Flow control valves shall be as manufactured by Bosch/Rexroth, Bethlehem, PA; Parker-Hannifin, Cleveland, OH; Dana/Weatherhead, Maumee, OH; or approved equal.

B.16.4 Shutoff Valves

Shutoff valves shall be furnished and installed in locations indicated on the hydraulic schematic. A red handle shall be furnished and installed at shutoff valves that should be kept normally in the closed to flow position. A green handle shall be furnished and installed at shutoff valves that should be kept normally in the open to flow position. If closing or opening a particular valve during operation of the span should not be permitted, in that it would be detrimental to the equipment or dangerous to personnel, the handle shall be furnished with a padlock and hasp to prevent adjustment of the valve without a key. Shutoff valves shall be as manufactured by Stauff, Waldwick, NJ; Bosch Rexroth, Bethlehem, PA; Dynaquip, Fenton, MO; or approved equal.

B.16.5 Electric Motors
Electric motors for both pumps on the main HPU shall be totally enclosed, squirrel cage AC motors suitable for pump operation. See the Specification for Electrical Equipment Cabinets for additional motor requirements.

B.16.6 Accumulator
A piston type accumulator of approximately 5 gallon capacity shall be furnished and installed at the HPU for the purpose of pre-pressurizing the hydraulic system prior to operation. Accumulator shall be as manufactured by Parker Hannifin, Cleveland, OH; Oil-Air Hydraulics, Houston, TX; or approved equal.

B.16.7 Accumulator Safety Block
An accumulator safety block for the purposes of de-pressurizing the hydraulic system between operations shall be furnished and installed in the location indicated by the hydraulic schematic. The purpose of this safety block is to ensure that the accumulator is fully discharged when not required between span operations. Accumulator safety block shall be as manufactured by Parker Hannifin, Cleveland, OH; Oil-Air Hydraulics, Houston, TX; or approved equal.

B.16.8 Check Valves
Check valves shall be furnished and installed in the locations indicated by the hydraulic schematic to provide free flow in one direction and prevent any flow of hydraulic fluid from occurring in the other direction. Check valves shall be as manufactured by Bosch/Rexroth, Bethlehem, PA; Dennison Hydraulics, Marysville, OH; Parker Hannifin, Cleveland, OH; or approved equal.

B.16.9 Relief Valves
Relief valves shall be furnished and installed where shown and as indicated to prevent excessive high pressure from occurring in the Bridge Hydraulic Systems. Pressure settings shall be adjustable. Relief valves shall be as manufactured by Bosch/Rexroth, Bethlehem, PA; Parker Hannifin, Cleveland, OH; or approved equal.

B.16.10 Shuttle valve
A shuttle valve shall be furnished and installed in the location indicated by the hydraulic schematic. It shall be located between two incoming lines, as indicated, and shall cause fluid flow and pressure to be transmitted into the outgoing line by the incoming line of the highest pressure. Shuttle valves shall be as manufactured by Bosch Rexroth, Bethlehem, PA; Parker-Hannifin, Cleveland, OH; or approved equal.

B.16.11 Solenoid operated directional valves
Solenoid operated directional control valves with manual over-ride features shall be furnished and installed in the locations indicated on the hydraulic schematic. They shall be of the required capacity to accommodate the flow and pressure requirements of the components downstream. Directional valves shall be as manufactured by Bosch/Rexroth, Bethlehem, PA; Parker Hannifin, Cleveland, OH; or approved equal.

B.16.12 Pressure switches
Bridge Hydraulic System pressure switches shall be furnished and installed in the locations indicated by the hydraulic schematic. The pressure switches shall be capable of indication and adjustment in the range of pressure required. Pressure switches shall be as manufactured by Allen-Bradley, Milwaukee, WI; Barksdale, Los Angeles, CA; Bosch/Rexroth, Bethlehem, PA; or approved equal.

B.16.13 Pressure gauges
Pressure gauges shall be furnished and installed in the locations indicated by the hydraulic schematic. All pressure gauges shall be rated for 3000 psi (min.) service, but shall indicate the required range of pressure reading. Faces of pressure gauges shall be of a clear flexible material not subject to cracking or fracture by impact. Pressure gauges shall be as manufactured by Parker Hannifin, Cleveland, OH; Bosch/Rexroth, Bethlehem, PA; No Shok, Cleveland, OH; or approved equal.

B.16.14 Temperature gauges
Temperature gauges to indicate the temperature of the hydraulic fluid shall be furnished and installed in accessible locations, easily viewed with respect to the configuration of the machinery room, on the reservoir of the hydraulic power unit. Temperature gauges shall be as manufactured by Parker Hannifin, Cleveland, OH; Vescor; or approved equal.

B.16.15 Temperature switches
Temperature switches shall be furnished and installed in the locations indicated by the hydraulic schematic. These shall indicate higher or lower than acceptable fluid temperatures by closing contacts to send a signal to the electrical system for indication and interlock. Temperature switches shall be as manufactured by ITT-Neodyne, Valencia, CA; or approved equal.

B.16.16 Level gauges
Level gauges to indicate the level of fluid in the reservoir shall be furnished and installed in accessible locations, easily viewed with respect to the configuration of the machinery room, on the reservoir of the hydraulic power unit. Level gauges shall be as manufactured by Parker-Hannifin, Cleveland, OH; Vescor, South Elgin, IL; or approved equal.

B.16.17 Level switches
Level switches to indicate acceptable and unacceptable levels in the hydraulic reservoir shall be furnished and installed in the reservoir of the hydraulic power unit. These shall indicate higher or lower than acceptable fluid levels by closing contacts to send a signal to the electrical system for indication and interlock. Level switches shall be as manufactured by Barksdale, Los Angeles, CA; GEMS Sensors, Plainville, CT; or approved equal.

B.16.18 Heat exchanger

If required, an air radiation-type heat exchanger of the capacity required to keep the oil in the reservoir under 140 degrees F. during times of frequent operation in hot weather shall be furnished and installed on the hydraulic power unit reservoir. The heat exchanger shall have the capability to dissipate the amount of heat generated by continuous operation of the main pump at maximum pressure, while discharging over the relief valve at its specified setting, for four hours in ambient temperatures of 100 degrees F. On this basis, the temperature of the oil shall never exceed 140 degrees F. when starting from a temperature 80 degrees F. Heat exchanger proposed shall be as manufactured by Hayden, Thermal Transfer Systems, Dallas, TX; or approved equal.

B.17 Hydraulic Jacking Cylinders.

B.17.1 General

The hydraulic jacking cylinders shall be of the single acting type, fed through the piston rod, as designed and manufactured by Bosch/Rexroth Corporation, Bethlehem, PA; Air-Dro Cylinders, Decatur, AL; or approved equal. Material for the hydraulic cylinder shall be a high strength carbon or alloy steel. Cylinder tubes which have been welded shall be stress relief heat treated and all welds shall be radiographed or magnetic particle tested, including those on the end mounts. Material for the piston rod shall be high strength carbon or alloy steel with a ceramic or nickel-chrome coating.

If used, the ceramic coating shall be a minimum of 150 micrometers (0.006 inch) thick, have a surface finish of 0.10-0.30 micrometers (4-12 microinches) rms, surface hardness of 67 Rc minimum, impact resistance of 7-15 Nm (5-11 lb-ft), modulus of elasticity of 360 to 415 GPa (52x106 - 60x106 psi), linear expansion coefficient of 7.2x10-6/degree C (4.0x10-6/degree F), and be capable of withstanding a fracture force of 280 MPa (41 ksi) minimum. Rings, bearings, packing, packing rings, retaining rings, seals, wiper-scrapers, etc., shall be fabricated from the finest selected quality materials as recommended by the manufacturer to provide zero leakage. Mounting and bracing, and rod end attachments shall be as shown on the plans. Connection pins shall be fabricated from ASTM A564 / A564M, Type 630, condition H-1150 stainless steel. The ceramic layer shall withstand at least 1000 hours of continuous salt spray testing according to ASTM B117.

A stainless steel drip edge with drain shall also be provided at the top of the cylinder to catch any leakage that may occur over time from the seals of the hydraulic jacking cylinder. A ¼ inch diameter conduit shall extend from the drain to an oil container of at least 5 gallons capacity to be furnished and installed at the base of each hydraulic jacking cylinder.

B.17.2 Material Strengths

Hydraulic cylinders for operation and holding of the span shall meet the minimum material strength requirements defined herein. Higher strength materials shall be provided as required to meet the design requirements depending on the manufacturer's design, detailing, and construction methods.

Hydraulic cylinders for span operation shall be of the single-acting, heavy duty mill type as shown on the plans. The working pressure rating of the cylinders shall be 3,000 psi. Cylinders shall have a minimum NFPA theoretical static failure as required by AASHTO. Cylinders shall have minimum bore, stroke, and rod diameter as indicated in the plans. Cylinder ports shall be SAE standard sized as shown in the plans. Cylinder head shall be bolted to the body flange.

B.17.3 Cylinder Mounts

Cylinders shall be designed and manufactured for mounting as shown in the plans. Cylinder mounts permanently attached to the cylinder and all associated bearings and hardware shall be supplied by the cylinder manufacturer and shall be included in the cylinder shop drawing for review by the Engineer.

B.17.4 Rod Ends

Rod ends shall be fabricated from steel, cast or structural, as required to meet the design application strength and geometry. Cast steel shall be ASTM A27 or ASTM A148, grade as required, or equal. Structural steel shall be ASTM A709 or ASTM A579, grade as required or similar. Mechanical property certification shall be provided for steel used for rod ends. Design calculations verifying strength in accordance with the design Specifications shall be provided with the shop drawings. Weldments shall be per this Specification. Rod ends shall be per plan details and shall be designed and fabricated for easy field removal of hydraulic fluid piping to allow for disconnecting a cylinder from the span to remove it from service.

B.17.5 Cylinder Tube

Cylinder tube shall be machined from ASTM A519, grade as required for rated pressure, heavy wall seamless steel tubing, and shall have the bore honed to 16 micro-inches rms surface finish or better. Cylinder body ends shall be chamfered or tapered to facilitate manufacturing. Body flanges shall be welded to the tube. Welding shall be in accordance with applicable ASME Section IX, boiler and pressure vessel codes. Weld procedures and filler materials shall be submitted for review with the cylinder shop drawings.

B.17.6 Cylinder Heads

Cylinder heads and caps shall be fabricated from ASTM A576, grade 1018, steel bar stock or equivalent and machine finished on all surfaces. The cylinder head shall be equipped with rod seal and external dirt wiper, and shall have rod bushings piloted into the head to ensure concentricity. Except as otherwise noted in the plans, cylinder heads shall be bolted to the body tube with through bolts, double nutted. Bolts shall be grade 8 minimum with grade 2H nuts.

B.17.7 Pistons

Pistons shall be precision fitted to the cylinder body bore. Pistons shall be of a steel core with SAE 62 bronze coating 1/16” thick and shall be equipped with multiple lip-type seals. The design shall protect piston seals from blow-out and over-squeeze. Pistons shall be positively secured to the piston rod by threading onto the rod and secured by set

screws. Piston bearing and packing sealing surfaces shall have a 32 micro-inch rms finish.

B.17.8 Piston Rods

Piston rods shall be made of medium carbon steel of yield strengths of 55 to 70 ksi high tensile strength using ASTM A108, grade 1045 or equivalent. Rods shall be case hardened, polished to 8 micro-inch rms surface finish or better, and ceramic coated. Ceramic material thickness shall be 150-350 micron. Piston rods shall be constructed to provide a minimum factor of safety of 3 against buckling. Factors of safety shall be based upon a maximum working pressure of 2,000 psi and shall account for mounting conditions and self-weight or load induced bending and axial loads. Data and calculations regarding buckling shall be submitted to the engineer for review. Certified testing of each rod shall be performed. Tests shall indicate ceramic material thickness throughout the entire length of rod at intervals not to exceed 12". Test results shall be neatly tabulated and submitted to the Engineer for review.

B.17.9 Cylinder Pressure Rating

The manufacturer shall submit certification that each cylinder was hydrostatically tested to 4,500 psi with no evidence of leaking and that all dynamic seals are suitable for both frequent and infrequent operation and are capable of not less than 500,000 cycles of operation without failure.

B.17.10 Rod Seals

Rod seals shall be a standard seal system for the manufacturer selected, but shall be at least equivalent to the sealing provided by a double chevron seal. A hard polyester (hallite 38 or equal) scraper shall be provided. Rod seals and scraper shall be designed so that replacement can be performed in the field without disassembly of the cylinder. A leakage detection port with bladder shall detect if a leak in the rod seal has occurred. Rod seals shall be compatible with the hydraulic fluid.

B.17.11 Cylinder and Rod End Ports

Cylinder and rod end ports shall be SAE O-ring or SAE four bolt code 62 flange connections. Two main fluid pressure ports shall be provided for each unit, including a port at the end of the axially bored cylinder rod and a port of the same size at the bottom of the cylinder. The port at the end of the rod shall be used for installation of the hydraulic piping from the HPU. The second port at the bottom of the cylinder shall be available for connection in the future, and shall also be available for use to drain oil from the cylinder. Each cylinder shall also incorporate a hydraulic pressure sensing port at the lower end of the cylinder for measurement of hydraulic pressure on each side of the hydraulic piston. The pressure testing port shall be compatible with standard threads supplied on a common transducer for this application and shall be fitted with a suitable sealed plug. Port location shall be such that sensor(s) may be easily installed. Bleed ports with suitable plugs shall also be provided at each end of the cylinder. Leakage detection at the rod seals shall also be provided by a detection port and bladder.

B.17.12 Cylinder Control Module

A cylinder control module (manifold) shall be rigidly plumbed with Type 304 or Type 316 stainless steel tubing and fastened to each main drive cylinder jack. Details of the method of attachment shall be submitted to the Engineer for review and approval. Brackets, hardware, and fasteners shall be Type 316 stainless steel. This module shall include the pressure switches, solenoid valves, gauges, and other features shown in the proximity of each cylinder jack on the schematic, and shall positively lock the cylinders in any position even in the event of a fluid line failure by means of a solenoid valve. The hydraulic cylinders shall automatically close to provide instant braking and holding capability for the lift span should pressure be lost in the hydraulic piping system, and shall be capable of holding the lift span in any raised position for at least 4 hours without movement after the hydraulic power unit is turned off. This module shall provide the relief function through the action of the electrical system should pressure remain or build up in the cylinders between operations. Means for emergency manual lowering of the bridge shall be provided as shown in the plans. The manual operators shall be color-coded and be referenced by a placard located in the area describing emergency lowering procedures.

B.18 Hydraulic Cylinder Supports and Attachments

Hydraulic cylinder supports and attachments shall be suitable for the new cylinders, the required piping, and the mounting and function of the cylinders and piping within the pier, as shown on the plans and defined herein. Supply all rod end attachments, support components, brackets, shims, pins, hardware, bearings, shrouds, grout, and anchor bolts as required. This work shall include surface preparation and leveling, installation and alignment.

The Contractor shall submit shop drawings of all fabricated components of the hydraulic cylinder supports to the Engineer for review prior to fabrication, together with complete assembly and installation drawings.

B.19 Hydraulic Fluid

All hydraulic fluid required for testing, storage, and to flush and install the system in working order shall be provided. The hydraulic fluid shall be Benz Oil Flomite 530, the same as that now used by the City in operating systems at other bridges, unless otherwise approved by the City. The selected hydraulic oil shall be in accordance to the hydraulic supplier requirements and oil specification data shall be submitted to the Engineer for approval. All components, seals, etc., shall be compatible with the approved fluid.

B.20 Filtration and Oil Sampling

The hydraulic system shall be fitted with filtration suited for the application.

The system shall be fitted with full flow pressure and return filtration. The pressure filters shall be sub-plate mounted to the main control manifold. The return filter shall be tank top mounted. Each filter shall have a bypass and a local visual indicators as well as electrical contacts as shown on the plans. The replacement filter elements shall be of quality construction with a 10 micron rating of beta 10>100 or better.

A drain valve shall be provided at the bottom of the HPU reservoir as shown on the hydraulic schematic. Fluid sampling shall be performed by the Contractor, and fluid shall be tested by a qualified testing service prior to acceptance of the structure. Testing shall include oil quality including analysis for levels of contamination. Wear particle detection shall include both metallic and non-metallic particles, including the detection and analysis of hydraulic hose particles. The oil shall also be analyzed for the presence of contaminating liquids such as water. Fluid testing shall be done both at the hydraulic power unit and at or near a hydraulic cylinder jack on the west pier.

Two oil testing services with the capabilities outlined above shall be identified by the hydraulic supplier. This information, together with recommendations and quotations for periodic sampling and testing, shall be furnished to the City prior to acceptance.

B.21 Seals

The seals for hydraulic components shall be Viton unless otherwise noted, suitable for the hydraulic fluid supplied.

B.22 Plumbing and Fittings

All hydraulic plumbing shall conform to current Bridge Hydraulic System standards as required by the AASHTO Specifications. Unless otherwise specified, rigid plumbing shall be seamless ASTM A269, Grade TP304 annealed stainless steel tube and ASTM A312 - Grades TP304 or TP316 stainless steel pipe as applicable. Fittings shall be SAE four bolt socket weld O-ring flange, 37° flare, or 37° O-ring seal. Threaded connections shall be SAE straight threads wherever possible. All piping located over the river shall be fully welded without bolted connections. All fittings shall be Type 316 series stainless steel. The use of hydraulic clamps is mandatory. All clamp fasteners, plates, and brackets shall be Type 316 series stainless steel. The Contractor shall follow clamp manufacturer's specifications for spacing and installation.

Tubing and pipe shall be sized to provide a minimum factor of safety of four based on burst pressure. Factors of safety shall be based on the maximum working pressure as defined by AASHTO. Fluid velocity in piping and hoses shall not exceed 20 FPS for pressure lines, 13 FPS for return lines and 4 FPS for suction lines. In addition, fluid lines shall be no smaller than those shown on the plans for any particular location.

Fluid lines on the hydraulic power unit, in the control house, and from the control house to the hose in the flexible enclosure on the west pier shall be annealed stainless steel tubing. Fluid lines beyond the hose in the flexible enclosure shall be stainless steel pipe.

The Contractor shall add to the Bridge Hydraulic System fluid lines in strategic locations any required ports or connection points deemed necessary to completely flush the system after assembly. The location of these ports and connection points shall be in accord with the Contractor's submitted plan of flushing, as approved by the Engineer. Such connection points and ports, together with all required components, shall be considered incidental.

B.23 Hydraulic Pipe and Tube Supports
Hydraulic pipe and tube supports shall be a strut mounted cushion clamp system. All clamps, fasteners, and channels shall be hot dip zinc-coated and painted or shall be Type 316 series stainless steel.

B.24 Hydraulic Hose Assemblies
Flexible hose shall be of the proper SAE rating, consistent with the working pressure encountered and having the working and burst pressures required by AASHTO. Hydraulic hose assemblies shall be provided between the east pier and the lift span in the location shown indicated on the plans. Additional use of flexible hose shall include: suction, drain, bypass, and pressure lines connecting all pumps to the system field plumbing. All hose assemblies shall be assembled with a proper sealant of high quality. Hose ends shall be FJICS 300 series stainless steel. Hose guards constructed of steel wire and plated to resist rust shall be used to protect and prolong the life of the flexible hose lines from abrasion, deep cuts, distributes bending radii, and kinking.

B.25 Hardware and Fasteners
All fasteners bolts, nuts, washers, and all other mounting hardware used on all the hydraulic equipment and power units shall be Type 316 stainless steel unless otherwise noted.

B.26 Undercut Anchors
Where specified in the plans, and as required due to replacement, cylinder supports shall be anchored to the concrete using undercut anchor bolts. The undercut anchors shall be of the length and diameter as indicated on the plans. The undercut anchor shall resist applied loads through bearing on the surface of the conical portion of the drilled hole. Wedge or sleeve anchors that rely on friction to resist applied loads will not be permitted.

Undercut anchors shall be hydraulically tensioned.

Unless otherwise specified, the undercut anchors shall be fabricated from the following materials:

Bolts	ASTM A193M Grade B7
Sleeves	ASTM A513 Type 5
Conical Nuts	ASTM A193M Grade B7
Heavy Hex Nuts	ASTM A194M Grade 2H
Washers	ASTM F436

All anchor components shall be zinc plated in accordance with Federal Specification QQ-Z-325C.

All installation equipment including drills, drill bits, undercutting tools, tolerance gauges, and tensioning devices shall conform with the manufacturer's recommendations. The

Contractor shall submit his proposed list of equipment and installation methods to the Engineer for review.

The Contractor shall install the undercut anchors in compliance with the manufacturer's recommendations. The Contractor shall employ at least one person with demonstrated experience in setting undercut anchors and shall arrange to have a qualified representative from the manufacturer on site to supervise the installation.

The sleeve shall be removed after the anchor is set and the void around the bolt shall be injected with an epoxy grout. Material and grouting methods shall be per the anchor manufacturer's recommendations.

Each undercut anchor shall be tested to the maximum listed allowable load as verification of proper installation. Contractor shall test bolts by using hydraulic jacks, recording the pressure and converting the pressure to pounds.

B.27 Epoxy Leveling Grout

Epoxy leveling compound shall be a two component, pourable epoxy based grouting compound for severe applications. Epoxy leveling grout shall be manufactured for use in a thickness range of ½" to 1-1/2".

Epoxy leveling grout shall have the following minimum properties:

Compressive Modulus of Elasticity:	1640 kips, ASTM C109
Maximum Compressive Strength:	19 ksi, ASTM C109
Fire resistance:	Self-extinguishing, ASTM D635
Maximum Izod Impact Strength:	3.4 in.lbs./in., ASTM D256
Maximum Linear Shrinkage:	0.0001 in./in., ASTM D2566
Maximum Tensile Strength:	2 ksi, ASTM D638
Max. Coefficient of Linear Expansion:	32°F-140°F, 15.4x10-6 /°F, ASTM D696

Grout shall be stored, mixed, placed, and finished in strict accordance with the manufacturer's recommendations.

B.28 Spare Parts

The Contractor shall furnish the following spare parts:

1	Set of plugs for each actuator to seal off all ports.
1	Set of plugs for power unit to seal off check valves should pumps be removed from service.
2	Seal kits for hydraulic cylinders jacks.
2	Seal kits of each type and size for all other hydraulic components
1 each	High pressure hose assembly with fittings for each type of hose furnished and installed.
4	Pressure gages with hose and fittings for reading pressure in main drive actuators.

4 each Replacement elements for all filters and breathers.
2 Button-head Fittings for cylinders.

Spare parts shall be labeled and organized in such a manner that each spare can be readily identified and associated with the specific hydraulic component for which it is required. Spare parts shall be so placed in a steel cabinet with a padlocked door to be provided by the Contractor and installed in the operator house as directed by the Engineer.

B.29 Speed and Directional Control

B.29.1 General

The speed control of the Bridge Hydraulic System for the lift span shall be provided by mechanically actuated proportional flow valves used together with two fixed displacement pumps. The mechanical actuation of these proportional flow valves shall be by means of small actuating cylinders, controlled by solenoid actuated directional valves. There shall be an electrical panel on the HPU where the hydraulics shall interface with the bridge control system by means of dry contact inputs and outputs. See plans for hydraulic control schematic detail and HPU layout.

B.29.2 Control Theory - Normal Operation

The following is a brief description of operator actions and automatic interlocking during operation with regard to the Bridge Hydraulic System only. Other interlocks with regard to traffic control and sequence prior to operation, as well as more detail regarding the following, are part of the electrical design.

1. Both Motors (1)[M1 and M2] are selected. Upon turning on the Motors (1), Pumps (3) will produce nominal pressure and flow over Solenoid Valve (14)[SV1] which is energized to divert flow back to Tank (42) prior to raising the lift span.

2. Operator has the option to move joystick controller to “RAISE-SLOW” or “RAISE FAST” at will during raising, and to “LOWER-FAST” or “LOWER-SLOW” on the same basis during lowering to control the speed manually, or to stop the span at any time by moving the joystick controller to “STOP”. The pump motors will run when raising the span, and when the joystick is in the neutral position. The pump motors will shut down during lowering of the span, allowing the span to lower by gravity.

    a. Such actions will cause the SOLENOID VALVES (18) [SV3 and SV4] to act in sequence by means of limit switches contacted by the ACCEL/DECEL ACTUATORS (34) at the ends of their strokes.

        (1) When raising or lowering, the selection of “RAISE-“ or “LOWER-FAST” shall initially cause SLOW SPEED SOLENOID VALVE (18) [SV3] to energize, causing the SLOW SPEED ACCEL / DECEL ACTUATOR (34) to extend over a 5 second period (subject to hydraulic adjustment by means of SLOW SPEED FLOW CONTROL VALVE (35)). When the SLOW SPEED ACCEL / DECEL ACTUATOR (34) is fully extended, thereby having accelerated the span to approximately 1/2 of full speed, a LIMIT SWITCH

[LS-3E] shall be contacted that will allow FAST SPEED SOLENOID VALVE (18) [SV4] to be energized. Provided the span has traveled beyond the Nearly Closed position, and has not attained the Nearly Open position (or vice-versa when lowering), this shall cause the FAST SPEED ACCEL / DECEL ACTUATOR (34) to extend, bringing the span to full speed over a 5 second period (again subject to hydraulic adjustment, by means of FAST FLOW CONTROL VALVE (35))

(2) Moving the joystick controller to "RAISE-" or "LOWER-SLOW" from "RAISE-" or "LOWER-FAST" shall cause FAST SPEED SOLENOID VALVE (18) [SV4] to de-energize. This shall cause the FAST SPEED ACCCEL / DECEL ACTUATOR (34) to retract, bringing the span back to approximately 1/2 of full speed over a 5 second period (hydraulically adjustable, as described above).

(3) Moving the joystick controller to "STOP" from "RAISE-" or "LOWER-FAST" shall initially cause FAST SPEED SOLENOID VALVE (18) [SV4] to de-energize. This shall cause the FAST SPEED ACCEL / DECEL ACTUATOR (34) to retract, bringing the span back to approximately 1/2 of full speed over a 5 second period (hydraulically adjustable, as described above). At this point, LIMIT SWITCH [LS-4R] shall be contacted to allow SLOW SPEED SOLENOID VALVE (18) [SV3] to de-energize, causing SLOW SPEED ACCEL / DECEL ACTUATOR to retract over a 5 second (hydraulically adjustable) period, bringing the span to a smooth stop. LIMIT SWITCH [LS-3R] shall be contacted at the fully retracted position of the SLOW SPEED ACCEL / DECEL ACTUATOR.

b. Random movements of the joystick controller by the operator, crossing "STOP" from a "RAISE" speed position to a "LOWER" speed position (or vice versa), without allowing the span to come to a full stop, should be prohibited. However, if such actions by the operator are performed, the following shall occur:

(1) Moving joystick controller from a "-FAST" position in one direction, to "-SLOW" or "-FAST" position in the opposite direction, shall initially cause FAST SPEED SOLENOID VALVE (18) [SV 4] to de-energize, but shall also cause the pump to immediately shut down causing the span to rapidly reverse direction. The Emergency Stop switch only should be used if an emergency stop is required. Otherwise, a normal stop should be used. This will cause the FAST SPEED ACCEL / DECEL ACTUATOR (34) to retract, bringing the span back to approximately ¼ of full speed over a 7 second period (hydraulically adjustable, as described above). At this point, LIMIT SWITCH [LS-4R] shall be contacted to allow SLOW SPEED SOLENOID VALVE (18) [SV 3] to de-energize, causing SLOW SPEED ACCEL / DECEL ACTUATOR (34) to retract over a 3 second (hydraulically adjustable) period, bringing the span to a smooth stop. LIMIT SWITCH [LS-3R] shall be

contacted at the fully retracted position of the SLOW SPEED ACCEL / DECEL ACTUATOR (34).

c. Random movements of the pump (drive) selector switch between ”BOTH” and ”PUMP A” or “BOTH” and “PUMP B” during operation should also be prohibited. However, if these operator actions are performed, it is anticipated that operation will cease momentarily prior to any operation of the pump (drive) newly selected.

3. Power failure during operation shall cause all motors to cease operation and all solenoid valves to de-energize momentarily prior to secondary power source being accessed, provided any delay occurs in the automatic transfer switch.

4. The “EMERGENCY STOP” push button can be used to cease all operation by de-energizing all SOLENOID VALVES and MOTORS. This shall effectively cause the span to stop while the Bridge Hydraulic System depressurizes.

5. If hydraulic pressure is lost in the Bridge Hydraulic System at any point during raising or lowering, as indicated by PRESSURE SWITCH (22) [PS2], all SOLENOID VALVES and MOTORS shall de-energize in the same manner as would occur during an emergency stop.

6. During periods of inactivity, during which the Bridge Hydraulic System remains idle, PRESSURE SWITCHES (22)[PS 14, 24] shall remain energized to detect excess pressure in the JACKING CYLINDERS (23). If a pressure build-up is detected at the JACKING CYLINDERS (23) during an idle period when the span is fully closed, SOLENOID VALVE (24)[SV 14, 24] shall open momentarily to allow the excess pressure to be removed from the JACKING CYLINDERS (23). This feature shall be de-activated during bridge operation and when the span is in any raised position.

B.29.3 Control Theory - Emergency Operation

The description of operator actions and automatic interlocking during operation with regard to the Bridge Hydraulic System is identical to that for Normal Operation, except that only one Motor (1)[M1 or M2] and Pump (3) are used to raise the span. Interlocks with regard to traffic control and sequence prior to operation, as well as more detail regarding the following, remain part of the electrical design.

C Construction

C.1 General

Installation, start-up, piping and flushing shall be done by an NFPA Certified Fluid Power Technician with prior experience on similar sized systems. Submit back-up information on technician showing prior experience to the Engineer for review and approval.

The Contractor shall be totally responsible for the coordination of the various subcontractors for this project and specifically the coordination of the mechanical,

hydraulic, and electrical work in order to assure proper fit up and operation of the various components of the mechanical, hydraulic, and electrical systems. The Contractor shall also be responsible for the shop adjustment and for fine adjustment in the field at the time of start-up.

C.2 Electrical Requirements

All hydraulic equipment shall be wired and connected to the electrical system under ELECTRICAL CONTROL EQUIPMENT unless otherwise noted. The HPU electrical panel shall be installed in the lowest floor of the operator house near the hydraulic power unit as directed by the engineer.

C.3 Hydraulic Cylinder Supports, Bracing, and Attachments

Base plates and bracing shall be set such that the cylinders are within 0.050" of the dimensions shown in the plans, both vertical and horizontal in the longitudinal and transverse directions.

All cylinder support component alignments shall be verified by use of laser level or other approved method prior to final mounting of cylinder support components.

Supply all temporary templates, leveling screws, blocking, jacking screws, etc., as required to locate and install cylinder bracing and brackets.

Cylinder supports shall be painted in accordance with the requirements for painting of structural steel.

C.4 Flushing

Using the Contractor's approved plan for flushing the Bridge Hydraulic System after installation, the Contractor shall ensure that all portions of the Bridge Hydraulic System are completely flushed in accord with the following.

The hydraulic fluid shall be used to flush the lines through pressure and return filters to remove any foreign particles from the hydraulic power unit and from the hydraulic lines installed on the approach span. Temporary return hoses, previously flushed with filtered fluid individually, shall be used to connect between various portions of the system and the reservoir while the remainder of the system is isolated. Circulate fluid for at least one hour while consistently monitoring filter-clogging indicators. Repeat one hour flushing procedure for each remaining portion of the Bridge Hydraulic System. Replace filters after flushing is completed.

In portions of the Bridge Hydraulic System that the Contractor deems not practical for flushing using the hydraulic power unit, in accord with the Contractor's approved plan, a portable pump and filtration unit together with any other required equipment, provided by the Contractor, shall be used to accomplish total flushing. The portable filtration unit assembly shall include pressure and return filters of the same filtration capability characteristics as those used in the hydraulic power unit. The portable filtration unit, if necessary, shall become the property of the City at the end of the Contract.

Initial system filling and flushing should be done through a 5 micron filter with an efficiency rating of beta 10<50. Flushing should be done only when atmospheric particles are at a minimum (no current or recent sandblasting or painting). Check reservoir condition through clean-out covers. All surfaces should be clean of dirt, rust or moisture. Once the reservoir has been determined to be clean, charge the reservoir with the proper fluid for final use in the system. Replace return filter once reservoir is filled for final use. Spares shall not be used as replacements.

C.5 Inspection, Testing, and Final Acceptance

C.5.1 General

Fabrication of the hydraulic power units, cylinders and control panel shall be done in a qualified shop. The City will send an inspector to the shop for verification of compliance and witnessing of shop testing prior to shipment of any equipment to the field. Prior to testing, the Contractor shall notify the Engineer three (3) weeks in advance for the ability to witness the components during testing. No testing shall be performed without the presence of the Engineer or Engineer's representative unless the Contractor has been otherwise directed, in writing, by the Engineer.

Shop testing shall be required of the HPU, cylinders, and HPU terminal panel. The procedure shall be comprehensive and shall test the HPU for functionality at full power under simulated loads and load changes and shall incorporate the assembled HPU panel. Each cylinder shall be tested through 50 cycles while under a simulated maximum load for the full stroke of the cylinder. This test procedure shall be submitted to the Engineer for review.

All malfunctions shall be recorded and corrected and re-tested before release from the manufacturer's shop. After each cylinder and HPU, including the HPU panel, have passed the test a Certificate of Compliance shall be submitted with the test reports to the Engineer for review.

In the event the Contractor should propose an alternate design which deviates from the designs shown in the plans, it shall become the responsibility of the Contractor to provide sufficient back-up data and working examples to demonstrate the functionality of the design. These working examples shall be of large dynamic structures similar in concept to a vertical lift bridge. This data shall be compiled and neatly organized and submitted to the Engineer along with the proposed hydraulic drive system for review. No material submitted shall relieve the Contractor from performing the hydraulic power unit testing as required of this Specification.

When testing the HPU, the assembled HPU control panel shall be present and interfaced to the HPU to provide required signals for control.

C.5.2 Shop Testing

Additional requirements for shop testing are as follows:

1. Hydraulic Power Unit Testing
   a. Full flow pump testing
   b. Pressure test to 1.5 times the maximum specified working pressure (1.5 times the main relief valve setting).
   c. No visible external leakage permitted.
   d. Electric motor performance at various pressure levels.
   e. Verify limit / pressure switch and warning functions at the HPU panel.

2. Cylinder Testing
   a. Pressure tested to 4,500 psi each direction. The use of compressed air to retract at end of test is not allowed.
   b. No visible external leakage permitted.
   c. Verify manifold operation and manual release of solenoid valves.

In addition to the above requirements, the Contractor shall complete two checklists, one for the cylinder manifold assembly shop test report and one for the HPU shop test report. The following information shall be provided in the report:

1. Cylinder Manifold Assembly
   a. Is block free of chips and dirt?
   b. Are all customer's connections per drawing?
   c. Do components agree with parts list?
   d. Are all labels affixed?
   e. Are all bolts properly torqued?
   f. Is manifold complete per assembly drawing and parts list?

2. Cylinder Manifold Test
   a. What type of fluid used to test manifold?
   b. Flow tested at manifold
   c. Pressure tested at manifold
   d. Are components adjusted according to schematic?
   e. Do labels agree with schematic?
   f. Is external leakage zero?
   g. Does manifold function according to schematic?

3. HPU Assembly
   a. Visually check reservoir inside (Free from moisture, rust, slag or chips)
   b. Are pipes routed correctly?
   c. Electric Motor requirements (Model, Make, Type, Voltage, Amps, RPM, Hz, Frame, Service Factor, and Class)
   d. Are fittings correct and per the parts lists?
   e. Are all down pipes in reservoir clean?
   f. Do components agree with parts list?
   g. Is power unit built according to the contract drawings and approved shop drawings?
   h. Do connections agree with schematic and arrangement drawings?

i. Does piping agree with schematic requirements?
j. Are filters accessible for changing?
k. Are manual overrides accessible?
l. Are direction of rotation arrows in place and correct?
m. Does unit have required labeling affixed?
n. Has correct fluid been supplied?
o. Fluid installed using required pre-filtration?

4. HPU Assembly Test
   a. Does reservoir leak? Check seams and welds.
   b. Test electronics on unit (Temp, Level, etc.)
   c. Pump settings (Pressure and Flow)
   d. Voltage and amperage of motors while running.
   e. Are components set properly and according to the schematic and shop drawings?
   f. Are all fittings and flanges tight?

During placement of any of the new Bridge Hydraulic System in operation, the Bridge Hydraulic System Supplier and Installer shall be on site to inspect the installation of the hydraulic system to ensure it is installed to the supplier's requirements and tolerances. The Bridge Hydraulic System Supplier and Installer shall furnish a letter to the Engineer after the inspection certifying that the installation is acceptable and in conformance to the requirements of the Bridge Hydraulic System Supplier and Installer.

The City shall be notified to have a representative present during field testing of the main drive system.

C.5.3 Field Testing

Field test requirements shall demonstrate full operation of the system under all potential conditions including the following:

1. After all components (tubing, valves, etc.) of the fluid system have been physically torqued and inspected, obtain power source for the motors.
2. All pressure relief valves and pressure switch settings which were not verified as part of the HPU testing in the shop shall be verified by testing that shall be recorded in the field.
3. Cylinders shall be tested for pressure being exerted during operation, and for any leakage.
4. Using the HPU control panel, fully open, close, and seat span. During this time, adjust flow control valves (35) to obtain correct speeds and ramps from Accel / Decel Valves (16) and (19).
5. After several operations of step 4, check all areas for leaks, fluid temperature, and motor current drain. Connect all control wiring for console system test.
6. Repeat using auxiliary mode and emergency power.
7. Demonstrate all interlocks, emergency stopping indications, etc.

After system start-up is complete and unit is properly adjusted, the Contractor shall draw an oil sample from the reservoir using accepted NFPA techniques and equipment. This sample shall be analyzed for particle content by a qualified laboratory. The report shall be forwarded, in shop drawing format, to the Engineer for review and approval. Cleanliness level shall be 18/14 based on ISO DIN 4406 Standards. If this level is not achieved, the Contractor shall be responsible to clean oil until proper cleanliness level is verified through re-sampling of the fluid.

The Contractor shall operate the bridge ten (10) times consecutively both on the main drive and on the auxiliary drive system, without problems, prior to final acceptance.

D Measurement

The City will measure Bridge Hydraulic System, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item.

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.07	Bridge Hydraulic System	LS

The lump sum price bid Bridge Hydraulic System shall include the cost of furnishing all labor, material, equipment and any incidentals required to complete the work which includes furnishing and installing the new cylinders and brackets, HPU, valves, manifolds, piping, bolts, lubrication fittings and lubricants, shims, supports and any incidentals required to properly execute and place in complete working order the bridge hydraulic system in accordance with the plans, Specifications, and Special Provisions.

Payment for furnishing electrical work associated with the bridge hydraulic system including wiring to motors, pumps, valves, and switches is not part of this item, but is paid for elsewhere in the Special Provisions.

42. Bridge Operator’s House, Item SPV.0105.08

A Description

Furnish all labor, material and tools required for the satisfactory completion of renovations to the bridge operator's house and cleaning masonry at three planters at the Pleasant Street Lift Bridge in accordance with the drawings and as set forth in these specifications.

Included are the following:

1. Cleaning masonry at bridge operator’s house and planters
2. Joint sealants
3. Hollow metal doors and frames
4. Door hardware

5. Trim Bead
6. Painting

The following are specified elsewhere and not included in this bid item:
Tuck pointing
Replace copper gutter and flashing

B Materials
B.1 Cleaning Masonry at Bridge Operator's House and Planters
B.1.1 Submittals
Product Data: For each type of product indicated.

B.1.2 Quality Assurance
Restoration Specialist Qualifications: Engage an experienced masonry restoration and cleaning firm to perform masonry cleaning. Firm shall have completed work similar in material, design, and extent to that indicated for this project with a record of successful in-service performance.

Cleaning and Repair Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from 50 feet away by the engineer. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

Test Panels: Prepare test panel, approximately 2 x 2 feet, to demonstrate aesthetic effects and set quality standards for materials and execution.

B.1.3 Cleaning Materials
Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

B.2 Joint Sealants
B.2.1 Summary
Silicone joint sealants for re-sealing joints between windows and masonry.

B.2.2 Preconstruction Field-Adhesion Testing
Before installing sealants, field test their adhesion to project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C1521.

B.2.3 Submittals
Product Data: For each joint-sealant product indicated.

Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for product indicated.

Preconstruction field-adhesion test reports.

B.2.4 Warranty
Special Installer's Warranty: Standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

Warranty Period: Two years from date of substantial completion.

B.2.5 Silicone Joint Sealants
Field-Tintable Silicone Sealant: Multi-component, neutral cure, medium modulus (+/ 50%); ASTM C920.

Grade NS,
Class 50,
Uses Related to Exposure: NT, G, A, M, O.

Color: Match window frames.

Products:

Pecora 890FT
Tremco Spectrem 4-TS

B.2.6 Joint Sealant Backing
Cylindrical Sealant Backings: ASTM C1330, of type recommended in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

B.2.7 Miscellaneous Materials
Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

B.3 Hollow Metal Doors and Frames

B.3.1 Summary

Replace existing hollow metal door and frame where indicated with new door as herein specified.

B.3.2 Definitions

Minimum Thickness: Minimum thickness of base metal without coatings.

B.3.3 Submittals

Product Data: Include construction details, material descriptions, core descriptions, and finishes.

Shop Drawings:

Details of doors, including vertical and horizontal edge details and metal thicknesses.

Frame details, including dimensioned profiles and metal thicknesses.

Locations of reinforcement and preparations for hardware.

Details of anchorages.

B.3.4 Delivery, Storage, and Handling

Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and project-site storage. Use vented plastic.

Deliver frame with two removable spreader bars across bottom of frames tack welded to jambs.

Store hollow metal work under cover at project site.

B.3.5 Field Measurements

Verify actual dimensions of openings by field measurements before fabrication.

B.3.6 Manufacturers

Subject to compliance with requirements, provide products by one of the following:

Amweld Building Products, LLC.
Ceco Door Products; an Assa Abloy Group company.
Curries Company; an Assa Abloy Group company.
Kewanee Corporation (The).
LaForce.
Steelcraft; an Ingersoll-Rand company.

B.3.7 Materials
Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum A40 (ZF120) metallic coating.

Inserts, Bolts, and Fasteners: Hot-dip zinc-coated according to ASTM A153/A153M.

Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

Shop Primer: Manufacturer's standard, fast-curing, lead-free and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

B.3.8 Hollow Metal Doors
Comply with ANSI A250.8, except as modified below.

Design: Flush panel.

Thickness: 1-3/4 inches

Face Sheets: Fabricated from metallic-coated steel sheet. Comply with requirements indicated below by reference to ANSI A250.8 for level and model and ANSI A250.4 for physical-performance level:

> Level 3 and Physical Performance Level A (Extra Heavy Duty, 0.053 inch thick (16 gauge) face sheets), Model 1 (Full Flush).

Core: Polyurethane; provide doors fabricated with thermal-resistance value (R-value) of not less than 14.5 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

B.3.9 Hollow Metal Frames
Comply with ANSI A250.8 and with details indicated for type and profile.

Fabricate from 0.067 inch thick (14 gauge) metallic-coated steel sheet, with mitered or coped and full profile welded corners with seamless face joints.

Form door stops integral with frames, minimum 5/8 inch high.

B.3.10 Hardware Reinforcement
Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets and door frames.

Hinges: Minimum 0.123 inch (10 gauge), thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.

Lock Face, Closers and Other Surface-Mounted Hardware: Minimum 0.067 inch thick (14 gauge).

Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

B.3.11 Frame Anchors
Jamb Anchors: Minimum 3/8 inch diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

Floor Anchors: Clip-type anchors, with two holes to receive fasteners, formed from same material as frames, not less than 0.042 inch thick (18 gage).

B.3.12 Fabrication
Fabricate hollow metal work rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.

Fabricate hollow metal work to tolerances indicated in SDI 117.

Doors: Provide weep-hole openings in bottom of doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

Weld floor anchors to bottom of jambs with at least four spot welds per anchor.

Locate jamb anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the templates furnished as specified in "Door Hardware" paragraph.

Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115

Series specifications for preparation of hollow metal work for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

B.3.13 Finishes

Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A780.

Priming: Apply shop primer immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils. Prime all surfaces of door and frame including inside of frame and bottom of door.

B.4 Door Hardware

B.4.1 Summary

Provide finish hardware as indicated for new door and replacement lockset for existing door.

Package and label each hardware item separately with all screws, bolts and accessories required for a complete installation.

B.4.2 Submittals

Product Data: Catalog cuts and descriptive data of each product indicated.

Shop Drawings: Wiring diagrams for electrified door hardware.

Templates: Furnish hardware templates to doors and frames manufacturer as required for fabrication.

B.4.3 Quality Assurance

Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

Review methods and procedures related to electrified door hardware including, but not limited to, the following:

Inspect and discuss preparatory work performed by other trades.

Inspect and discuss electrical roughing-in for electrified door hardware.

Accessibility Requirements: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

Provide operating devices that do not require tight grasping, pinching, or twisting

of the wrist and that operate with a force of not more than 5 lbf.

Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

B.4.4 Hinges

Continuous Hinges: BHMA A156.26; extruded-aluminum, pinless, geared hinge leaves; joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

Minimum 0.120 inch thick hinge leaves with minimum overall width of 4 inches; fabricated 1 inch less in length than door height to accommodate full width surface sweeps, and to template screw locations; with components finished after milling and drilling are complete.

Manufacturers:

Select Products Limited
Bommer Industries, Inc.
Hager Companies
McKinney Products Company; an ASSA ABLOY Group company

B.4.5 Locksets

Cylindrical Locks: BHMA A156.2; Grade 1, Series 4000.

Manufacturers:

Dorma, LR design.
Schlage, Rhodes design.
Sargent, LL Design.

Lock Throw: 3/4 inch.

Backset: 2-3/4 inches.

Function: Storeroom.

Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

Construction Cylinders: Standard Lock Cylinders, BHMA A156.5; Grade 1; with interchangeable cores; face finished to match lockset.

Number of Pins: 6.

Permanent Cores: Schlage Primus cylinders provided by Owner and exchanged for construction cylinders following substantial Completion.

B.4.6 Electric Strikes
BHMA A156.31; Grade 1.

Provide power supply by same manufacturer as electric strike.

Manufacturers:

Dorma Architectural Hardware; Member of The DORMA Group North America.
Adams Rite Manufacturing Co.; an Assa Abloy Group company.
Security Door Controls.
Von Duprin; an Ingersoll-Rand company.

B.4.7 Door Closer
BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

Manufacturer: LCN Closers; an Ingersoll-Rand company.

B.4.8 Overhead Stop
BHMA A156.8.

Manufacturers:

Architectural Builders Hardware Mfg., Inc.
Glynn-Johnson; an Ingersoll-Rand company.
Rockwood Manufacturing Company.

B.4.9 Kick Plates
Fabricate not more than 1-1/2 inches less than door width on stop side and not more than 1/2 inch less than door width on pull side, by the height indicated.

Base metal: Stainless steel, 0.050" (U.S. 18 gauge).

Manufacturers:

Trimco
ABH (Architectural Builders Hardware Mfg., Inc.)
CHMI (Custom Hardware Manufacturing, Inc.)
Rockwood Manufacturing Co.

B.4.10 Weather-Stripping
BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

Manufacturers:

National Guard Products.
Pemko Manufacturing Co.; an ASSA ABLOY Group company.
Reese Enterprises, Inc.
Zero International

B.4.11 Threshold
BHMA A156.21; fabricated to full width of opening indicated.

Manufacturers:

National Guard Products.
Pemko Manufacturing Co.; an ASSA ABLOY Group company.
Reese Enterprises, Inc.
Zero International

B.4.12 Finishes
Provide finishes complying with BHMA A156.18.

Satin stainless steel 630 (US32D) or stain chrome 626/652 (US26D) except as otherwise indicated.

Interior Door closers: Aluminum painted or powder-coated

B.5 Trim Bead
B.5.1 Summary
Installation of trim bead at juncture of gypsum board and concrete walls.

B.5.2 Submittals
Product Data: For each type of product.

B.5.3 Materials
Gypsum Wallboard: ASTM C1396/C1396M.

Thickness: Match existing.

Trim Bead: ASTM C1047.

Material: Vinyl

Products: Similar to Shadow Bead; Trim-Tex Drywall Products.

Joint Treatment Materials: Comply with ASTM C475/C475M.

Joint Tape: Paper.

Joint Compound: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

Prefilling: Setting-type taping compound.

Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

Fill Coat and Finish Coats: For second and third coats, use setting-type, sandable topping compound.

B.6 Painting
B.6.1 Summary
Restoration of paint finish at new trim bead in gypsum board.
Painting new hollow metal door and frame.

B.6.2 Definitions
Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523, per "MPI Architectural Painting Specification Manual."

B.6.3 Submittals
Product Data: For each type of product. Include preparation requirements and application instructions.

Samples: For each type of paint system and each color and gloss of topcoat.

Product List: For each product indicated. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B.6.4 Paint
MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

Material Compatibility: For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

Primers: As recommended in writing by topcoat manufacturer.

Paint for Gypsum Board: Match existing.

Paint for Hollow Metal Door: MPI #163, light industrial coating, exterior, water based, semi-gloss (Gloss Level 5).

> Color: Paint color to match Sherwin Williams H&C Concrete Stain; Muddy Gray HC172.

C Construction
C.1 Cleaning Masonry at Bridge Operator's House and Planters
C.1.1 Protection

Keep wall wet below area being cleaned to prevent streaking from runoff.

Dispose of runoff from cleaning operations by legal means and in a manner that prevents contamination of the waterway and water penetration into building interiors.

C.1.2 Detergent Cleaning
Wet masonry with cold water applied by low-pressure spray.

Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.

Rinse with cold water applied by low-pressure spray to remove detergent solution and soil.

Repeat cleaning procedure above where required to produce cleaning effect established by sample panel.

C.2 Joint Sealants
C.2.1 Project Conditions
Environmental Conditions: Do not proceed with installation of joint sealants under the

following conditions:

When adverse or inclement weather conditions are impending or when ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturers.

C.2.2 Preparation

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

Completely remove existing sealants from joints indicated.

Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

C.2.3 Installation

Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

Do not leave gaps between ends of sealant backings.

Do not stretch, twist, puncture, or tear sealant backings.

Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

Install sealants using proven techniques that comply with the following and at the same time backings are installed:

Place sealants so they directly contact and fully wet joint substrates. Completely fill recesses in each joint configuration.

Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

Tooling of Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

Remove excess sealant from surfaces adjacent to joints.

Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.

Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

C.3 Hollow Metal Doors and Frames

C.3.1 Examination

Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

Proceed with installation only after unsatisfactory conditions have been corrected.

C.3.2 Installation

Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

Install hollow metal frames in compliance with ANSI/SDI A250.11.

Set frames accurately in position; plumbed, aligned, and braced securely.

Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

Remove welded-in shipping spreaders.

Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

Jambs and Head: 1/8 inch plus or minus 1/16 inch.

Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of galvanizing repair paint and compatible air-drying, rust-inhibitive primer.

C.4 Door Hardware

C.4.1 Preparation

For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

C.4.2 Installation

Mounting Heights: Mount door hardware units at heights to comply ANSI/SDI A250.8.unless otherwise required to comply with governing regulations.

Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.

Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

C.4.3 Adjusting

Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

C.5 Trim Bead

C.5.1 Installation

Comply with ASTM C840.

Attach trim bead according to manufacturer's written instructions.

Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for

decoration. Promptly remove residual joint compound from adjacent surfaces.

Prefill open joints and damaged surface areas.

Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

Finish gypsum board panels to Level 4 according to ASTM C840.

C.5.2 Protection
Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

C.6 Painting
C.6.1 Examination
Examine substrates and conditions for compliance with requirements affecting performance of the work.

Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

C.6.2 Preparation
Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

Hollow Metal Door: Clean bolted connections and abraded areas of shop paint compatible with specified finish, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

> Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C.6.3 Application
Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

> Apply 1 coat primer and 2 coats finish.

Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

Paint all exterior and interior surfaces of doors and frames including top and bottom of doors.

D Measurement
The city will measure Bridge Operator's House, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment
The city will pay for the measured quantity at the contract price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.08	Bridge Operator's House	LS

Payment is full compensation for all materials, labor and incidentals for Bridge Operator's House, including cleaning masonry at bridge operator's house and planters, joint sealants, hollow metal doors and frames, door hardware, gypsum board and painting in accordance with the drawings and as set forth in these specifications.

43. Bridge Machinery - General

A Description
A.1 General
This section describes the General Requirements for the detailed work to be completed on the following bridge machinery components and systems: Counterweight Machinery, Equalizer Machinery, Hydraulic Machinery, and Span Guides.

The cost of work in Bridge Machinery - General is included in the Bridge Machinery bid items.

A.2 Machinery Design Criteria
The design of any new operating machinery conforms to the 2007 LRFD Movable Bridge Design Specifications 2nd Edition of the American Association of State Highway Transportation Officials (AASHTO), with 2011 Interim Revisions, except as otherwise provided herein or shown in the plans. Should any inconsistency exist between this specification and the plans the plans shall govern.

A.3 Manufacturer's Product Data
Submit manufacturer's data and/or shop drawings for all manufactured and purchased products.

The data for manufactured parts and assemblies shall include, as applicable: the manufacturer's name and trade name; descriptive literature, catalog cuts, drawings, diagrams and certified prints and lay out dimensions; catalog model number, nameplate data, size and capacity, plus commercial, federal and military specification references; and any other relevant data required to establish contract compliance.

A.4 Shop Drawings

Detail and accurately dimension all parts on the shop drawings. Show limits of accuracy and tolerance required for machining, surface finishes and allowances for fits. Give journal and associated bearing tolerances so that prescribed limits are obtained. Unless otherwise called for the fits and finishes shall apply in accordance with ANSI B46.1 and ANSI B4.1 for both cylindrical and non-cylindrical parts.

Show proprietary parts in outline on the drawings. Furnish complete dimensions and data to enable a determination of the adequacy of the unit. Furnish certified dimensional prints stating the name, part and job number. Give pertinent load and speed ratings; provisions for lubricating, draining and determining the level of lubricant, the method of lubrication, location and type of fittings and the inspection openings, seals and vents. If a product is modified in any way from the description submitted by its original manufacturer, provide a drawing that details the modifications and assigns a special part number to that part to avoid supply of replacement parts not similarly modified.

Provide a diagram or assembly drawing sufficient to enable disassembly and reassembly of the component. Identify and describe on the assembly drawing, or diagram, each internal part and show dimensions of principal parts; certified external dimensions; gross weight and normal operating ratings.

Provide shop bills of material, listing all parts by number and quantity. Provide the materials and specifications for each part. Where standard specifications are used, give the designating numbers.

The following abbreviations may be used:

American Association of State Highway Transportation Officials	AASHTO
American Gear Manufacturers Association	AGMA
American Iron and Steel Institute	AISI
American National Standard Institute	ANSI
American Society of Mechanical Engineers	ASME
ASTM International	ASTM
American Welding Society	AWS
National Electrical Manufacturers Association	NEMA
National Lubricating Grease Institute	NLGI
Occupational Safety and Health Act	OSHA
Society of Automotive Engineers	SAE
Steel Structures Painting Council	SSPC

State of Wisconsin Standard Specifications for Highway and Structure Construction -

Furnish assembly and erection drawings with identifying marks and essential dimensions for locating parts and assemblies. The use of opposite hand or mirror image erection drawings is not acceptable. It is the contractor's responsibility to achieve satisfactory construction and operation of the machinery; approval of shop drawings by the engineer does not constitute relief from this provision.

Show subtitles describing the parts and the inspection agency on each shop drawing.

Submit shop drawings to the engineer for review and approval by the date agreed upon during the pre-construction meeting. Resubmit drawings rejected or requiring correction until they are approved. Any damages or costs that result from ordering materials or performance of any work before receiving shop drawing approval shall be the responsibility of the contractor. The required number of copies of approved shop drawings will be determined at the pre-construction meeting.

A.5 Operation and Maintenance Manuals

A.5.1 General Requirements

Furnish manuals containing complete descriptive literature, catalog cuts, reduced size shop drawings and other information required for successful operation and maintenance for the span operating and lock machinery systems of the bridge. Provide revisions, if required, after the start-up period by means of addenda to the manuals.

Clearly print all materials so that the submittals, drawings, catalog cuts and all other information is legible, accurate and distinct. Reduced size drawings and illustrations must be legible so that dimensions and lettering are readable. Fold all contents to the page size for inclusion in the manuals.

Print the material on durable mediums. Use water resistant inks. Use printing methods that offer permanence and durability.

A.5.2 Contents

Neatly inscribe the following information on the manual’s cover: Title: “Operating and Maintenance Manual;” the name and location of the bridge; the contract number, date, and the names of the consulting engineer and the contractor.

Include the following in the manual:

1. Index of contents and tabbed dividers for each section.
2. A system layout showing all machinery components, including all existing components reused.
3. A detailed description of the control system and procedure for operating the bridge using the main drive motors, auxiliary drive motors and any manual means.
4. Reduced size copies (11” x 17”) of shop drawings and lubrication charts.

5. Certified parts drawings and descriptions of proprietary units.
6. A detailed description of the function of each principal component.
7. Manufacturer's standard literature and instructions for installation, operation, lubrication, adjustment and maintenance for each component and assembly.
8. A list of the names, addresses and telephone numbers of all subcontractors and manufacturers furnishing and installing the equipment and systems together with the a record of the local representatives for the equipment and systems installed.
9. Recommended procedures and frequency for cursory and detailed inspections of the equipment.
10. Information on trouble-shooting problems that may be encountered during operation for each of the major pieces of equipment. Include things to look for, signs of irregular operation and suggested solutions.

A.5.3 Materials for Manuals

Bind the maintenance and operating materials in heavy duty, three hole binders, of either ring or post type, as directed by the engineer. Use binders that have nickel-plated, metal hinges and a locking mechanism that permits the sheets to lie flat, such as a channel lock. Use heavy duty, stiff covers that are moisture, oil and grease resistant such as plastic or other suitable materials.

Bind all the printed material between the rigid covers of the book. Provide a book measuring approximately 9 x 12 inches. Provide included drawings in black outline on white background. Use archival quality, acid free, punched, 60 pound, 8-1/2 x 11 inch, loose leaf paper. Use paper pages, foldout drawings, diagrams and illustrations having three standard spaced holes, 5/16 inch minimum diameter, with plastic or cloth reinforcement.

A.5.4 Manual Submittals

Submit to the engineer for approval the arrangement of the books, proposed methods of binding, printing and reproduction and materials to be included. Two copies of sample formats and outlines of the contents in draft form are required ninety (90) days before the earliest of: final inspection, acceptance tests or return of the span operation to the City of Milwaukee, Department of Public Works.

Submit two (2) copies of the complete manual in final form thirty (30) days prior to final inspection, acceptance tests or return of the span operation to the City of Milwaukee, Department of Public Works.

Submit six (6) copies of the approved manual ten (10) days after final inspection and acceptance tests. One of the six copies shall become the property of the engineer of record; the remaining copies shall become the property of the City of Milwaukee, Department of Public Works.

A.6 Operating Instructions

Provide operating instructions, approved by the engineer, for each system and principal piece of equipment for the use of operation and maintenance personnel. Post on or

adjacent to the piece of equipment the printed operating instruction, including proper adjustment, operation, lubrication, safety precautions, procedures to be followed in event of equipment failure and other items of instruction recommended by the manufacturer. Use either weather-resistant materials or protect the instructions with suitable enclosures. Prepare diagrams showing the complete layout of the operating machinery and span lock systems. Frame the diagrams, under glass or in an approved laminated plastic, and post where directed by the engineer. Securely fasten all posted instructions and diagrams to prevent easy removal. Do not locate in the direct sunlight.

A.7 Quality Assurance

A.7.1 Standard Products

In so far as practical, use materials and equipment that are the standard, catalogued products of manufacturers regularly engaged in the production of such products; and that are the latest standard design; and that comply with the requirements of the contract documents. Provide materials and equipment that essentially duplicate units which have served satisfactorily for at least two years prior to bid opening. Where two units of the same category equipment are required in the system they shall be the products of the same manufacturer; although, components of the system need not be the products of one manufacturer.

Provide each major component with a name plate, securely affixed in a conspicuous place, with the manufacturer's name and address, the model and serial number. The nameplate of the distributing agent is not acceptable.

A.7.2 Manufacturer's Recommendations

Install and align all units and components as recommended by the manufacturer of that product. Furnish printed copies of those instructions and procedures to the engineer before beginning installation. Failure to furnish these instructions may be cause for rejection. Preparation of the mounting surfaces and associated components required for the installation is included in the work.

A.7.3 Codes and Standards

Furnish all machinery bid items in compliance with the applicable requirements of the latest standards and codes of, but not limited to, those organizations designated in Clause A.4. Where other codes and standards are designated in these special provisions they shall also apply to the work requirements of the parts and equipment with which they are associated.

A.7.4 Qualification, Personnel and Facilities

Complete all fabrication, cleaning, lubrication, testing and all other work required for bridge machinery pay items using an adequate number of experienced mechanics and service personnel who are thoroughly trained and familiar with the required methods specified for correct completion of the work.

For the installation, alignment and fastening of the bridge operating machinery and span lock systems, use an adequate number of trained and skilled millwrights having past experience in the installation of machinery on at least two (2) previous movable bridges.

Equip the mechanics, millwrights and service personnel with the necessary instruments, tools and other equipment necessary to assure the related components have been furnished within acceptable tolerances; and to make any adjustments required to attain correct installation and satisfactory operation.

A.7.5 Rules, Regulations and Ordinances

Assure that all work complies with all applicable federal, state and local rules, regulations and ordinances.

In the event of a conflict between these special provisions and the federal, state and local codes, standards, rules, regulations and ordinances the most stringent requirement applies.

A.7.6 Measurements and Verification

Dimensions given on the plans are nominal and intended for guidance only. Note any variations from nominal dimensions on the shop drawings.

It is the contractor's responsibility to verify all field dimensions contained in the plans and special provisions. By incorporating the field dimensions contained in the plans and special provisions into the shop drawings, the contractor is acknowledging that he has verified their accuracy.

A.7.7 Substitutions

The specification of a manufacturer's name and part number is for the purpose of defining quality, configuration, rating and arrangement of parts. Equivalent products of another manufacturer may be substituted for the specified item upon the written approval of the engineer. Make any changes necessary, as a result of the substitution, in related machinery, structural and electrical parts at no additional cost to the City.

Obtain the engineer’s written approval for a substitute product prior to ordering it. Acceptance of the substitute product is at the sole discretion of the engineer. The basis for acceptability of a substitute product will be a review of the descriptive material and detail submitted and evaluation of its ability to fulfill the contract requirements.

The engineer will stamp submittals for substituted materials. Resubmit rejected shop drawings showing the specified product. Rejection shall in no way result in extra cost. Approval of a substitute product by the engineer does not relieve the contractor of the responsibility for proper operation, performance or functioning of that product.

Inform the engineer if departures from the contract documents are deemed necessary. Submit full details of the departures and reasons for the need, as soon as possible, to the engineer for approval. Do not proceed with any departure without written approval.

B Materials

B.1 Castings

Castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes, and other defects in positions affecting their strength and value for the service intended. All castings shall be sandblasted or otherwise effectively cleaned of scale and sand, to present a smooth, clean, and uniform surface. All unfinished edges of castings shall be neatly cast with rounded corners, and all inside angles shall have ample fillets. All surfaces requiring finish shall have adequate material allowance for machining to finish dimensions. All surfaces of castings in contact with other metal shall be finished to 125 microinches as measured under ANSI B46.1, unless a finer finish is specified by the Plans. Where castings are machined, the thickness of the metal after finishing shall not be less than the thickness shown on the Plans. Machined bosses shall be provided to give proper seats for bolt heads and nuts.

Blow holes appearing upon finished castings shall not have a depth injuriously affecting the strength of the casting. Minor defects, which do not impair the strength may, with the approval of the Engineer, be welded by an approved process and be inspected by magnetic particle examination. The defects shall be removed to solid metal by chipping, drilling, or other satisfactory method, and, after welding, the castings shall be annealed, if required by the Engineer. Castings, which have been welded without the Engineer's permission, will be rejected.

Perform visual surface examinations per ASTM A802 criteria for Level II and requirements of MSS SP-55 for every steel casting. Perform liquid-penetrant exams in accordance with ASTM E165, or magnetic particle examination in accordance with ASTM E709 on every casting to detect surface and near-surface flaws. Perform ultrasonic inspection on every casting in accordance with ASTM A609 that meets the requirements of Level 2 (Procedure A) or Level 3 (Procedure B) for castings with cross sections in both directions thicker than 4 1/2 inches. Meet the requirements of Level 1 (Procedure A) or Level 1 (Procedure B) for thinner castings. Reject steel castings that do not meet all of the above examination criteria. Reject castings that have been welded without the Engineer's approval.

B.2 Forgings

All forged shafts shall be reduced to size from a single bloom or ingot until perfect homogeneity is secured. The blooms or ingots, from which shafts are to be made, shall have a cross-sectional area at least three times that required after finishing. No forging shall be done at less than a red-heat. Forged rounds for shafts shall be true, straight, and free from all injurious flaws, seams, or cracks. Forgings shall provide adequate material allowance for machining to finish dimensions.

Perform magnetic particle examination per the requirements of ASTM A668 Supplementary 6. Submit all test results to the engineer.

B.3 Supports

Provide new supports and brackets that meet the requirements of ASTM A36. Stress relieve supports after welding. Hot–dip galvanize and paint supports with pre-approved 2 coat system. Discuss with galvanizer methods to minimize distortion from galvanizing Incorporate methods on shop drawings and implement methods.

B.4 Shafting and Pins

All shafts shall be accurately finished, round, smooth, and straight; and when turned to different diameters, they shall have rounded fillets at shoulders and chamfers at shaft ends. All journal-bearing areas on shafts and pins shall be accurately turned, ground, and polished with no trace of tool marks or scratches on the journal surface or adjoining shoulder fillets. Journal diameters shall be finished to the limits specified in AASHTO Specifications.

Provide shafts of forged steel meeting the requirements of ASTM A668. Hot rolled steel of equivalent strength and ductility may be substituted for shafting with a finished diameter of 4 inches or less. Cold finished shafts and pins will not be permitted. Provide ANSI Standard B4.1 FN2 fit at hub locations. Machine finish each shaft over its entire length to obtain a smooth finish concentric with the bearing centerline. All shafts with holes shall be shipped with pipe plugs at each end prior to final assembly.

B.5 Fasteners

Subdrill all holes for connecting machinery parts to the supporting steel at least 1/32 inch smaller in diameter than the finish diameter, unless otherwise specified. Line ream at assembly with the mating part for proper fit after the parts are correctly aligned.

Positive locks shall be furnished for all nuts. If double nuts are used, they shall be of standard thickness. Double nuts shall be used for all connections requiring occasional opening or adjustment. If lock washers are used for securing screws or nuts, they shall be made of tempered steel and shall conform to the SAE regular dimensions. The material shall meet the SAE tests for temper and toughness.

Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

Provide fasteners manufactured in the United States correctly marked on top of the head with identification of the property, class and source.

Clean all contacting surfaces of machinery elements and structural steel to be bolted together in accordance with the standard specifications before bolting.

All threads for bolts, nuts, and cap screws shall conform to the coarse thread series and shall have a Class 2 tolerance for bolts and nuts or Class 2A tolerance for bolts and Class 2B tolerance for nuts in accordance with the ANSI B1.1, "Unified Screw Threads."

All bolt heads and nuts shall bear on seats square with the axis of the bolt. On castings, except where recessed, the bearing shall be on finished bosses or spot-faced seats. Bolt heads, which are recessed in castings, shall be square. All bolt holes through unfinished surfaces shall be spot-faced for the head and nut, square with the axis of the bolts.

B.5.1 Turned Bolts

Turned bolts shall conform to the requirements of ASTM Specifications A449. Turned bolts shall have the diameter of the shank 1/16-inch larger than the diameter of the threads. Hexagonal heads and nuts shall be in accordance with the heavy series in accordance with ANSI B18.2.1 and shall be finished. Two nuts or one nut and a lock-washer shall be used on turned bolts. Lock washers will only be permitted if approved by the Engineer. Holes for turned bolts shall be carefully reamed to provide for an ANSI B4.1 LC6 fit with the body of the bolt.

B.5.2 High Strength Bolts (Machinery Connection to supports)

High strength bolts shall be used for connection of machinery components to the machinery bases wherever turned bolts are not required by the plans or Special Provisions. Machinery connection bolts, nuts, and hardened washers shall conform to the requirements of ASTM Specifications A449, A563, and F436, respectively. Holes for machinery connection bolts shall be 1/32 inch larger than the diameter of the bolt. All high strength bolts, nuts, and washers shall be galvanized with a Class 50 mechanically deposited zinc coating in accordance with the requirements of ASTM B695.

B.5.3 Anchor Bolts

Anchor Bolts - Anchor bolts fastening new machinery supports to concrete shall be Hilti HVA Capsule Adhesive Anchors with HAS-SS threaded rods manufactured of AISI 304 or 316 stainless steel. Nuts shall conform to the requirements of ASTM Specification F594. Washers shall be stainless steel. Double nuts shall be used on all anchor bolts.

B.5.4 Socket Head Screws

The dimensions of socket-head cap screws, socket flat-head cap screws, and socket-set screws shall conform to ANSI B18.3; and the screws shall be made of heat-treated alloy steel, cadmium-plated and furnished with a self-locking nylon pellet embedded in the threaded section. Unless otherwise called for on the plans or specified herein, set screws shall be of the headless, safety type; shall have threads of the coarse thread series; and shall have cut points. Set screws shall neither be used to transmit torque nor as the fastening or stop for any equipment that contributes to the stability or operation of the bridges.

B.6 Wire Ropes and Sockets

Wire rope and sockets shall conform to the requirements of 6.8.3.3 of the AASHTO Specifications and the following. Every possible effort shall be made to fabricate wire ropes of uniform physical properties and all similar ropes shall be cut from a minimum number of reels.

All wire ropes shall be pre-stretched by the manufacturer. A stripe shall be painted on one side of all ropes to facilitate correct alignment of the rope during field installation.

A minimum of two samples from each reel shall be tested to destruction to determine the actual breaking strength of the wire rope.

B.6.1 Counterweight Ropes
Counterweight ropes shall be of the diameter shown on the contract documents, preformed, drawn galvanized, of 6 x 37 classification, 6 x 36 Warrington Seale construction, with independent wire rope core fabricated from extra improved plow steel wire. Counterweight ropes shall have a minimum breaking strength of 159,800 lbs.

B.6.2 Equalizer Ropes
Equalizer ropes shall be of the diameter shown on the contract documents, preformed, drawn galvanized, of 6 x 19 classification, 6 x 25 filler wire construction, with independent wire rope core fabricated from extra improved plow steel wire. Transverse equalizer ropes shall have a minimum breaking strength of 58,800 lbs. Longitudinal equalizer ropes shall have a minimum breaking strength of 41,200 lbs.

B.6.3 Rope Sockets
Rope sockets shall be as specified on the contract documents. During testing of wire rope assemblies per AASHTO 6.8.3.3.6, socket performance shall be as specified in AASHTO 6.8.3.3.7.

B.7 Keys and Keyways
All keys shall conform to the requirements as specified in the contract documents. Keys and keyways shall be provided between sheaves, drums, or rollers and their respective shafts. Unless specified otherwise, keys and keyways shall conform to the dimensions and tolerances for parallel keys of ANSI B17.1 with fit and finish as specified in AASHTO for keys and keyways. For connections requiring one key, as indicated on the Plans or recommended by component manufacturer, the side fit between key and keyway shall conform to ANSI B4.1 FN2 fit, and the top and bottom fit shall conform to ANSI B4.1 LC4 fit. For connections requiring two keys, as indicated on the Plans or recommended by component manufacturer, key and keyway fit shall conform to ANSI B17.1 Class 2 fit. All keys and keyways shall have key chamfer and keyway radius as suggested by ANSI B17.1, regardless of fit. All keys and keyways shall be finished to 63 microinches as measured under ANSI B46.1. Keyways shall not extend into any bearing.

Furnish keys that are machined from carbon steel forgings, ASTM A668, Class D, unless otherwise specified in the contract documents.

B.8 Bearings and Bushings
Select anti-friction bearings to provide for an AFBMA rated B-10 life of 40,000 hours for the load conditions specified in the contract documents. Use pillow block bearings, adapter mounted, self-aligning, fixed or expansion versions as required, and locate units as designated on the plans. Use cast steel housings capable of withstanding the design

loads in any direction, including radial up-lift. Secure the cap with high strength, steel bolts. Cast the mounting bases without bolt holes. Mounting holes may be sub-drilled in the shop and then final drilled and reamed with the supporting structures, after alignment, at assembly in the field. Units shall be grease lubricated and have provision for re-lubrication through fittings in the housings. Provide shaft seals, mounted in the housings, capable of retaining the lubricant and preventing the entry of water and foreign materials.

Provide bronze bushing halves, of ASTM B22 Alloy as shown in the plans. Finish machine the outside diameters of the bushings to provide an ANSI Class LC-1 fit with their associated housing bores. Provide sufficient stock in the bushing inside diameter to permit final machining of the bore after assembly in their housings with the full liners in place. Polish bushing bores to a surface texture of 16 microinches in accordance with ANSI B46.1

B.9 Shims

Where shown on the Plans and required for leveling and alignment of equipment, shim packs shall be furnished, and shall be capable of height adjustment from 0 inches to twice the nominal shim pack dimension in 1/64 inch increments. For example: each 1/2 inch nominal shim pack shall include one 1/2", one 1/4", one 1/8", one 1/16", one 1/32", and two 1/64" plates. In the case where fine adjustment is required to secure proper alignment of components, thinner shims (0.001" to 0.015") shall be used.

Machinery shims shall be neatly trimmed to the dimensions of the assembled parts and drilled for all bolts that pass through the shims. Holes for bolts shall be oversized by 1/16-inch. Shims shall be shown and fully dimensioned as details on the working drawings. Shims with open side or U-shaped holes for bolts will not be permitted. No shims shall have less than two holes for bolts.

Shims shall conform to the requirements of ASTM A36, except that thicknesses less than ¼-inch shall be stainless steel, conforming to the requirements of ASTM A480 or ASTM A240.

B.10 Epoxy Grout and Sealant for Supports on Concrete Surfaces.

Apply a pre-approved epoxy grout for level contact under all brackets and supports mounted to concrete surfaces. Seal joint with pre-approved sealant.

B.11 Welding

Perform all welding required or designated in the plans in conformance with the appropriate American Welding Society Specifications. Ultrasonically inspect all welds used to fabricate machinery per AWS D1.5 for compression welds. Stress relieving will be required. Keep distortion of the pieces to a minimum by use of welding fixtures or other approved devices, fixtures and procedures. Perform required machining after welding and stress relieving. Field welding of completed structures and machinery assemblies or components will not be permitted without the approval of the engineer.

Show complete details of welding joint sizes on the shop drawings. Submit welding procedures for multi-pass welds.

B.12 Lubrication

Standardization of the lubrication for the mechanical and electrical systems is required, including but not limited to all bearings and wire ropes. The Contractor shall coordinate with all the system suppliers to ensure that the type of lubricant supplied shall be kept to as few as possible.

B.12.1 Lubrication Fittings

Provide all bearings and other grease lubricated machinery components with ¼ PTF lubrication fittings with ball check.

Locate the fittings to conveniently facilitate lubrication. Connect the lubrication ports to central stations using 1/4 inch stainless steel, seamless pipe with stainless steel fittings. Use pipe extensions that are as short as possible and securely supported.

Upon completion of fabrication plug all grease fitting locations until the components are installed and regular lubrication is started. Immediately after erection and prior to operation lubricate all rotating and sliding parts.

Provide removable hinged or bolted covers in order to access lubrication fittings and other routine maintenance devices that might be covered by machinery guards.

B.12.2 Lubrication Charts

The Contractor shall furnish three (3) copies on mylar full size (22 inches by 34 inches) as well as reduced ½ sized for inclusion in the operating and maintenance manuals. The lubrication chart shall show the location of all lubrication fittings and other points of lubrication for the new and existing mechanical and electrical equipment, which will require lubrication of any kind. The chart shall show the kind of lubricant to be used at each point and the frequency of lubrication. A full size print of the chart shall be framed under Lexan in a neat wooden frame with backing and shall be placed as directed by the Engineer within the control house.

Lubrication chart shall be submitted to the Engineer for review and approval as a working drawing in accordance this Special Provision. Final lubrication chart shall not be made until the chart has been approved by the Engineer.

C Construction

C.1 Shop Fabrication

Give the engineer no less than ten (10) working days notice before beginning work at foundries, forge and machine shops so that inspections and tests may be arranged. Provide the engineer the names and locations of casting, forging and machining suppliers; sub-contractors and other suppliers; and furnish copies of orders that have been placed, prior to the start of any work.

Allow the inspector, designated by the engineer, free access and facilities for inspection of materials and workmanship in foundries, forge and machine shops. Such inspections are to facilitate work and avoid errors, but it is understood the contractor is not relieved of the obligation of assuring compliance with the plans and specifications or the necessity of replacing defective materials and workmanship. Any work performed while free access has been refused will be automatically rejected.

The inspector shall have full authority to reject materials or workmanship which does not fulfill the requirements of these special provisions.

Perform all testing and furnish test specimens, certified copies of chemical and physical tests and certificates of compliance to the engineer without additional charge. Initial acceptance of material and finished parts and assemblies will not preclude subsequent rejection if found deficient. Correction of the deficiencies and/or replacement of materials shall be the responsibility of the contractor. Any materials, components or assemblies rejected after receipt at the bridge site shall be removed and replaced without additional cost to the City.

C.2 Shop Inspection and Testing

Completely assemble all machinery components to assure they fit as required. Perform critical measurements to confirm conformance with the shop detail and assembly drawings.

C.3 Defective Materials and Workmanship

Remove and replace, without additional cost to the City, components determined defective and not made acceptable during inspection and testing. No claims for additional compensation due to delays resulting from defective materials and/or components will be recognized.

Correct, without additional cost to the City, defects resulting from faulty materials, workmanship, components or installation errors that are revealed during the warranty period. If corrections are not made in a timely manner the City will make the necessary corrections and charge the costs to the contractor.

C.4 Shipment and Storage

C.4.1 Protection for Shipment

Clean all machinery components and assemblies of dirt, grit, chips, corrosion and other injurious substances before shipment. Coat unpainted surfaces with an approved corrosion-inhibiting preservative.

Grease exposed shaft journals, wrap in oil-resistant paper, cover with oil-soaked burlap and securely timber lag for shipment. Take all precautions to assure the bearing surfaces are not damaged during shipping and handling.

Completely protect machinery parts from weather, dirt and foreign materials during shipment. Store machinery parts indoors while awaiting installation and erection at the

site. Mount assembled units on skids or otherwise crate or protect during handling and shipping.

Bag and/or crate for shipment all mounting hardware and other small parts. Do not co-mingle the parts. Identify each part with its number and keep separate from other parts. Provide tags recording the part number wired to the containers for each part prior to shipment. Coat bolts, nuts and other steel parts with approved rust-inhibitor.

C.4.2 Package and Deliver Spare Parts

Prepare spare parts for long term storage as recommended by the manufacturer. Wrap and box in a durable wooden container labeled with the bridge name. Tag all individual spares with clear identification using the part number , bridge name and description as shown on the approved shop drawings. Clearly and permanently mark the outside of the spare parts boxes, identifying the contents of the box.

C.4.3 Guarantees and Warranties

The contractor will assign to the City all manufacturers' warranties and guarantees covering products, components and assemblies purchased by the contractor and used in fulfillment of this contract. The terms of those warranties and guarantees are to be consistent with the customary practices of the manufacturer in commercial trade upon acceptance of the contract.

The contractor shall warrant satisfactory service operation of the mechanical systems, components and associated equipment for a period of sixty (60) months following the date of final acceptance of the project. Manufacturer's standard warranties shall be extended to cover this period at no additional cost to the City.

C.5 Erection

C.5.1 General

Erection and adjustment of machinery shall be by millwrights or experienced machinists with demonstrated skill in this type of work

C.5.2 Alignment and Bolting

Erect and assemble the machinery in accordance with part number and match marks, and in accordance with manufacturers' recommendations. Adjust all parts for precise alignment and orientation by means of shims. Pull tightly against supporting members by use of clamps, temporary bolts, or other approved means before drilling and reaming holes for connecting fasteners. Tapered shims may be used, if required, and shall be furnished at no additional cost to the City.

Turned bolt holes into structural steel for attaching machinery components shall, generally, be drilled from the solid after final alignment of the machinery. During erection a sufficient number of 1/4 inch undersized, subdrilled holes are permissible for the use of undersize, temporary bolts. When final alignment is achieved, drill and ream the remaining bolt holes and install full size bolts. Remove the temporary bolts, ream the undersize holes and install full size bolts.

In locations where existing bolt holes in the bearings and structures are to be reamed to accept a larger diameter turned bolt, use some of those holes for temporary bolting to achieve alignment. When properly aligned, ream the unused holes to full size, install the full size bolts; remove the temporary bolts, ream the holes and install full size bolts.

Accuracy of the reamed holes through the machinery component, shims and structural steel is required to maintain correct alignment of the machinery. Use a structural steel reaming jig, affixed to the drill and secured to the work piece to prevent the reamer from deviating and assure a cylindrical hole throughout its length. Check holes with a bolt hole micrometer.

Torque all high strength bolts, and turned bolts as recommended by the equipment manufacturer.

C.5.3 Coatings

Coat threads for all turned bolts with anti-seize compound before assembly to avoid corrosion or galling and ease future removal.

C.6 Painting

C.6.1 General

Clean and paint all unfinished surfaces of machinery and equipment as required by the City using a system listed on the department's master list of preapproved zinc rich three coat paint systems. Submit an outline of painting materials and methods with the shop drawings. Coat in accordance with section 517 of the standard specifications and the requirements herein.

Paint items designated in the contract plans to be hot dipped galvanized and painted with the preapproved 2 coat system. Apply all prime and final paint coats in the shop.

C.6.2 Shop Painting

Before painting unfinished surfaces in the shop, remove all burrs, chips, rust, scale, sand, grease and other foreign material by blasting, wire brushing or other approved means. Prepare surface for painting by blasting to achieve a SSPC-SP-10 "Near White Metal Blast Cleaning".

Use masking to avoid painting machinery surfaces which are in normal rubbing contact, such as shaft journals and bushings, and sliding guides.

After properly cleaning the surfaces apply one prime coat of shop paint to all unfinished machinery surfaces. Use a primer compatible with the paints selected for subsequent coats.

C.6.3 Faying Surfaces

All finished contact surfaces which are not finally assembled in the shop shall be coated with waterproof National Lubricating Grease Institute No. 3 Multipurpose grease as soon

as possible after being accepted and before removal from the shop, and shall be adequately protected during shipment by wrapping with burlap or canvas held by wooden bats securely wired together. During erection these surfaces shall be thoroughly cleaned and a field coat of grease applied prior to assembly.

C.6.4 Field Painting

After erection and installation is completed, clean and paint all remaining non-rubbing, exposed machinery surfaces with an intermediate, weather resistant free coat.

Upon completion of all operation and acceptance tests and after removing all accumulated grease, oil, dirt and other material, apply a final finish coat..

C.7 Contractor's Inspection

Upon completion of the machinery installation, make a thorough inspection to confirm that all machinery components are free of obstructions and properly aligned; all bolts tightened in accord with section 506 of the standard specifications; all field painting is complete; bearings and other rotating and sliding parts are supplied with lubricants; and the lift span is balanced as required.

The engineer shall accompany the contractor during his final inspection to determine if the bridge is ready for field testing.

C.8 Field Testing

When the bridge is ready for field testing, notify the engineer no less than fifteen (15) days before scheduling the tests. Inform all City personnel designated by the engineer about the tests. Provide a complete crew of machinists to be available during conduct of the tests to operate the lift span and make all adjustments and corrections required to complete the tests.

Submit a testing procedure to the engineer for approval prior to the tests. Coordinate all mechanical equipment testing with tests required for electrical equipment.

The testing procedure shall include, but not be limited to, the verification of proper installation, alignment, fastening, adjustment and operation of the following:

1. Hydraulic Machinery
2. Counterweight Machinery
3. Equalizer Machinery
4. Span Guides

The tests shall include operation of the span under normal and auxiliary drive conditions.

During the test runs, observe and inspect all machinery assemblies to determine if everything is in proper running order and fully meets the requirements of the contract documents, special provisions and the manufacturer's performance standards. The engineer and representatives of the machinery and electrical control manufacturers shall

be present and witness all field testing. Temperature rises in mechanical and electrical equipment shall not exceed design and/or manufacturer's limits.

If testing shows that components are defective, inadequate, functioning improperly or incorrectly adjusted, make all corrections, adjustments, repairs or replacements necessary before final acceptance at no additional cost to the City.

C.9 Training
Provide instruction for the City's Operation and Maintenance personnel. The instruction shall include classroom presentations and discussions, utilizing materials in the Operation and Maintenance Manuals, as well as observations of the equipment in place on the lift span, while stationary as well as in operation. Facilities for training will be provided by the City.

The topics covered during the training shall include, but not be limited to:

1. Function and purpose of the major components and systems
2. Normal and auxiliary operation
3. Routine maintenance, adjustments, and lubrication
4. Trouble shooting

D (Vacant)

E Payment
No payment is associated with Bridge Machinery –General. The cost of work required by Bridge Machinery-General is included in the bridge machinery bid items.

44. Counterweight Machinery, Item SPV.0105.09

A Description
Under this item, remove the counterweight cables and sheaves, recondition the existing counterweight sheave, shaft, bearing housing, and replace the bushings and counterweight cables. Adjust, paint, test and place in satisfactory operation the Counterweight Machinery in each pier.

The counterweight machinery consists of the following major components:

MK	Item	Total
SX-1	Counterweight Sheave	4
S-1	Counterweight Shaft	4
B-1	Counterweight Bearing Housing	8
C1	Counterweight Cable (long)	8
C2	Counterweight Cable (short)	8
CB-1	Counterweight Cable Bracket	4
CB-2	Counterweight Cable Bracket	4
P1	Counterweight Cable Pin	8

B Materials

B.1 General

Materials used to fabricate the new counterweight machinery components shall be as shown on the contract documents, and in accordance with the requirements specified in Bridge Machinery - General provisions.

Fabricate new bronze bushings (16 halves) of material meeting the requirements of ASTM B22 UNS C91300. Fabricate new bushing pins (64 pieces) of material meeting the requirements of ASTM B21. Fabricate new cable brackets CB-1 meeting the requirements of ASTM A36.

C Construction

C.1 Removal of Equipment

Remove the counterweight machinery with utmost care, since a majority of it will be reused. Disposal of the machinery components not reused shall be accomplished in accord with existing local, state and federal regulations. All HAZMATS (Oils, greases, etc.) shall be handled as required by the appropriate EPA regulations.

C.2 Magnetic Particle Inspection of Existing Counterweight Shafts

Have an independent testing agency experienced in NDT techniques inspect the shafts for cracks and defects. Inspect the four (4) counterweight shafts to the requirements of ASTM A275 “Magnetic Particle Examination of Steel Forgings”. Prepare a test report with recommendations and submit to the engineer for information. Perform this inspection early in the project schedule to allow procurement of new counterweight shafts, if required as a result of the testing, in a timely manner so as not to compromise the project schedule.

C.3 Recondition Counterweight Sheaves and Shafts

The four (4) counterweight sheave and shaft assemblies are to be reused and refurbished. Remove grease and corrosion and repaint. Protect journals during blasting. Polish the shaft journals to remove scoring by removing 10 to 15 thousandths of an inch from the diameter (5 to 7 thousandths radially) of the journals. Measure and record final diameter of journals. Regroove the rope grooves on the sheaves as shown on the contract documents.

C.4 Recondition Counterweight Bearings

The eight (8) counterweight bearing housings are to be reused and refurbished, and new bronze bushings installed. Careful measurements will need to be taken on each housing and journal to assure the fits as specified.

Remove bushings from the bearing housing without damaging the bushings and retain for measurements. Remove grease and corrosion, and repaint bearing housing. Prior to painting measure and record housing inside diameter to achieve specified fit with bushing.

Fabricate new bushings. Based on the housing diameter measurements, supply an outside diameter on the bushing to achieve an ANSI B4.1 LC1 fit. Based on the journal diameter measurement performed above, supply an inside diameter on the bushing to achieve an ANSI B4.1 RC6 fit.

Fabricate new ¾" diameter bushing pins. Place pins adjacent to the location of the existing holes in the bearing housing. Supply an ANSI B4.1 FN2 fit between the pins, the bushing, and the bearing housing.

C.5 Recondition Counterweight Cable Brackets
The four (4) counterweight cable brackets (CB-2) embedded in the counterweight concrete are to be reused and refurbished. With bracket in place, remove grease and corrosion, redrill pin holes to the diameter shown on the contract documents, and repaint.

C.6 New Counterweight Cable Brackets
The four (4) counterweight cable brackets (CB-1) attached to the legs of the span are to be newly fabricated. Install cable brackets on the span using new ¾" high strength galvanized bolts (22 per bracket), nuts, and washers in existing holes on the structural steel. Galvanize and paint all brackets.

C.7 Install, Adjust and Lubricate Counterweight Cables
Provide and install counterweight cables. Measure and record the period of each cable when hand vibrated in the fundamental harmonic. Adjust cable tension by tightening or loosening nuts on threaded end stud until the measured periods of all cables, min value to max value, deviate 10% or less of the max value. Operate lift span 20 times and measure, record and adjust the cable tension if necessary. Operate lift span 20 more times and measure, record and adjust the cable tension if necessary. Lubricate all counterweight cables with a field dressing recommended by the rope manufacturer.

D Measurement
The City will measure Counterweight Machinery as a single lump sum unit acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.09	Counterweight Machinery	LS

Payment is full compensation for furnishing all materials, labor, tools and equipment necessary to manufacture, assemble, install, erect, test, lubricate, paint and perform all incidental work to achieve a complete and acceptable installation.

Submit to the engineer for evaluation a full and complete breakdown of all costs under this item. The engineer has full authority to revise the breakdown, to suit his/her

judgment, and make the various tasks more in conformity with the adjudged true values. The contractor agrees the detailed breakdown shall not be effective until it has been approved by the engineer.

Progress billing payments will be based upon the approved breakdown. Progress payments for Counterweight Machinery shall be made in accordance with the City of Milwaukee, Department of Public Works and the department's standard payment practices and in the following manner:

1. Upon completion and acceptance by the department of all shop detail drawings, the contractor will be paid 5% of the item bid price.
2. Upon completion and acceptance by the department of shop fabrication, shop inspection, shop testing, delivery and storage of materials, the contractor will be paid 35% of the item bid price
3. Upon completion and acceptance by the department of the Counterweight Machinery installation, alignment, bolting and protection of materials, the contractor will be paid 20% of the item bid price.
4. Upon completion and acceptance by the department of the Counterweight Machinery inspection and field testing the contractor will be paid 30% of the item bid price.
5. Upon completion of training and receipt and acceptance by the department and the city of approved Operating and Maintenance Manuals the contractor will be paid the remaining 10% of the item bid price.

45. Equalizer Machinery, Item SPV.0105.10

A Description

Under this item, remove the equalizer cables, drums, sheaves, bearings, supports and covers, recondition the existing equalizer sheaves, drums, and shafts, and replace all bearings, supports, cables, cable hardware, cable brackets, drum covers, and equalizer cable covers. Adjust, paint, test and place in satisfactory operation the Transverse Equalizer Machinery in each pier and the Longitudinal Equalizer Machinery on each side of the bridge.

The equalizer machinery consists of the following major components:

Transverse Equalizer Machinery

MK	Item	Total
D-1	Trans. Equalizer Drum	2
SX-2	Trans. Equalizer Sheave	8
S-2	Trans. Equalizer Drum Shaft	2
S-3	Trans. Equalizer Sheave Shaft	4
S-4	Trans. Equalizer Sheave Shaft	2
B-2	Equalizer Bearing	20
BB-2	Trans. Equalizer Bearing Bracket	20
C5	Trans. Equalizer Cable (long)	2

C6	Trans. Equalizer Cable (short)	2
CB-5	Trans. Equalizer Lower Cable Bracket	2
CB-6	Trans. Equalizer Upper Cable Bracket	4

North Longitudinal Equalizer Machinery

MK	Item	Total
D-2N	Long. Equalizer Drum	1
SX-3N	Long. Equalizer Upper Sheave	4
SX-4N	Long. Equalizer Lower Sheave	2
S-5N	Long. Equalizer Drum Shaft	1
S-6N	Long. Equalizer Upper Sheave Shaft	2
S-7N	Long. Equalizer Upper Sheave Shaft	2
S-8	Long. Equalizer Lower Sheave Shaft	1
B-2	Long. Equalizer Drum Bearing	1
B-3	Long. Equalizer Drum Bearing	1
B-4	Long. Equalizer Upper Sheave Bearing	4
B-5	Long. Equalizer Upper Sheave Bearing	4
B-6	Long. Equalizer Lower Sheave Bearing	4
BS-1	Long. Equalizer Drum Bearing Seat	1
BS-2	Long. Equalizer Sheave Bearing Seat	4
C3	Long. Equalizer Cable (long)	1
C4	Long. Equalizer Cable (short)	1
CB-3	Long. Equalizer Cable Bracket	2
CB-4	Long. Equalizer Cable Bracket	1
CB-4A	Long. Equalizer Cable Bracket	1

South Longitudinal Equalizer Machinery

MK	Item	Total
D-2S	Long. Equalizer Drum	1
SX-3S	Long. Equalizer Upper Sheave	4
SX-4S	Long. Equalizer Lower Sheave	2
S-5S	Long. Equalizer Drum Shaft	1
S-6S	Long. Equalizer Upper Sheave Shaft	2
S-7S	Long. Equalizer Upper Sheave Shaft	2
S-8	Long. Equalizer Lower Sheave Shaft	1
B-2	Long. Equalizer Drum Bearing	2
B-4	Long. Equalizer Upper Sheave Bearing	8
B-6	Long. Equalizer Lower Sheave Bearing	4
BS-1	South Long. Equalizer Drum Bearing Seat	1
BS-2	South Long. Equalizer Upper Sheave Bearing Seat	4
C3	Long. Equalizer Cable (long)	1
C4	Long. Equalizer Cable (short)	1
CB-3	Long. Equalizer Cable Bracket	2

CB-4	Long. Equalizer Cable Bracket	2

B Materials

B.1 General

Materials used to fabricate the new equalizer machinery components shall be as shown on the contract documents, and in accordance with the requirements specified in Bridge Machinery - General provisions.

All machinery shall be attached with new fasteners in accordance with the requirements specified in Bridge Machinery – General, unless specified otherwise.

B.2 Replacement Bearings

The forty-eight (48) existing equalizer bearings shall be replaced according to the following schedule:

MK	Total Quantity	Manufacturer & Model
B-2	23	Link Belt 21463Z
B-3	1	Link Belt F2263Z
B-4	12	Link Belt 21455Z
B-5	4	Link Belt F2247Z
B-6	8	Link Belt 21431Z

B.3 Longitudinal Equalizer Protective Covers

B.3.1 Drum Covers

Fabricate longitudinal equalizer drum protective covers from steel plates hot dipped galvanized to the requirements of ASTM A153. Steel plate shall be fabricated from ASTM A709 Grade 36. Round all sharp corners prior to galvanizing. All supporting members for the drum cover shall be ASTM A709 Grade 50 steel and be hot dipped galvanized to the requirements of ASTM A153. All bolts, nuts, and washers shall be galvanized with a Class 50 mechanically deposited zinc coating in accordance with the requirements of ASTM B695. After galvanizing, paint with approved 2 coat paint system.

B.3.2 Cable Covers

Fabricate longitudinal equalizer cable protective covers from 6” ABS Schedule 40 Cellular Core Pipe and DWV Fitting System that meets the requirements of ASTM D3965. Paint cable covers the same color as the lift span steel. Pipe shall be iron pipe size (IPS) conforming to ASTM F628. Fittings shall conform to ASTM D2661. Hangers for pipes shall be clevis hangers sized for a 6 inch pipe and be suspended by a 5/8” stainless steel rod attached to a galvanized steel beam clamp. Clevis hangers shall be manufactured of 304 stainless steel.

B.3.3 Cable Guide Bushings

Fabricate cable guide bushing plates from oil-impregnated bronze conforming to the requirements of ASTM B438 CT-1000-K26

C Construction

C.1 Removal of Equipment

Remove the equalizer machinery with utmost care, since a majority of it will be reused. Disposal of the machinery components not reused shall be accomplished in accord with existing local, state and federal regulations. All HAZMATS (Oils, greases, etc.) shall be handled as required by the appropriate EPA regulations. Remove existing anchors for pier mounted bearing and cable brackets to the face of the pier concrete.

C.2 Recondition Equalizer Sheaves and Shafts

All equalizer sheave and shaft assemblies are to be reused and refurbished. Prior to removal, each sheave assembly shall be uniquely labeled so it can be reinstalled in the same location from where it was removed. Care must be taken to assure the correct labeling is retained for each component during the cleaning process. Without removing the sheave from its respective shaft, remove grease and corrosion and repaint. Protect journals during blasting. Polish the shaft journals to remove scoring by removing 5 to 10 thousandths of an inch from the diameter (2 to 5 thousandths radially) of the journals. Measure and record final diameter of journals.

C.3 Recondition Equalizer Drums and Shafts

All equalizer drum and shaft assemblies are to be reused and refurbished. Prior to removal, each drum assembly shall be uniquely labeled so it can be reinstalled in the same location from where it was removed. Care must be taken to assure the correct labeling is retained for each component during the cleaning process. Without removing the drum from its respective shaft, remove grease and corrosion and repaint. Protect journals during blasting. Polish the shaft journals to remove scoring by removing 5 to 10 thousandths of an inch from the diameter (2 to 5 thousandths radially) of the journals. Measure and record final diameter of journals.

C.4 New Bearing Supports

Replace existing bearing brackets (BB-1) with new galvanized and painted brackets (BB-2) as detailed in the Plans. Install bearing brackets using Hilti HVA/HAS-SS or equivalent adhesive anchors. Replace bearing seats (BS-1, BS-2) galvanized and painted. Match the mounting hole patterns to those existing on the structural steel. Install bearing seats using existing girder with new galvanized high strength bolts, nuts and washers.

C.5 New Equalizer Cable Brackets

All equalizer cable brackets are to be newly fabricated. For cable brackets installed on the pier concrete (CB-3, CB-4, CB-4A), install using Hilti HVA/HAS SS or equivalent adhesive anchors. Remove existing anchors to the face of the concrete. For cable brackets installed on existing structural steel (CB-5), install using new ¾” diameter galvanized high strength bolts, nuts, and washers in existing holes in structural steel. For cable brackets installed on new structural steel (CB-6), install as shown on the contract documents. Galvanize and paint all brackets.

C.6 Cable Guide Bushing
Install new cable guide bushing plates at each location where the longitudinal equalizer cables pass through a floorbeam. Install one cable guide bushing plate on each side of the floorbeam web as shown on the Plans.

C.7 Cable Installation
The transverse and longitudinal equalizer drums shall be wound such that each continuous cable shall have the turns about the drum shown on the Plans, and shall be attached to the drum with new cable clamps. Attach ends of equalizer cables to cable brackets, and tighten such that all springs are deflected 1 inch. Raise the lift span to the up position and readjust springs such that all are deflected 1 inch. Operate lift span 2 times up and down. Repeat adjustment in the down and the up position. Operate lift span 10 times up and down. Repeat adjustment in the down and the up position. Continue operating the lift span in 10 lift increments and adjust cable tension until the tension is stable and unchanging. Small changes due to temperature may be noted. Record the spring deflection at all cable bracket locations.

C.8 Longitudinal Equalizer Machinery Covers
Install drum covers over the two longitudinal equalizer drums as shown in the plans. Shims are required, and tapered shims may be required above the new stringer to install the drum cover parallel to the drum shaft. Cables that pass through the floorbeams shall be protected by pipes mounted on closet flanges attached to the floorbeams. Pipes and closet flanges shall be cut in half longitudinally and aligned over the equalizer cables. Additional support shall be supplied by clevis hangers, rods, and beam clamps attached to the flanges of the channels that support the steel grid deck. Cables that pass under floor beams shall be protected by pipes as above, but supported solely by clevis hangers, rods, and beam clamps attached to the flanges of the channels that support the steel grid deck. Holes drilled in supporting structure shall be touched-up after drilling and prior to assembly by using a zinc rich paint.

D Measurement
The City will measure Equalizer Machinery, completed in accordance to the contract and accepted, as a single unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.10	Equalizer Machinery	LS

Payment is full compensation for furnishing all materials, labor, tools and equipment necessary to manufacture, assemble, install, erect, test, lubricate, paint and perform all incidental work to achieve a complete and acceptable installation.

Submit to the engineer for evaluation a full and complete breakdown of all costs under this item. The engineer has full authority to revise the breakdown, to suit his/her judgment, and make the various tasks more in conformity with the adjudged true values. The contractor agrees the detailed breakdown shall not be effective until it has been approved by the engineer.

Progress billing payments will be based upon the approved breakdown. Progress payments for Equalizer Machinery shall be made in accordance with the City of Milwaukee, Department of Public Works standard payment practices and in the following manner:

1. Upon completion and acceptance by the City of all shop detail drawings, the contractor will be paid 5% of the item bid price.
2. Upon completion and acceptance by the City of shop fabrication, shop inspection, shop testing, delivery and storage of materials, the contractor will be paid 35% of the item bid price
3. Upon completion and acceptance by the City of the Equalizer Machinery installation, alignment, bolting and protection of materials, the contractor will be paid 20% of the item bid price.
4. Upon completion and acceptance by the City of the Equalizer Machinery inspection and field testing the contractor will be paid 30% of the item bid price.
5. Upon completion of training and receipt and acceptance by the department and the city of approved Operating and Maintenance Manuals the contractor will be paid the remaining 10% of the item bid price.

46. Span Guides, Item SPV.0105.11

A Description

Under this item, remove the guide rail brakes, span guide rails, rollers, bearings, and support brackets. Recondition the existing guide rails. The two fixed end and two expansion end guide roller assemblies shall be of new fabrication, and all support brackets, bearings, and lubrication fittings shall be replaced. Reinstall, adjust, paint, test and place in satisfactory operation the Span Guides in each pier.

The span guides consist of the following major components:

MK	Item	Total
GR-1	Span Guide Rail	4
S-9	Span Guide Roller Shaft	2
S-10	Span Guide Roller Shaft	2
R-1	Span Guide Roller (fixed end)	2
R-2	Span Guide Roller (expansion end)	2
B-7	Span Guide Roller Bearing	8
RB-1	Span Guide Roller Support Bracket	4
TB-1	Roller Guide Thrust Bearing	4
TB-2	Roller Guide Thrust Bearing	4

B Materials

B.1 General

Materials used to fabricate the new span guide components shall be as shown on the contract documents, and in accordance with the requirements specified in Bridge Machinery - General provisions.

Fabricate new galvanized and painted support brackets meeting the requirements of ASTM A36. Fabricate new fixed and expansion end span guide rollers and shafts of material meeting the requirements of ASTM A148 GR 80-50 and ASTM A576 1141HR respectively. Fabricate new bronze thrust bearings meeting the requirements of ASTM B438. New guide rail clamp plates and fillers shall meet the requirements of ASTM A36.

B.2 New Bearings

The eight (8) existing span guide roller bearings shall be replaced with part No. 21239Z by Link Belt or equivalent.

C Construction

C.1 Removal of Equipment

Remove the span guide machinery with utmost care, since the guide rails will be reused. Disposal of the machinery components not reused shall be accomplished in accord with existing local, state and federal regulations. All HAZMATS (Oils, greases, etc.) shall be handled as required by the appropriate EPA regulations. Remove existing anchors for existing roller brackets to the surface of the pier concrete.

C.2 New Guide Rollers and Shafts

Fabricate new shaft and roller assemblies in accordance with the contract documents.

C.3 New Roller Support Brackets

Fabricate new roller support brackets in accordance with the contract documents. Install using Hilti HVA/HAS Stainless Steel or equivalent adhesive anchors.

Recondition Guide Rails

Remove the guide rails from the structural steel and remove grease and corrosion. After the structural steel has been reconditioned in accordance with the contract documents, reinstall the four (4) guide rails with new rail clamps and high strength galvanized fasteners. While the bridge is supported only at the jacking beam cylinder locations, each rail shall be reinstalled plumb, aligned with the center of the span guide rollers. All rail clamp plates, fillers and hardware shall be replaced with four bolt tight clamp type clamps. Install new rail clamps using bolt holes from their existing locations.

D Measurement

The City will measure Span Guides, completed in accordance to the contract and accepted, as a single unit of work

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.11	Span Guides	LS

Payment is full compensation for furnishing all materials, labor, tools and equipment necessary to manufacture, assemble, install, erect, test, lubricate, paint and perform all incidental work to achieve a complete and acceptable installation.

Submit to the engineer for evaluation a full and complete breakdown of all costs under this item. The engineer has full authority to revise the breakdown, to suit his/her judgment, and make the various tasks more in conformity with the adjudged true values. The contractor agrees the detailed breakdown shall not be effective until it has been approved by the engineer.

Progress billing payments will be based upon the approved breakdown. Progress payments for Span Guides shall be made in accordance with the City of Milwaukee, Department of Public Works and the department's standard payment practices and in the following manner:

1. Upon completion and acceptance by the City of all shop detail drawings, the contractor will be paid 5% of the item bid price.
2. Upon completion and acceptance by the City of shop fabrication, shop inspection, shop testing, delivery and storage of materials, the contractor will be paid 35% of the item bid price
3. Upon completion and acceptance by the City of the Span Guides installation, alignment, bolting and protection of materials, the contractor will be paid 20% of the item bid price.
4. Upon completion and acceptance by the City of the Span Guides inspection and field testing the contractor will be paid 30% of the item bid price.
5. Upon completion of training and receipt and acceptance by the department and the city of approved Operating and Maintenance Manuals the contractor will be paid the remaining 10% of the item bid price.

47. Electrical Control Equipment, Item SPV.0105.12

A Description

A.1 General

Under this item, furnish, test, and deliver to the City of Milwaukee in satisfactory operating condition the electrical control equipment for the control and operation of the hydraulically operated vertical lift bridge and specifically with the new Hydraulic Power Unit system specified in the Hydraulic System Special Provisions and other support equipment which shall include, but not limited to, a new control console, new relay cabinet, new 208 volt switchboard cabinet and new 480 volt switchboard cabinet

including spare parts and all required provisions for interlocking complete with all accessories as specified herein and as shown on the plans.

The electrical control equipment specified herein shall be coordinated as required, with the work of all other sections of the specifications and the plans, so that all installations shall operate as designed. Specific coordination is directed toward the Hydraulic System work. The electrical control equipment shall be tested as an integral part of the hydraulic equipment at the hydraulic system provider's facilities.

Any apparatus, device, circuit, appliance, material, or labor not herein specifically mentioned or included, but that may be found necessary to complete or perfect the installation and equipment in a manner acceptable to the engineer, shall be furnished by the contractor as if specifically included in these specifications, and without extra cost to the City.

A.2 Reference Standards.
Portions or all of certain recognized industry or association standards referred to herein as being a requirement of these specifications shall be considered as binding as though reproduced in full herein unless supplemented and/or modified by more stringent requirements in this specification. Unless otherwise stated, the reference standard shall be the standard which is current as of the date of issuance of these specifications. Reference may be made to standards either by full name or, for the sake of brevity, by letter designation as follows:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute, Inc.
ASME	American Society of Mechanical Engineers
AWG	American Wire Gauge
ICEA	Insulated Cable Engineer's Association
JIC	Joint Industrial Council
NEC	National Electrical Code of NFPA
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories, Inc.

A.3 Drawings and Specifications.

A.3.1 General

Omissions from the drawings and specifications, or the mis-description of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the contractor from performing such omissions and details or work, but they shall be performed as if fully and correctly set forth and described in the drawings and specifications. In any case of discrepancy in figures, catalog numbers, or descriptions in the drawings or in the specifications, the matter shall be properly submitted to the engineer who shall promptly make determination in writing. Any adjustment in the plans by the contractor without written approval shall be at the contractor's own risk and expense.

A.3.2 Equipment Locations.

The layout drawings show, in general, the arrangements and location of all equipment. This shall be considered as illustrative. Final arrangement shall be subject to the approval of the Engineer. The Contractor shall modify it as necessary, for complete and proper construction and operation. The location of the equipment shown on the plans is diagrammatic only, and may be subject to shifting as required.

B Materials.

B.1 General.

All materials and equipment furnished under these specifications shall be new, except where noted and, to the extent possible, standard products of the various manufacturers. Where more than one of any specific item is required, all shall be of the same type and manufacturer. Items of equipment or material which are not specifically defined herein shall conform to the general standard of quality established herein.

All electrical devices, including their components, and any other electrical or electronic parts, shall be completely identified in such a way as to be easily procured from a supplier of that device. All prints and drawings of same shall show complete circuitry and identify all components as to their specific use and function in the circuit.

All ferrous metal work shall be hot-dip galvanized in accordance with ASTM A123 or ASTM A153, whichever is applicable. If any galvanizing is damaged, the metal work shall be refinished by cleaning and painting, with two coats of approved galvanizing repair paint, or approved zinc chromium paint.

Lock washers shall be provided on all mechanical fastenings.

B.2 Shop Drawings

Within 90 days after execution of the contract, submit shop drawings to the engineer. Submit full size drawings for those items requiring construction from such drawings. Provide descriptive leaflets for standard catalog items which are mass produced.

Submit shop drawings for the cabinet enclosures, contactors, relays, conductors, wiring devices, fasteners and other such equipment. No equipment is to be purchased without

approval of shop drawings. Shop drawings shall include manufacturer's test data, shall be certified by the manufacturer, and shall identify the application for which they are proposed.

Equipment identification shall be the same as shown on the drawings. Standard drawings showing more than one model or size shall be marked to indicate the model or size proposed.

Shop drawings of relay cabinet containing electrical equipment shall include outside dimensions, areas for conduit penetrations, one-line and three-line diagrams, wiring diagrams, schematic and interconnection diagrams, terminal block arrangements and numbers if such terminal blocks are intended for connection of field wiring, and operating instructions.

Submit shop drawings when installation and mounting details of switches, fixtures, and devices are different from or not specifically detailed on the drawings.

If requested by the engineer, submit for inspection samples of the proposed substitute items at no additional cost to the city. Submit all support data in quintuplicate for checking. Neither the city nor the engineer will be liable for any materials purchased or work done or any delay incurred prior to their review. Failure of the engineer to note unsatisfactory materials as received will not relieve the contractor from responsibility. Deliver manufacturers' guarantees or warranties on materials to the engineer upon receipt of the materials.

Working drawings shall be made on standard 22 in. x 34 in. sheets. Drawings submitted for review may be 11in. x 17in., half size. Catalog cuts and manufacturers' standard drawings may be submitted on their respective standard sizes. Submit them to the engineer for review and distribution.

The engineer will not be responsible for errors of submitted working drawings, even though approval has been indicated, or for quantities or bills of material which may be included. Any failure of the engineer to correct errors on working drawings, or implied approval thereof, shall not relieve the contractor of the full responsibility for the safe and adequate execution of the work in accordance with the plans and specifications.

After review of the working drawings by the engineer, no changes shall be made without resubmission for approval by the engineer, and all changes or revisions later made shall be clearly marked and dated.

Before final payment is made, deliver to the City two sets of as-built drawings reflecting all changed or modifications made from the contract drawings having to do with the finished system. One set of as-built drawings will be given to the city.

As-built drawings shall be suitable for permanent storage, and any reproducible material which is subject to fading when exposed to light will not be acceptable.

B.3 References
Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design. Whenever any article, materials, or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or approved equal", if not inserted, shall be implied, except as otherwise noted.

B.4 Substitutions
Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design.

Equipment for which an acceptable manufacturer is not specifically named, or named equipment for which substitution is proposed, shall be manufactured by a company which has had a minimum of ten years of experience in the manufacture of similar equipment and which, in the engineer's opinion, has demonstrated its proficiency in the manufacture of such equipment. All equipment will be subject to the engineer's approval.

B.5 Structural Steel
Material for support of limit switches shall conform to the requirements of ASTM A36 structural carbon steel. Bolts used shall conform to the requirements of ASTM A325 Type 1 bolts and hardened steel washers shall be provided as shown in the plans. All material shall be hot-dip galvanized with approved 2 coat paint system specified under Bridge Structural Steel.

C Construction
C.1 General.
All work shall be executed in a neat and workmanlike manner and shall present a neat and mechanical appearance when completed. Upon completion of the contract, deliver to the engineer a corrected plan showing in detail all changes on construction from the original plans, especially location and sizes of conduits, complete schematic circuit diagrams and the like.

Provide all terminal strips with approved permanent terminal markings for each connected conductor in service. Place the marking on a material which will not be affected by age or moisture and apply two coats of clear lacquer or other suitable material after placing the markings to prevent fading over an extended time period.

C.2 Circuit Identification
Each conductor or circuit, as shown on the plans, shall be identified at both ends with an identification tag. Tags shall be machine or computer generated, non-releasing holding device. Identification shall be permanent and waterproof.

C.3 Nameplates
Provide nameplate for all major pieces of equipment named on the drawings, for all devices on the in the cabinet enclosure. Nameplate shall be made of laminated micarta or textolite with chamfered edges, and shall be engraved to show BLACK letters on a WHITE background. They shall be mounted with stainless steel screws. Nameplates for devices shall show the device designation used on the schematic wiring diagram. Fuse nameplates shall show the type, ampere, and voltage rating of the fuses.

C.4 Motors
Motors, furnished as part of the Hydraulic System and provided by others, shall be built in accordance with NEMA standards. All exposed metal surfaces shall be protected with a moisture-proof corrosion-resistant polyester paint or coating. Exposed unpainted and uncoated metal surfaces shall be of a heavy-duty corrosion-resistant material. The rotors shall be balanced mechanically and electrically. All windings shall be provided with special insulation to retard decrease in insulation resistance due to excessive moisture. Each motor shall have Class B insulation.

Furnish each motor with a cast-iron frame, bearing brackets with re-lubrication fittings and conduit connection box.

Each hydraulic pump motor shall be 480 volt, 3-phase, 60-Hertz, totally enclosed, fan cooled, 60-minute rated, squirrel cage induction motor.

C.5 Panelboard
Mount a panelboard within the relay cabinet as shown on the drawings. Construction shall be as follows:

(1) Cabinet. Panel shall be dead front type and enclosed in a code gauge galvanized sheet steel cabinet complete with hinged door, lock and two keys, finished in ANSI 61 Light Gray enamel paint, with circuit directory filled out in type and with all exposed metal surfaces prime coated and factory painted.

Cabinets shall be of sufficient size to provide gutter space no less than that required by the Underwriter's Laboratories and in no case less than 4 inches.

(2) Mains. Circuit breakers shall be changeable without additional machining, drilling or tapping. Branch circuit connections shall provide sequence phasing, with connections permanently identified on the face of the front of the panel interior.

Mains shall be equipped with automatic circuit breakers for branch circuit protection and shall have ratings as indicated. All single pole branches shall be rated 20 ampere, unless indicated otherwise.

Buses shall be rigid copper or copper alloy, installed to provide consecutive phasing. Solid neutral bus shall have solderless connectors, shall be insulated from the cabinet and shall have an ampacity equal to the ampacity of the phase buses. Equipment grounding

bus shall be bonded to the cabinet, shall have solderless connectors and a main lug. All copper parts shall be plated to prevent corrosion.

(3) Branches. Circuit breakers shall be of the indicating type, providing distinctive "on", "off", and "tripped" positions of the operating handle. All multi-pole breakers shall be so designed that an overload in any one pole automatically causes all poles to open. Multi-pole breakers shall have a single operating handle. Single pole 15 and 20 ampere branch breakers shall be UL listed for switching duty.

Breakers shall be thermal magnetic type having inverse time delay thermal trip on overloads and instantaneous magnetic trip on short circuit. Circuit breakers shall be quick-break, quick-make on manual, as well as automatic operation. Each circuit breaker shall be independently removable without disturbing adjacent units or other bus connections and shall be fastened to the main bus bars with a bolt-on connection. All copper parts shall be plated to prevent corrosion.

All 100 ampere frame breakers shall have an interrupting rating of 10,000 amperes A.C. All larger frame size breakers shall have an interrupting rating of 22,000 amperes.

All panelboards shall be factory assembled, UL listed, Type NQOB as manufactured by Cutler-Hammer, Square D, Westinghouse, General Electric, or approved equal.

C.6 Motor Starters Contactors

The new starter contactors shall conform to NEMA Standards and shall be of the size and style as shown on the drawings. All motor starters shall be of the full voltage type with overload relays, auxiliary contacts and all accessories as required by the drawings and specified herein. Furnish motor overload elements to match motors provided in accordance with manufacturer’s instructions.

Motor starters shall be 3-pole, 480 volt or 208 volt, full voltage, magnetic type as shown on the drawings. Circuit breakers for motor protection shall be of the adjustable instantaneous type sized for the motor to be connected.

Metering equipment and all accessories shown on the drawings or as required shall be mounted in the switchboard cabinet as shown on the drawings.

An incoming line transient voltage surge suppressor (TVSS) shall be provided and installed on the incoming line of the 480 Volt Switchboard Cabinet near the incoming line service breaker as shown on the drawings. The TVSS shall be a heavy duty unit with audible alarm, modular design, self-test capability, modular design, rated for 200ka for service entrance protection at 480 volt grounded delta. Unit shall be UL 1449 listed, 200KAIC rated fusing, less than ½ nanosecond response time and provided with a 5 year warranty. Unit shall be by National Lightning Protection Inc. Model XA-04-20-E1 or equal by MCG Electronics, Inc or EFI Electronics.

C.7 Control Panels.

C.7.1 General

The following general requirements apply to all panels and enclosures. Specific requirements are included later in this special provision with the description of each panel.

Furnish the following panels and enclosures:

Main Control Console
Relay Cabinet
480 Volt & 208 Volt Switchboard Cabinet

Electrical indicating instruments, unless otherwise specified, shall be of the analog meter type, with 2 percent accuracy classification, shall be designed for semi-flush mounting, and shall be 4¼" diameter. Instrument ranges and scales shall be as shown on the plans. Instruments shall be as manufactured by Crompton, Simpson, Red Lions or approved equal.

Push buttons, indicating lights, and non-illuminated selector switches shall be 30.5mm, heavy duty oil tight by Allen Bradley 800T, Square D type K or Cutler Hammer 10250T. Indicating lights shall be a one to four light display with individually controlled lamp and color lenses. Lens colors shall be as shown on the plans. Units shall have internal 120 VAC transformers and each lamp individually controlled. Engraving shall be as shown on the plans.

Key switches shall be double pole, double throw spring return or maintained contact type, heavy duty oil tight, as shown on the plans, Cutler Hammer type 10250T, Allen Bradley type 800T, Square D type K or approved equal. Switches shall be keyed as indicated on the plans to match existing City of Milwaukee key styles currently in use.

Toggle switches shall be 3 pole, double throw spring return or maintained contact type as indicated on the plans, 10A minimum at 115 VAC, with a red switch guard. Switch guard shall be red high strength plastic configured such that when closed it returns the toggle switch to the normal position.

All load relays (R166, R170, etc.) shall be 10 ampere, 600 volt rated, Allen Bradley Type P, Square D Type X or Cutler Hammer type M-600 with normally open and normally closed power poles as shown in the plans.

All panels and enclosures shall be of the freestanding type. The construction shall be of steel plate of thickness described in the individual panel specifications and shall consist of a frame of suitably sized, formed structural steel members joined by electrical welding to ensure true surfaces and adequate support for the instruments mounted thereon.

All welds on the exposed surfaces shall be ground smooth. Finished surfaces shall be free from waves, bellies or other imperfections. Exterior surfaces shall be sandblasted, ground smooth, filled, primed, sanded and finished.

All instrument cutouts, mounting studs, and support brackets shall be located accurately. Unless specified otherwise, doors shall be hinged and shall have turned-back edges and additional bracing where required to assure rigidity. Hinges shall be of the piano or concealed type. Door latches shall be of the three-point type to assure tight closing.

Before application of paint, all surfaces shall be carefully cleaned of all dirt, moisture, rust, scale, lubricants and other substances. Lubricants shall be removed by suitable solvents. Rust and scale shall be removed by sandblasting, power sanding, power grinding or power wire brushing.

Exterior finish shall consist of application of suitable primers and two or more finish coats of enamel, as required to provide a smooth, hard and durable finish. The finish color for control panels shall be ANSI 61 Light Gray.

Interior surfaces shall be finished with gloss white lacquer applied over suitable primers.

The supplier shall include six 16-ounce containers of touch-up paint in aerosol cans for each color specified above. Touch-up paint shall be of the same type and color as the finish paint used in the factory applied painting. Complete painting instructions shall accompany the touch-up paint.

Paint films shall be free of sags, checks, blisters, teardrops or fat edges. If any such defects appear, they shall be repaired by and at the expense of the supplier.

Provide interconnecting wiring between all electrical devices mounted in the panels and enclosures. If the devices are to be connected to external equipment, they shall be connected to terminal blocks. Conductors for connection of machine tool relays panelboard circuits and other miscellaneous equipment shall be UL listed type THWN-MTW. Minimum size shall be No. 14 AWG. For internal conductors between the PLC I/O cards and the field wiring terminals shall be of similar type with a minimum size of No. 16 AWG.

Install all interior wiring neatly and carefully. Terminate at suitable terminal blocks. Make all wire terminations with ring tongue nylon self-insulating wire terminals. Install wire terminals using a high compression indenting crimping tool that assures a full crimp by releasing the terminal only when the crimp is complete. All control and instrument wiring used within the panels shall conform to NEC and NEMA standards and shall be installed and tested at the factory.

Wiring to each control switch shall be individually bundled. Install with a "drop loop" of sufficient length to allow its removal from the panel for maintenance without disconnecting the wiring.

Internal wiring in factory pre-wired electronic system cabinets may be installed according to the manufacturer's standard as to wire size, insulation, and method of termination on internal equipment.

Provide terminal blocks for conductors requiring connection to circuits external to the specified equipment, for internal circuits crossing shipping splits, and where equipment parts replacement and maintenance will be facilitated.

Provide terminal blocks with white marking strips. All terminal blocks shall be rated 600 volts and have strap screw terminals. Standard terminal blocks for 8 AWG and smaller conductors shall be channel mounted screw type in groups of 12 and shall be Square D 9080 GP6, Allen Bradley 1492-CA1,Tyco/Buchanan Series 900 or approved equal. Variations in number of terminal blocks per group shall be as shown in the drawings. Identify individual terminal blocks using the numbering system shown in the plans, using ABB/Enterlec marker-holder catalog number PEBM 0113 084.01 or approved equal.

Provide terminal blocks with corrosion resistant plating’s on non-ferrous hardware.

Group terminal blocks for easy accessibility unrestricted by interference from structural members and instruments. Provide sufficient space on each side of each terminal block to allow an orderly arrangement of all leads to be terminated on the block.

Permanently label each terminal block, device, fuse block, terminal, and both ends of each conductor, to coincide with the identification indicated on the manufacturer's wiring diagrams. Terminal blocks and devices already numbered on the plans shall be so numbered on the equipment supplied. Identify mounted electronic components by marking with contrasting colored ink beside the component.

Identify individual conductors by permanent marking sleeves using handheld marking tapes or other computer generated software. The marking shall be done on a sleeve not less than 1/2 inch long. The inside diameter of the sleeve shall be such that it will slip snugly over the insulated wire. Mark each sleeve so that the identification shall be permanent and waterproof. Adhesive type labels are not acceptable.

Provide internal illumination in all panels and enclosures using 18" fluorescent strip fixtures. Install a lighting switch beside the access door inside the panels and enclosures. The control desk will not require internal lighting.

Provide a system of convenience outlets in each panel and enclosure for use with power tools, portable lamps, and other similar equipment. Furnish in each enclosure and the control desk a 120 volt AC circuit to feed the interior lighting, the convenience outlets and the illuminated indicators.

Prepare wiring diagrams on sheets approximately 22 inches by 34 inches. Where interconnecting wiring from different items of equipment or sectional wiring diagrams of

the same item of equipment appear on different wiring diagram sheets, all interconnections shall be clearly identified.

Information indicated on the contractor's drawings shall include wiring of the individual panel items as they actually will appear in the panel, contact arrangements of switches, and internal wiring of relays and instruments.

Elementary diagrams shall be cross-referenced to terminal markings on the connection and interconnection diagrams, but need not show complete details of circuits external to the panels. Identify each item of panel mounted equipment indicated on the diagrams by item number and name.

Factory test all control panels for circuit continuity and operation.

Provide laminated phenolic nameplates on the panel faces for all instruments and devices mounted on the panel faces, except where the instruments or devices are themselves provided with a service engraving. Attach phenolic nameplates to the panels with double-sided adhesive tape.

All nameplates shall be WHITE with BLACK engraved lettering unless specified otherwise.

C.7.2 Main Control Console

Furnish the Main Control Console, for operation of the lift span and its auxiliaries. All devices necessary for the electrical control of the bridge shall be mounted on this console.

Push buttons, indicating lights, and non-illuminated selector switches shall be 30.5mm, heavy duty oil tight by Allen Bradley 800T, Square D type K or Cutler Hammer 10250T. Indicating lights shall be a single light display with individually controlled lamp and color lenses. Lens colors shall be as shown on the plans. Units shall have internal 120 VAC transformers and lamps shall be LED type. Engraving shall be as shown on the plans.

Key switch shall be double pole, double throw maintained contact type, heavy duty oil tight, as shown on the plans, Cutler Hammer type 10250T or approved equal. Switch shall be keyed to type MD2 key to match existing City of Milwaukee key styles currently in use.

All load relays (R166, R170, etc.) shall be 10 ampere, 600 volt rated, Allen Bradley Type P, Square D Type X or Cutler Hammer type M-600 with normally open and normally closed power poles as shown in the plans.

The control console shall be of neat, substantial construction, arranged as shown on the plans. It shall be fabricated from not less than No. 11 gauge sheet metal properly formed, and suitably reinforced by steel angles to provide adequate strength. The flat top and

inclined portions of the console top shall be 10 gauge brushed stainless sheet steel. The top and front slope shall be of non-reflecting finish.

Provide removable doors in the front of each console, secured with 3-way latches. The console shall be neatly fitted up with close joints, and all rough edges or corners shall be ground off smooth and all projecting edges rounded off. All metal hardware shall be of substantial construction, and shall have a satin-chrome plate finish.

The bottom shall be of open type construction. The opening shall be framed with standard size strut, arranged to facilitate the clamping of cables or conduits.

Mount the span control switches and other control devices within the body of each console. Mount the indicating lights for each operation inside or adjacent to the control device governing that operation as indicated.

(1) Indicating Lights - Functions to be indicated, and the color of the caps for such indication shall be as shown on the plans. Each indicating light shall be as shown on layout. Each lens shall be provided with an engraved legend, as indicated on the plans, which shall be readily visible when the lamp is energized. Each indicating light shall be similar to type shown and it shall be suitable for mounting on the desk top provided.

(2) Span Operated Counter shall be 120VAC, 6-digit, panel mount, non-reset. Unit shall count 1/2 digit on a closed contact and 1/2 digit on an open contact.

C.7.3 Relay Cabinet

The Relay Cabinet shall be of neat, substantial construction, arranged as shown on the plans. It shall be fabricated from not less than No. 12 gauge sheet steel metal properly formed, and suitably reinforced by steel angles to provide adequate strength. The door shall be 12 gauge sheet steel. The cabinet shall be Hoffman Engineering Co. catalog number A72XM7818FTC with back panel, Hammond Industries catalog number 2UHD727818A with back panel or approved equal. The general arrangement may be varied to fit specific equipment used. The cabinet dimensions shall not be exceeded. The cabinet shall have a nameplate attached to the left hand door. Nameplates shall be not less than one inch high and shall be attached with screws. Provide a thermostat controlled cooling fan with filtered intake and exhaust vents with the cabinet.

Factory test the relay cabinet for circuit continuity and operation with associated equipment prior to shipment for testing with the hydraulic equipment and to the job site.

C.7.4 480 Volt Switchboard Cabinet

The 480 volt switchboard cabinet shall be of neat, substantial construction, arranged as shown on the plans. It shall be fabricated from not less than No. 12 gauge sheet steel metal properly formed, and suitably reinforced by steel angles to provide adequate strength. The door shall be 12 gauge sheet steel. The cabinet shall be provided with flange mounted disconnect switch. The cabinet shall be Hoffman Engineering Co. catalog number A72XM5418FTC with back panel, Hammond Industries catalog number

2UHD725418A or approved equal. The general arrangement may be varied to fit specific equipment used. The cabinet dimensions shall not be exceeded. The cabinet shall have a nameplate attached to the left hand door. Nameplates shall be not less than one inch high and shall be attached with screws. Provide a thermostat controlled cooling fan with filtered intake and exhaust vents with the cabinet.

Factory test the switchboard cabinet for circuit continuity and operation with associated equipment prior to shipment for testing with the hydraulic equipment and to the job site.

C.7.5 208 Volt Cabinet

The 208 volt cabinet shall be of neat, substantial construction, arranged as shown on the plans. It shall be fabricated from not less than No. 12 gauge sheet steel metal properly formed, and suitable reinforced by steel angles to provide adequate strength. The door shall be 12 gauge sheet steel. The cabinet shall be provided with flange mounted disconnect switch. The cabinet shall be Hoffman Engineering Co. catalog number A72XM5418FTC with back panel, Hammond Industries catalog number 2UHD725418A or approved equal. The general arrangement may be varied to fit specific equipment used. The cabinet dimensions shall not be exceeded. The cabinet shall have a nameplate attached to the left hand door. Nameplates shall be not less than one inch high and shall be attached with screws. Provide a cooling fan with filtered intake and exhaust vents with the cabinet.

Factory test the 208 volt cabinet for circuit continuity and operation with associated equipment prior to shipment for testing with the hydraulic equipment and to the job site.

C.7.6 Testing

Pre-test the complete electrical control system at the system integrators location. Testing shall include the control console, relay cabinet and both switchboards. At the completion of the preliminary testing, the electrical control equipment shall be tested as an integral system with the hydraulic equipment specified in the Bridge Hydraulic System, SPV.0105.07 in these Special Provisions.

External field devices such as limit switches, traffic barriers etc., shall be simulated using a test panel capable of being switched to indicate different switch positions. Outputs to field devices shall be simulated using light panels.

Notify the engineer at least 30 days prior to the test so that he can arrange to witness the test.

The System Integrator's cost (if any) of debugging the control system shall be included in the contract.

C.8 Maintenance Manuals.

C.8.1 General

Furnish 6 bound copies each in loose-leaf booklets. The materials shall be bound the booklet between rigid plastic or cloth binding covers. The manual shall be approximately

9 inches by 12 inches, and large enough to contain the drawings without excessive folding so that they may be easily opened. The booklet shall be neatly entitled with a descriptive title, the name of the project, the location, year of installation, owner, supplier and engineer. Copies of drawings shall be in black on white background and shall be easily legible. The arrangements of the booklet, the method of binding, materials to be included, and the composite text shall all be reviewed and approved by the engineer.

C.8.2 Manual Contents

The manual shall contain the following:

(1) Table of Contents.

(2) Detailed maintenance instructions for adjusting, lubricating, and operating all of the electrical equipment, including manufacturer's recommended preventative maintenance lubrication schedule.

(3) A set of descriptive leaflets, bulletins, and drawings covering all items of equipment and apparatus made a part of the completed bridge operation and control. The catalog number of each piece in the event it becomes necessary to order replacement parts from the manufacturer. This information shall be furnished for all electrical equipment such as motors, switches, circuit breakers, relays, cables, etc.

(4) Copies of all warranties on equipment supplied to the project.

(5) The spare parts list.

(6) All schematics and wiring diagrams.

(7) All submitted shop drawings.

C.9 Field Tests

C.9.1 Preliminary Checkout Period

Arrange for and provide all the necessary field tests, as indicated herein and as directed by the engineer, to demonstrate that the equipment is in proper working order operates the new hydraulic system in accordance with the plans and specifications.

The contractor shall be responsible for operation and maintenance, including all costs thereof, for systems or equipment temporarily placed in operation for testing and adjusting purposes or for the convenience or necessity of the contractor, prior to final acceptance by the engineer.

The contractor shall instruct the bridge operating and maintenance personnel in the operation of equipment during test runs and prior to acceptance.

C.9.2 Operational Testing Period
After the span is operating to the satisfaction of the engineer, an operational test period of not less than one week shall begin, during which time all aspects Hydraulic System relay cabinet will be tested and observed during operation. During this period, the contractor shall make any repairs necessary as a result of equipment failure due to faulty equipment or workmanship. Should preliminary checks or operational tests show that any piece of equipment furnished by the contractor, 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 completely acceptable to the engineer, and at no extra cost to the city.

C.10 Spare Parts
Furnish the following spare parts:

(a) One circuit breaker of each kind and size installed in the panelboards.

(b) Three control relays with a minimum of one contact block with 4 contacts installed on the relay.

(c) A quantity of 30% (3 minimum) of the total for each size and type of thermal overload relay installed.

(d) For the control desk lights:

12 indicating lamps for each type installed
1 color cap of each color and legend

(e) For the maintenance panel indicating lights:

6 indicating lamps for each type and color installed.

Provide spare parts in sealed, uniform-sized cartons, with typed and clearly varnished labels to indicate their contents. Provide a directory of permanent type describing the parts. The directory shall state the name of each part, the manufacturer's number therefore, and the rating of the device for which the part is a spare. The spare parts shall also be marked to correspond with their respective item numbers as indicated on the elementary wiring diagram.

C.11 Guarantee
The contractor shall be responsible for the proper performance in part and as a whole of the electrical equipment provided for the operation of the lift spans and related parts for a period of one year after the completion of the operational testing period and final acceptance from the City. During the one year period of operation, the contractor shall correct at his own expense any difficulties in the operation which may arise as the result of defects of material, equipment and manufacture. Responsibility for such correction shall include the repair, readjustment and replacement not only of such defective parts,

but other parts which may have been damaged thereby. The City reserves the right to correct any such defects, and the contractor shall pay the cost thereof. The contractor shall give a written guarantee satisfactory to the city to insure the carrying out of the obligations.

D Measurement
The City will measure Electrical Control Equipment completed in accordance to the contract and accepted, as a single unit of work.

E Payment.
The City will pay for the measured quantity at the contract unit price under the following bid item:

Item Number	Description	Unit
SPV.0105.12	Electrical Control Equipment	LS

Payment is full compensation for furnishing the electrical control equipment as specified, ready for operation; for Operation and Maintenance manuals; and for furnishing all shop drawings, materials, labor, tools, equipment, incidentals and services necessary to achieve a complete and acceptable installation.

48. Traffic Control Equipment, Item SPV.0105.13

A Description
A.1 General
Under this item, furnish and install in satisfactory operating condition the traffic control equipment and other support equipment which shall include, but not limited to, new traffic barriers and warning bells including spare parts and all required provisions for interlocking complete with all accessories as specified herein and as shown on the plans.

The traffic control equipment herein shall be coordinated as required, so that all installations shall operate as designed. The traffic control equipment shall be pre tested prior to shipment to the project site. The traffic control equipment shall be furnished and installed on the Pleasant Street Bridge, fully assembled and tested, ready for connection to the bridge control system. Connection to the bridge control system to be by the City of Milwaukee.

Any apparatus, device, circuit, appliance, material, or labor not herein specifically mentioned or included, but that may be found necessary to complete or perfect the installation and equipment in a manner acceptable to the engineer, shall be furnished by the contractor as if specifically included in these specifications, and without extra cost to the city.

A.2 Reference Standards.
Portions or all of certain recognized industry or association standards referred to herein as being a requirement of these specifications shall be considered as binding as though reproduced in full herein unless supplemented and/or modified by more stringent requirements in this specification. Unless otherwise stated, the reference standard shall be the standard which is current as of the date of issuance of these specifications. Reference may be made to standards either by full name or, for the sake of brevity, by letter designation as follows:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute, Inc.
ASME	American Society of Mechanical Engineers
AWG	American Wire Gauge
ICEA	Insulated Cable Engineer's Association
NEC	National Electrical Code of NFPA
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories, Inc.

A.3 Drawings and Specifications.
A.3.1 General
Omissions from the drawings and specifications, or the mis-description of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the contractor from performing such omissions and details or work, but they shall be performed as if fully and correctly set forth and described in the drawings and specifications. In any case of discrepancy in figures, catalog numbers, or descriptions in the drawings or in the specifications, the matter shall be properly submitted to the engineer who shall promptly make determination in writing. Any adjustment in the plans by the contractor without written approval shall be at the contractor's own risk and expense.

B Materials.
B.1 General.
All materials and equipment furnished under these specifications shall be new, except where noted and, to the extent possible, standard products of the various manufacturers. Where more than one of any specific item is required, all shall be of the same type and manufacturer. Items of equipment or material which are not specifically defined herein shall conform to the general standard of quality established herein.

All electrical devices, including their components, and any other electrical or electronic parts, shall be completely identified in such a way as to be easily procured from a supplier of that device. All prints and drawings of same shall show complete circuitry and identify all components as to their specific use and function in the circuit.

All ferrous metal work shall be hot-dip galvanized in accordance with ASTM A123 or ASTM A153, whichever is applicable. If any galvanizing is damaged, the metal work shall be refinished by cleaning and painting, with two coats of approved galvanizing repair paint, or approved zinc chromium paint.

Lock washers shall be provided on all mechanical fastenings.

B.2 Shop Drawings

Within 90 days after execution of the contract, submit shop drawings to the engineer. Submit full size drawings for those items requiring construction from such drawings. Provide descriptive leaflets for standard catalog items which are mass produced.

Equipment identification shall be the same as shown on the drawings. Standard drawings showing more than one model or size shall be marked to indicate the model or size proposed.

If requested by the engineer, submit for inspection samples of the proposed substitute items at no additional cost to the City. Submit all support data in quintuplicate for checking. Neither the City nor the engineer will be liable for any materials purchased or work done or any delay incurred prior to their review. Failure of the engineer to note unsatisfactory materials as received will not relieve the contractor from responsibility. Deliver manufacturers' guarantees or warranties on materials to the engineer upon receipt of the materials.

Working drawings shall be made on standard 22 in. x 34 in. sheets. Drawings submitted for review may be 11in. x 17in., half size. Catalog cuts and manufacturers' standard drawings may be submitted on their respective standard sizes. Submit them to the engineer for review and distribution.

The engineer will not be responsible for errors of working drawings, even though approval has been indicated, or for quantities or bills of material which may be included. Any failure of the engineer to correct errors on working drawings, or implied approval thereof, shall not relieve the contractor of the full responsibility for the safe and adequate execution of the work in accordance with the plans and specifications.

After review of the working drawings by the engineer, no changes shall be made without resubmission for approval by the engineer, and all changes or revisions later made shall be clearly marked and dated.

Before final payment is made, deliver to the city two sets of as-built drawings reflecting all changed or modifications made from the contract drawings having to do with the finished structure. Two sets of as-built drawings will be given to the city.

As-built drawings shall be suitable for permanent storage, and any reproducible material which is subject to fading when exposed to light will not be acceptable.

B.3 References

Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design. Whenever any article, materials, or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or approved equal", if not inserted, shall be implied, except as otherwise noted.

B.4 Substitutions

Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design.

Equipment for which an acceptable manufacturer is not specifically named, or named equipment for which substitution is proposed, shall be manufactured by a company which has had a minimum of ten years of experience in the manufacture of similar equipment and which, in the engineer's opinion, has demonstrated its proficiency in the manufacture of such equipment. All equipment will be subject to the engineer's approval.

B.5 Structural Steel

Material for support of limit switches shall conform to the requirements of ASTM A36 structural carbon steel. Bolts used shall conform to the requirements of ASTM A325 Type 1 bolts and hardened steel washers shall be provided as shown in the plans. All material shall be hot-dip galvanized with approved 2 coat paint system specified under Bridge Structural Steel.

C Construction

C.1 General.

All work shall be executed in a neat and workmanlike manner and shall present a neat and mechanical appearance when completed. Upon completion of the contract, deliver to the engineer a corrected plan showing in detail all changes on construction from the original plans, especially location and sizes of conduits, complete schematic circuit diagrams and the like.

Provide all terminal strips with approved permanent terminal markings for each connected conductor in service. Place the marking on a material which will not be affected by age or moisture and apply two coats of clear lacquer after placing the markings.

C.2 Circuit Identification
Each conductor or circuit shall be identified at both ends with an identification tag or permanent marking tag. Tags shall be machine or computer generated, non-releasing holding device. Identification shall be permanent and waterproof.

C.3 Nameplates
Provide nameplate for all major pieces of equipment named on the drawings, for all devices on the in the cabinet enclosure. Nameplate shall be made of laminated micarta or textolite with chamfered edges, and shall be engraved to show BLACK letters on a WHITE background. They shall be mounted with stainless steel screws. Nameplates for devices shall show the device designation used on the schematic wiring diagram. Fuse nameplates shall show the type, ampere, and voltage rating of the fuses.

C.4 Motors
Motors, furnished as part of the Traffic Barriers, shall be built in accordance with NEMA standards. All exposed metal surfaces shall be protected with a moisture-proof corrosion-resistant polyester paint or coating. Exposed unpainted and uncoated metal surfaces shall be of a heavy-duty corrosion-resistant material. The rotors shall be balanced mechanically and electrically. All windings shall be provided with special insulation to retard decrease in insulation resistance due to excessive moisture. Each motor shall have Class B insulation.

Furnish each motor with a cast-iron frame, bearing brackets with re-lubrication fittings and conduit connection box.

Each traffic barrier motor shall be 208 volt, 3-phase, 60-Hertz, totally enclosed, fan cooled, 60-minute rated, squirrel cage induction motor.

C.5 Traffic Barriers
Traffic barriers shall be as detailed on the drawings. Each barrier shall be designed for use as a penetration barrier and shall be explicitly designed for traffic control on movable bridges. Each barrier shall have an arm of the length indicated on the drawings, which shall open through an angle of 90 degrees from the horizontal to the vertical. Each barrier housing shall be constructed from 3/8” carbon steel, hot dip galvanized after fabrication. Exterior surfaces shall be painted a color to be determined by the City of Milwaukee at the time of shop drawing submittal. All fasteners shall be corrosion resistant. Housing shall be designed to allow ease of maintenance and removal of shaft components. Arm assembly shall be fully gasketed and shaft openings shall incorporate O-ring seals. Housing shall have front and back access doors mounted on full cross straps. Hinges shall be of the slip-off type and shall have stainless steel pins. Doors shall be secured with two handles using a vise action to compress a neoprene gasket to provide a weatherproof seal for the motor, disconnect switches, gear train and limit switches and shall be lockable with all handles keyed alike. The transmission gearing for each barrier shall be enclosed.

The traffic barrier assemblies shall be heavy duty model VR-6 as manufactured by B&B Roadway Corp., Russellville, AL or approved equal.

The barrier arm design shall be of a double rail aluminum tube. Stainless steel truss cables and a damping type bumper rod shall be furnished if recommended by 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" wide and shall slope at 45 degrees down toward the arm tip. Remaining exposed surfaces shall be painted white.

Energy absorption cables shall be utilized to assist in diffusing the kinetic energy of an impacting vehicle. The barrier shall be capable of absorbing the energy of a 5000 pound vehicle traveling up to 50 mph. The double rail aluminum tube resistance arm shall two ½" cables, one in each tube. The energy absorption cables shall be anchored at both ends of the barrier arm span while in the closed or lowered position.

All bolts, screws or other fastenings used in the barrier arm assembly and for connection to the barrier stand shall be of corrosion-resistant metal or shall be hot-dip galvanized.

The number of warning lights on the barrier arms shall be as indicated on the Plans. Each warning light shall be a weatherproof, two-way, cast aluminum unit with red Fresnel lenses front and back. The lights shall be interconnected with three-conductor portable cord using watertight connectors at the fixtures. The lights shall be connected so that adjacent units will flash alternately. Lamps shall be LED type. Fuses for the warning lights shall be midget cartridge fuses installed in molded rubber connection kits. Provide cannon plug connectors from the barrier housing to the barrier arm for the warning lights.

An 8-circuit heavy-duty limit switch shall be provided in each barrier, operated by the barrier mechanism. Each limit switch shall be a rotary, cam-type switch and it shall be gear-driven from the transmission. The contacts shall be quick-break with silver alloy buttons. The limit switch shaft shall be stainless steel, and cams shall be secured with set screws.

The motor for each barrier shall be furnished as part of the barrier assembly by the barrier manufacturer. Each motor shall be a totally enclosed, 480 volt, three-phase, 60-cycle ball-bearing induction motor complete with solenoid released brake and shall be capable of withstanding instant reversal when running at full speed. Each motor and gear train shall be capable of raising or lowering the barrier arm in 16 seconds. A motor-mounted, spring-set, magnetically released disc brake shall be provided for stopping and holding the mechanism. The brake shall have a manual release lever to permit manual operation of the barrier. A watertight disconnect switch shall be provided to permit disconnecting the motor and brake from the incoming power. A hand crank shall be provided with each barrier operator to facilitate manual operation of the barrier.

Each traffic barrier housing shall come equipped with a 175 watt heater and thermostat as well as a switched service light and duplex, 15 ampere, 120 volt, GFI specification grade

receptacle. All internal wiring for each barrier shall be brought to numbered terminal blocks inside the housing for the connection of external circuits.

Each traffic barrier housing shall be bolted to its concrete foundation as indicated on the Plans. Anchor bolts shall be furnished with the barrier by the manufacturer. In erecting the traffic barrier, the arms shall be carefully attached to the supporting members so as to make a rigid connection. The arms shall be counterbalanced and the limit switches adjusted so that the arms are stopped in a truly vertical or horizontal position.

The traffic barrier flasher unit (4 required) shall be mounted within the relay cabinet as shown on the plans. The flasher shall be rated 120 volts AC, consisting of four (4) flashing circuits one for each barrier operator. Each circuit shall flash .50 seconds on and .50 seconds off. Flasher output circuits shall be rated at 5 amps minimum at 120 volts. Flasher shall be Roadway Manufacturing catalog number PFL-120VAC-10A, or approved equal.

C.6 Traffic Barrier Mounted Warning Bell

Provide and mount warning gongs on the southeast and southwest traffic barriers as shown on the plans. The warning gong shall be a twelve-inch motor driven gong type, and operate at 120 VAC. Each warning gong shall be B&B Roadway Corp., Russellville, AL model G-12 or approved equal.

C.7 Maintenance Manuals.

C.7.1 General

Furnish 6 bound copies each in a loose-leaf booklets. The materials shall be bound the booklet between rigid plastic or cloth binding covers. The manual shall be approximately 9 inches by 12 inches, and large enough to contain the drawings without excessive folding so that they may be easily opened. The booklet shall be neatly entitled with a descriptive title, the name of the project, the location, year of installation, owner, supplier and engineer. Copies of drawings shall be in black on white background and shall be easily legible. The arrangements of the booklet, the method of binding, materials to be included, and the composite text shall all be reviewed and approved by the engineer.

C.7.2 Manual Contents

The manual shall contain the following:

(1) Table of Contents.

(2) Detailed maintenance instructions for adjusting, lubricating, and operating the traffic barriers and warning bells, including manufacturer's recommended preventative maintenance lubrication schedule.

(3) A set of descriptive leaflets, bulletins, and drawings covering all items of equipment and apparatus made a part of the traffic control equipment. The catalog number of each piece in the event it becomes necessary to order replacement parts from the manufacturer.

This information shall be furnished for all electrical equipment such as motors, limit switches, fuses, transformers, warning lights, etc.

(4) Copies of all warranties on equipment supplied to the equipment.

(5) The spare parts list.

(6) All schematics and wiring diagrams.

(7) All submitted shop drawings.

C.8 Spare Parts
Furnish the following spare parts for the traffic barrier:

One complete set or pair of barriers complete with barrier operator, barrier arm, warning lights and all accessories.
One warning light flasher unit.
6 warning light lamps

Provide spare parts in sealed, uniform-sized cartons, except barrier arms, with typed and clearly readable labels to indicate their contents.

C.9 Warranty
Provide a 2 year warranty that shall cover the traffic barrier and related equipment against defective material and components. Manufacturer shall furnish replacement parts for a minimum of 10 years. Replacement parts for standard components shall normally be available within 1 working day.

D Measurement
The city will measure Traffic Control Equipment completed in accordance to the contract and accepted, as a single unit or work.

E Payment.
The city will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.13	Traffic Control Equipment	LS

Payment is full compensation for furnishing and installing the traffic control equipment as specified, ready for operation; for Operation and Maintenance manuals; and for furnishing all shop drawings, materials, labor, tools, equipment, incidentals and services necessary to achieve a complete and acceptable installation.

49. Utility Service Work, Item SPV.0105.14

A Description

A.1 General

This section describes the General Requirements for the work to be completed for the installation of the new electrical utility service as specific under these Special Provisions. Under this item, furnish, install all raceways, conductors, disconnect switches and other equipment as specified herein and as shown on the plans.

The new utility service specified herein shall be coordinated as required, with the work of all other sections of the specifications and the plans, so that all installations shall operate as designed.

The work also includes providing new utility services on both the west side and east side of the bridge from the utility service connection point to the east side and west side service disconnect switches including the utility metering devices, disconnect switches and automatic transfer switch. All work from the disconnect switches to the bridge distribution system will be by others. The transfer switch shall be provided to the City of Milwaukee for installation by others.

Any apparatus, device, circuit, appliance, material, or labor not herein specifically mentioned or included, but that may be found necessary to complete or perfect the installation and equipment in a manner acceptable to the engineer, shall be furnished as if specifically included in these specifications.

A.2 Reference Standards.

Portions or all of certain recognized industry or association standards referred to herein as being a requirement of these specifications shall be considered as binding as though reproduced in full herein unless supplemented and/or modified by more stringent requirements in this specification. Unless otherwise stated, the reference standard shall be the standard which is current as of the date of issuance of these specifications. Reference may be made to standards either by full name or, for the sake of brevity, by letter designation as follows:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute, Inc.
ASME	American Society of Mechanical Engineers
AWG	American Wire Gauge
EPA	Environmental Protection Agency
IES	Illuminating Engineering Society

ICEA	Insulated Cable Engineer's Association
JIC	Joint Industrial Council
NEC	National Electrical Code of NFPA
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act
UL	Underwriters' Laboratories, Inc.

A.3 Permits and Codes.
The electrical installation shall comply with the National Electrical Code and all applicable laws and ordinances in effect at the construction site and with regulations of the utility companies furnishing power services to the site.

A.4 Drawings and Specifications.
A.4.1 General
Omissions from the drawings and specifications, or the mis-description of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall be performed as if fully and correctly set forth and described in the drawings and specifications. In any case of discrepancy in figures, catalog numbers, or descriptions in the drawings or in the specifications, the matter shall be properly submitted to the engineer who shall promptly make determination in writing. Any adjustment in the plans by the contractor without written approval shall be at the contractor's own risk and expense.

A.4.2 Equipment Locations.
The layout drawings show, in general, the arrangements and location of all equipment. This shall be considered as illustrative and subject to the approval of the Engineer; the Contractor shall modify it as necessary, for complete and proper construction and operation. The location of the conduits, boxes, and equipment shown on the plan is diagrammatic only, and may be subject to shifting as required or as the engineer may direct in order to conform to local conditions. The design drawings may be utilized in the preparation of the shop or as-built drawings showing the permanent construction as actually made.

A.4.3 Circuit-and-Raceway Schedules.
Specification and data sheets for most of the circuits and raceways are included in the drawings. These data sheets fully describe the raceways shown on the plan sheets, and fully describe the circuits enclosed in the scheduled raceways. Raceways and circuits used solely for lighting and general purpose receptacles are shown only on the plans, and are not included in the schedules.

The Raceway Schedule is keyed to the raceway numbers as they appear on the plan sheets. The schedule gives the raceway type (galvanized steel - GRS, PVC coated rigid steel - PVGR, etc.), fill (total area of enclosed circuits) trade size (nominal inside dimension), and a list of the enclosed circuits.

The Circuit Schedules are keyed to the circuit numbers as they appear in the wiring diagrams. The schedules give the origin and destination of each circuit, the number of cables in the circuit, the description of each cable in the circuit (size in AWG, type per data sheets in this specification, and number of conductors in each cable), area of each cable, and a listing of all the raceways that the circuit is routed through.

B Materials.
B.1 General.
The Electrical Equipment and its installation shall be in accordance with regulations of the NEC and shall conform to Division II, Group B of the latest revision, for movable bridges of the American Association of State Highway and Transportation Officials except as otherwise provided herein.

All materials and equipment furnished under these specifications shall be new and, to the extent possible, standard products of the various manufacturers. Where more than one of any specific item is required, all shall be of the same type and manufacturer. Items of equipment or material which are not specifically defined herein shall conform to the general standard of quality established herein.

Each piece of electrical equipment and apparatus shall have a permanent type corrosion-resisting metal nameplate on which is stamped the name of the manufacturer, the catalog or model number, and the rating or capacity of the equipment or apparatus.

All ferrous metal work shall be hot-dip galvanized in accordance with ASTM A123 or ASTM A153, whichever is applicable. If any galvanizing is damaged, the metal work shall be refinished by cleaning and painting, with two coats of approved galvanizing repair paint, or approved zinc chromium paint.

Lock washers shall be provided on all mechanical fastenings.

In order to prevent deterioration due to corrosion, all bolts, nuts, studs, washers, pins, terminals, springs, hangers, cap screws, set screws, tap bolts, brackets, and other hardware fastenings and fittings shall be of an approved corrosion-resisting material such

as silicon bronze, or stainless steel. Hot-dip galvanizing, per ASTM Specification A153, will be considered approved treatment for all non-moving ferrous hardware.

B.2 Shop Drawings

Within 90 days after execution of the contract, submit shop drawings to the engineer. Submit full size drawings for those items requiring construction from such drawings. Provide descriptive leaflets for standard catalog items which are mass produced.

Submit shop drawings for all cabinet enclosures, transformers, switches, raceways, conductors, service equipment, boxes, control equipment, fasteners and other such equipment, and methods of fastening to structures. No equipment is to be purchased without approval of shop drawings.

Shop drawings shall include manufacturer's test data, shall be certified by the manufacturer, and shall identify the application for which they are proposed.

Equipment identification shall be the same as shown on the drawings. Standard drawings showing more than one model or size shall be marked to indicate the model or size proposed.

Working drawings shall be made on standard 22 in. x 34 in. sheets. Catalog cuts and manufacturers' standard drawings may be submitted on their respective standard sizes. Submit them to the engineer for review and distribution.

The engineer will not be responsible for errors of working drawings, even though approval has been indicated, or for quantities or bills of material which may be included. Any failure of the engineer to correct errors on working drawings, or implied approval thereof, shall not relieve the contractor of the full responsibility for the safe and adequate execution of the work in accordance with the plans and specifications.

After review of the working drawings by the engineer, no changes shall be made without resubmission for approval by the engineer, and all changes or revisions later made shall be clearly marked and dated.

Before final payment is made, deliver to the city two sets of as-built drawings reflecting all changed or modifications made from the contract drawings having to do with the finished structure. One set of as-built drawings will be given to the city.

As-built drawings shall be suitable for permanent storage, and any reproducible material which is subject to fading when exposed to light will not be acceptable.

B.3 References
Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design. Whenever any article, materials, or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or approved equal", if not inserted, shall be implied, except as otherwise noted.

B.4 Substitutions
Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design.

Equipment for which an acceptable manufacturer is not specifically named, or named equipment for which substitution is proposed, shall be manufactured by a company which has had a minimum of ten years of experience in the manufacture of similar equipment and which, in the engineer's opinion, has demonstrated its proficiency in the manufacture of such equipment. All equipment will be subject to the engineer's approval.

B.5 Structural Steel
Material for support of limit switches shall conform to the requirements of ASTM A36 structural carbon steel. Bolts used shall conform to the requirements of ASTM A325 Type 1 bolts and hardened steel washers shall be provided as shown in the plans. All material shall be hot-dip galvanized with approved 2 coat paint system specified under Bridge Structural Steel.

C Construction
C.1 General.
All construction and installation shall be made by workmen skilled in this type of work and under the supervision of an experienced and qualified electrical supervisor. In addition, the approved control system vendor shall provide supervisory assistance to the electrical contractor as specified herein. All work shall be executed in a neat and workmanlike manner and shall present a neat and mechanical appearance when completed. Upon completion of the contract, deliver to the engineer a corrected plan showing in detail all changes on construction from the original plans, especially location and sizes of conduits, complete schematic circuit diagrams and the like.

Provide all terminal strips with approved permanent terminal markings for each connected conductor in service. Place the marking on a material which will not be affected by age or moisture and apply two coats of clear lacquer after placing the markings.

C.2 Raceways.

C.2.1 General

All conduit shall be of the material called for in the plans. All conduits shall be free from blisters, cracks, or injurious defects. Wiring troughs shall be hot dip galvanized after fabrication.

Raceway sizes shall be as shown on the plans, and shall be 3/4" minimum trade size.

C.2.2 Galvanized Rigid Steel Conduit

The conduit shall be UL listed and shall comply with the requirements of ANSI Standard C80.1 "Specifications for Rigid Steel Conduit (Zinc-Coated)". Manufacturers shall be Allied, Steel duct, Triangle, Youngstown, or approved equal.

All rigid steel conduit fittings shall be hot-dip galvanized after fabrication in accordance with ASTM-A153. Manufacturer shall be Appleton Electric, Crouse-Hinds, O.Z./Gedney, Pyle-National, Russell & Stroll, Thomas & Betts, or approved equal.

After field threading, re-galvanize all steel conduit with "Zinc Rich", "Zincilate 810", or "Galvanizing Powder M-321". Apply this material in the field, immediately after the conduit is threaded and cleaned.

C.2.3 PVC Coated Galvanized Rigid Steel Conduit

The PVC coated galvanized rigid conduit shall be UL listed. The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit and be UL Listed. The PVC coated rigid galvanized steel conduit must be certified and authorized to apply the ETL Verification Mark “ETL Verified to PVC-001”. ETL Verified to :Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure. Continued compliance to this specification is monitored through production testing, quarterly inspections by Intertek ETL SEMKO at production facility and random sample testing. Ferrous fittings for general service locations must be UL Listed with PVC as the primary corrosion protection. All conduit and fittings must be new, unused material. The PVC coating shall be gray, 40 mils in thickness, and be free of blisters, bubble, or pin holes. Applicable UL standards may include: UL 514B Standard for Safety, Fittings for Conduit and Outlet Boxes. Conduit and fittings shall be evaluated for reliability and performance. Certified test results are the respective test data that have been witnessed and certified to be accurate by an independent, recognized third party. Acceptable conduit and fitting PVC bonds shall be confirmed with a minimum average of 30 days in a heat and humidity test (ASTM D1151 and D2247) with the temperature at 150 degrees F and 95% humidity. Acceptable seal performance shall be confirmed at 15psig (positive) and 25 inches of mercury (vacuum) for 72 hours. Manufacturer shall be Perma-Cote Industries or approved equal by Plasti-Bond or Rob-Roy.

All conduit and fittings shall be hot-dip galvanized inside and out with hot galvanized threads prior to applying plastic coatings. All exterior surfaces shall be coated with a heat polymerizing adhesive not to exceed .0005" thick prior to plastic coating. The exterior

plastic coating shall be bonded to the metal with a thickness of .040" nominal the full length of the pipe except the threads. Interior coating shall be 2 mil minimum urethane.

Repair any nicks or gouges in the PVC coating after installation with manufacturer's approved touch-up compound to restore corrosion protection.

All fittings, support struts, pipe clamps, etc, shall be PVC coated to meet all requirements of the conduit manufacturer.

C.2.4 Rigid Nonmetallic Conduit

The conduit shall be rigid polyvinyl chloride, schedule 80, 90 degree C, of the sizes indicated on the plans and shall conform to the NEMA standards. Conduit shall be UL listed in conformity with Article 347 of the National Electric Code. Conduit, fittings, and cement shall be produced by the same manufacturer who shall have had at least five years experience in manufacturing these products. All joints shall be solvent welded in accordance with the recommendation of the manufacturer.

C.2.5 Installing Raceways

Connect conduit sections to each other with screw couplings, made up so that the end of both conduits will butt squarely against each other inside of coupling and non-metallic conduit shall be solvent welded in accordance with the manufacturer's recommendations. Install conduits so as to be continuous and watertight between boxes or equipment. Protect conduits at all times from the entrance of water and other foreign matter by capping or well plugging overnight and when the work is temporarily suspended.

Install all conduits so that they will drain properly. Provide drainage tees at low points where required.

All field bends shall be long sweep, free from kinks, and of such easy curvatures as to facilitate the drawing in 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 shall not exceed 360 degrees. Long running threads will not be permitted.

Use pull boxes wherever necessary to facilitate the installation of the conductors. Condulets shall not be used for pulling more than ten conductors or for making such turns in conduit runs or for branching conductors, except for indoor wiring to lighting fixtures and receptacles.

Galvanized rigid steel (GRS) conduit shall be installed only within the control tower and where the areas remain dry. PVC coated rigid steel (PVGR) shall be installed within the pier areas and in areas where the conduit will be exposed to an exterior environment. Rigid non metallic (PVC) conduit shall be installed where ever the raceway is to be buried below grade or within concrete.

All conduit fittings shall be of the same type material as the conduit installed.

Where conduits pass through the floors or walls of the control room, galvanized rigid conduit sleeves shall be provided for free passage of the conduits. After the conduits are installed, caulk the opening with an elastic fireproof compound and escutcheon plates provided on the interior walls, ceilings, and floors for airtight fits. Sealants shall be manufactured by Carborundum, Dow Corning, Nelson Fire Stop Products, or approved equal.

Exposed raceway runs shall be straight and shall be parallel or at right angles to the general structure lines. Attachment to steel or concrete in the pier areas shall be by PVC coated fittings, straps, or hangers held at not less than two points by stainless steel bolts or lag screws. Concrete inserts shall be Unistrut, B-line, Midland Ross, or approved equal, fabricated from stainless steel. Conduits mounted exteriorly on parts of the steel work shall be set not less than 2 inches clear from the supporting structure to prevent accumulation of dirt, and they shall be securely clamped to the steel work to prevent rattling and wear. The clamps, in general, shall consist of U-bolts attached to angle or channel iron supports bolted to the members. The spacing of the clamps shall not exceed 6 feet.

Supports for electrical work which are fabricated from structural plates or shapes bolted to structural members and which are shown or requested to be included on the steel drawings, will be paid for under the items shown on the plans. Additional alterations and supports not shown or requested, but that are found necessary after completion of steel fabrication plans, shall be included for payment and additional compensation will not be considered.

See "Bridge Machinery – General" for coordination with bridge mechanical system.

At any point where a conduit crosses an expansion joint, or where movement between adjacent sections of conduit can be expected, install bronze or alloy expansion fittings equal to Type AX as made by the O.Z. Electrical Manufacturing Company, Inc., Hope, Spring City, or approved equal.

Use of flexible conduit is allowed for the connection of limit switches, and other devices that must be periodically adjusted in position. Connections between the rigid conduit system shall be made with flexible conduit with couplings and threaded terminal fittings. The flexible conduit shall be fully interlocked and shall be Type RT-6 as made by the Flexonics Corporation, Type UA-OR as Anaconda's Sealtite, Carflex by Carlon, or approved equal. Flexible conduit extensions shall be equipped with bonding jumpers.

All conduits shall be carefully cleaned, both before and after installation. Upon completion of the conduit installation, clear each conduit with a tube cleaner equipped with a mandrel of a diameter not less than 80 percent (80%) of the nominal inside diameter of the conduit, and shall then draw in the conductors.

Provide both ends of each conduit run with a brass tag having a number stamped thereon in accordance with the conduit diagrams. Securely and permanently fasten these tags to the conduit ends with bare copper wire.

C.3 Conductors.

C.3.1 General

Furnish insulated conductors and conductor accessories in sufficient quantities for a complete installation. Installation shall be in accordance with the National Electrical Code, and shall include placement, splicing, terminating, identification, testing, and verification of each circuit and conductor.

Conductors at 480 volts (power conductors) potential shall not be routed in the same raceway as conductors at 120 volts potential or less (control conductors).

Cable types, as shown on the plans, shall be as shown on the cable data sheets. The "type" as shown on the circuit schedules in the plans is the "type" referenced to at the top of each cable specification sheet.

The "Outside Diameter" is the nominal diameter used to calculate the required conduit size. If actual cables used are of larger diameter, the contractor shall increase the size of the affected conduits, as required by the NEC, at no additional cost to the city.

C.3.2 Acceptable Manufacturers

Acceptable manufacturer for type B is American Insulated Wire, Okonite, Southwire or approved equal.

Provide a durable marking on the outer surface of all cables or conductors at intervals not exceeding 24 inches. Marking shall include manufacturer's name, insulating material, conductor size, and voltage class.

Each conductor, of power, control and signal wiring, shall be color coded with colored insulation. Color coding of power wiring 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. Switch legs for local wall switches shall conform to local Code requirements.

C.3.3 Circuit Identification

Each circuit, as shown in the Circuit Schedule on the plans, shall be identified at both ends with an identification tag. Tags shall be of an opaque nylon material arranged to include a marker board, non-releasing holding device, and cable fastening tail. The marking board shall be not less than 3/8 inch wide x 3/4 inch long, and 25 mils thick, roughened on one side to hold black nylon marking ink from a permanent marking pen. Identification shall be permanent and waterproof. Once installed, the tie shall not be removable except by cutting it loose from the cable.

C.3.4 Installation or Placement

Draw the wire and cables into conduits without causing injury to the wires or their insulation or covering.

Install all cables as recommended by the manufacturer. Adhere to the manufacturer's recommended maximum pulling tension and minimum bending radius during installation. Use the necessary guides, pulleys, sleeves, and pulling aids to prevent abrasion and damage to the cables during installation. Use lubricants recommended by the cable manufacturer and acceptable to the engineer for the pulling of conductors or cables. Permanently and clearly tag both ends of every single length of conductor with approved tags marked in accordance with the same number and designation shown on the wiring diagrams. Connect all outgoing wires No. 8 AWG or smaller in the control desk, on the switchboards and panels and in terminal cabinets to terminal blocks.

All terminal strips shall be provided with approved permanent terminal markings for each connected conductor in service. The marking shall be placed on a material which will not be affected by age or moisture and shall be given two coats of clear lacquer after the markings are placed thereon or as stated elsewhere in these Specifications.

All splices, T-taps, and free ends of 600 volt cables shall be insulated. General use cables shall be insulated with type 33 tape. High ambient cable shall be insulated with type 70 tape.

Wherever it becomes necessary to terminate, joint, or branch conductors, terminal blocks in boxes shall be used.

Cable connections for No. 8 and smaller, for making terminations and splices shall be with high pressure indent type pressure connectors. Connectors shall be copper and as manufactured by Buchanan Products, Burndy, Thomas & Betts, or approved equal.

Cable connections for No. 6 and larger for making terminations, T-taps, and splices shall be with a high compression or bolted type pressure connector. Compression connectors shall be installed as recommended by the manufacturer using the recommended tooling for installation. Bolted connectors shall have a non-rotating pressure cap and as manufactured by Burndy, O.Z. Electric, Buchanan, or approved equal.

C.3.5 Tests after Placement

All insulated conductors shall be electrically tested after placement. All circuits, including lighting circuits, shall be tested with the circuit complete except for connections to equipment. All splices shall be complete prior to testing. Any circuit failing to test satisfactorily shall be replaced, or repaired and retested as directed by the engineer. All equipment and labor required for testing shall be provided by the contractor.

All insulated conductors shall be tested for continuity and conductor identification. In addition, all insulated conductors of multi-conductor cable shall be tested for short circuits. Furnish portable, battery powered, ring testers, and other test equipment as required for these tests.

(1) Continuity tests shall include all tests necessary to confirm that each conductor is continuous throughout its entire length.

(2) Identification tests shall include all tests necessary to confirm that the conductor being investigated originated and terminates at the locations designed in the Circuit List or indicated on the drawings.

(3) Short circuit tests shall include all tests necessary to confirm that no conductor of a multi-conductor cable is short circuited to another conductor in that cable.

(4) Power and control cable rated below 2,000 V. - All insulated conductors, except instrumentation cable, rated less than 2,000 v. shall be tested with a 1,000 v. megger or an equivalent testing device. Insulation resistance measurements shall be made between each conductor and ground and between each conductor and all other conductors of the same circuit. Minimum acceptable resistance values shall be in excess of 100 Megohms.

TYPE B

600 Volt Single Conductor Flame Resistant Power Cable

DESCRIPTION:

Reference:	ICEA S-66-524
Conductor:	Class B Stranding, 90 DEG C, Standard Round Uncoated Copper
Insulation:	Flame Resistant Cross Linked Polyethylene
Jacket:	None
UL Listing:	THWN
Tests:	Flame Test Requirements per IEEE 383, using a gas burner flame source.

DETAILS:

Size (AWG)	Number of Strands	Insulation Thickness-Inches	Outside Diameter-Inches
12	7	.030	0.16
10	7	.030	0.18
8	7	.045	0.24
6	7	.045	0.28
4	7	.045	0.35
2	7	.045	0.40
1	19	.055	0.46
1/0	19	.055	0.51
2/0	19	.055	0.57
3/0	19	.055	0.60
4/0	19	.055	0.66
250	37	.065	0.73
350	37	.065	0.84
500	37	.065	0.97

C.5 Boxes

All exterior surface mounted pull, junction, splice, and terminal boxes shall be 14 gauge stainless steel, NEMA 4X, and shall be provided with hinged, overlapping covers of the same material, with pad-lock provisions and shall be by Hoffman Engineering Company, Hammond Manufacturing or approved equal. Exterior boxes mounted on the bridge steel work shall be primed and painted the same color as the bridge. Wall-mounted boxes installed in the new control house shall be NEMA 12. Junction boxes and terminal cabinets mounted in the machinery rooms shall be NEMA 4X, 14 gauge stainless steel as described above.

Furnish and install junction and pull boxes, reducers, and other fittings as required by these specifications or where required by the NEC or where required to facilitate pulling, whether shown on plans or not.

Provide drain holes in the boxes. Provide all boxes with mounting lugs and securely fasten to the structure with not less than four bronze or monel metal through-bolts. All cast-iron boxes shall be bossed, drilled, and tapped for threaded conduit ends, which shall enter squarely. Sheet metal enclosures shall be drilled to receive the conduit ends, which shall be secured with insulated hub connectors. The conduit ends projecting into all boxes and enclosures shall be equipped with insulated bushings. No box or enclosure shall be drilled for more conduits than actually enter it.

Boxes for flush-mounted devices in finished areas shall be stamped galvanized steel.

Fasten device boxes to the mounting surface with not less than two bolts.

Fabricate framework for supporting boxes, switches, and other externally mounted electrical devices from structural steel Type A36 not less than 3/8 inch thick, or if material of thickness less than 3/8 inch is used it shall be hot-dip galvanized.

All mounting bolts, nuts, washers, and other hardware used for fastening boxes, disconnect switches, devices, lighting outlet boxes, conduit clamps, and similar devices shall be brass, monel metal, or stainless steel. Bolt heads and nuts shall be hexagonal, and bolts smaller than 3/8 inch diameter shall not be used except as may be necessary to fit the mounting holes in small devices, outlet boxes, and similar standard equipment.

C.6 Nameplates

Provide nameplates for all major pieces of equipment named on the drawings, for all devices on the control desk and in panels, and shall be made of laminated micarta or textolite with chamfered edges, and shall be engraved to show BLACK letters on a WHITE background. They shall be mounted with monel or stainless steel screws. Nameplates for devices shall show the device designation used on the schematic wiring diagram. Fuse nameplates shall show the type, ampere, and voltage rating of the fuses.

C.7 Service and Distribution

C.7.1 General

Commercial electric power for operation of the bridge and its auxiliaries will be supplied by dual feeds from We Energies at 480 volts nominal, 3-phase, 3-wire, grounded delta, 60-Hertz. The new service permits and associated fees for the new service will be arranged for and paid by the City of Milwaukee. Point of contact for the City of Milwaukee is Mr. Paul Novotny, Paul.Novotny@milwaukee.gov, 414-286-3982.

C.7.2 Service Disconnect

Furnish and install one 200A rated fusible disconnect switch at the east and west pier abutments where shown on the plans. Disconnect enclosures shall be NEMA 4X rated stainless steel. Fuses shall be Class K-5 dual element type and sized as shown on the plans. Furnish to the City of Milwaukee, one 200A fusible disconnect switch for installation by the City of Milwaukee within the control house. Disconnect enclosure shall be NEMA 12 rated.

Furnish and install utility meter sockets at the east and west pier abutments where shown on the plans.

C.7.3 Automatic Transfer Switch

Furnish to the City of Milwaukee a 200A automatic transfer switch for installation by the City of Milwaukee. Each contact pole of the transfer switch shall be double break design, with solid silver cadmium contacts, capable of handling both non-conductive and inductive loads and allow for inrush currents of 20 times the continuous rating. Contact pressure shall be maintained by a coil sprint, not a part of the current-carrying path. The ampere rating of the transfer switch shall be sufficient to handle the capacity of the loads being transferred. The transfer switch enclosure shall be NEMA 12 rated and shall

confirm to the requirements of UL 1008, IEC 947-6-1, NFPA 70, NFPA 99, NFPA 202, NFPA 110, ANSI C33.76 and NEMA ICS10.

C.7.4 Service Grounding
The 480-volt delta power system shall be solidly grounded to the grounding grid assembly at the transformer or utility service metering equipment and to the grounding grid assembly within each pier.

Terminal lugs and the metal framing and enclosures of the new electrical equipment such as the hydraulic HPU assembly, new relay cabinet, and other apparatus shall be bonded to the grounding grid assembly.

Terminals of grounding system shall be solderless type, secured by means of hexagonal head, copper plated steel machine bolts with lock washers. Grounding system conductors shall be continuous unspliced connections between terminal lugs.

Follow requirements for Article 250 of the NEC for equipment and service grounds.

D Measurement
The city will measure Utility Service Work completed in accordance to the contract and accepted, as a single unit of work.

E Payment.
The city will pay for the measured quantity at the contract unit price under the following bid item:

Item Number	Description	Unit
SPV.0105.14	Utility Service Work	LS

Payment is full compensation for providing two new utility services, removing and disposing the existing east side utility service conductors and conduit as required; for furnishing and installing the complete utility service as specified, ready for operation; furnishing a NEMA 12 disconnect switch and automatic transfer switch and for furnishing all shop drawings, materials, labor, tools, equipment, incidentals and services necessary to achieve a complete and acceptable installation.

50. Modify Existing Northeast Railing SPV.0105.15.

A Description
This special provision describes the repairing, cleaning, and modifying the existing steel bridge railing on the northeast retaining wall. The railing repairs and modifications will be as per the details as shown in the plans. Supplying, fabricating, and installing the new steel elements of any nature for railing repairs is included in this special provision. Painting of the railing is included in Structure Repainting Recycled Abrasive (B-40-406).

It is advised to conduct an inspection of this railing prior to submitting a bid to determine the full extent of repairs required.

B Materials
Use steel conforming to ASTM A709 Grade 36 for all new material except as noted herein or on the plans. Do not hot-dip galvanize the repaired railing.

Tests indicate the presence of lead paint on the existing railing.

Use A325 hot-dip galvanized bolts for all bolted connections.

Prepare shop drawings for all new steel in accordance with special provision for Shop Drawings and Submittals. The shop drawings for the original Pleasant Street Lift Bridge are available at the City of Milwaukee Department of Public Works for the contractor's use. However, it is the contractor's responsibility to field verify dimensions relevant to detailing and fabrication of new steel that is to be attached to existing steel.

C Construction
Prior to Modifying the railing, conduct a field inspection of the railing with the engineer. Document, with the concurrence of the engineer, damaged or deteriorated sections, elements and components of the railing, replace or repair any damaged or deteriorated part of railing elements found and documented during this inspection that has holes or more than 15% section loss.

The contractor is responsible for any damage to any components of the railing. It is the contractor's responsibility to repair or replace any damaged steel to the satisfaction of the engineer and at no additional expense to the City.

Be aware that the existing paint was identified as containing lead. Conform to all environmental requirements regarding the removal and disposal of lead based paint residue.

If, during cleaning, painting, and repair of the railing, either the engineer or the contractor identifies sections, elements or components of the railing that were not identified during the original field inspection as requiring repair or replacement, but that, in the opinion of the engineer, should be repaired or replaced, the repair or replacement of these elements will be required. Make such repairs or replacements at no additional cost to the City.

Remove all old paint, clean and paint entire bridge railing in accordance with bid item Structure Repainting Recycled Abrasive (B-40-406).

Applicable parts of section 506.3 of the standard specifications apply to this bid item.

D Measurement
The City will measure Modify Existing Northeast Railing, completed in accordance to the contract and accepted, as a single complete unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.15	Modify Existing Northeast Railing	LS

Payment is full compensation for conducting a field inspection of the railing; modifying and fabricating the deteriorated parts of the railing, including furnishing, fabricating and reattaching replacement elements; for making repairs and replacements identified during the process that were not identified during the initial field inspection; and for furnishing all labor, tools, equipment, and incidentals necessary to complete to work. Replacement of all contractor-damaged parts will not be measured for payment.

Sandblasting and painting of the railing is included in the bid items Structure Repainting Recycled Abrasive (B-40-406), and Negative Pressure Containment and Collection of Waste Materials (B-40-406).

51. Remove and Replace Safety Cages SPV.0105.16

A Description
This work includes removing the existing safety cages in Pier 1 and Pier 2, and fabricating, and installing galvanized steel safety cages to match the existing. The work includes all galvanized attachment hardware.

B Materials
Safety Cages shall be galvanized steel, or approved equal. All hardware associated with safety cages shall be galvanized.

Safety cages shall meet the Title 27, Code of Federal Regulations Part 1910, Occupational Safety and Health Standards, Part 1926 Safety Health Regulations for Construction (OSHA).

C Construction
Prepare and submit shop drawings in accordance with the special provision for Shop Drawings and Submittals.

D Measurement
The City will measure Remove and Replace Safety Cages, completed in accordance to the contract and accepted, as a single complete unit of work.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.16	Remove and Replace Safety Cages	LS

Payment is full compensation for removing existing safety cages; for fabricating, transporting, and erecting the proposed galvanized steel safety cages, for providing and placing galvanized nuts, bolts, washers, and shims as required, and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance to the contract.

52. Replace Copper Gutter and Flashing, Item SPV.0105.17

A Description

Furnish all labor, material and tools required for the satisfactory completion of Replace Copper Gutter and Flashing as required to repair roof leaks at the bridge operator's house at the Pleasant Street Bridge in accordance with the drawings and as set forth in these specifications.

B Materials

B.1 Submittals

Product Data: For each type of product.

Shop Drawings: For sheet metal flashing: include:

Plans, elevations, sections, and attachment details.
Details of termination points and connections to adjoining work.

Samples: For each exposed product.

B.2 Performance Requirements

Sheet Metal Standard for Flashing: Comply with Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

Temperature Change: 140 deg F, ambient; 2000 deg F, material surfaces.

B.3 Copper Sheet

ASTM B370, cold-rolled copper sheet, H00 or H01 temper, mill finish.

B.4 Underlayment

Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to

written recommendations of underlayment manufacturer.

Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:

Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
Henry Company; Blueskin PE200 HT.
Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.

Thermal Stability: ASTM D1970; stable after testing at 240 deg F or higher.

Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F or lower.

Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft.minimum.

B.5 Miscellaneous Materials
Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

Fasteners: Copper, hardware bronze or passivated Series 300 stainless steel wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners recommended by manufacturer of primary sheet metal.

Solder: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead.

Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

Elastomeric Sealant: ASTM C920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

B.6 Fabrication
Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

Obtain field measurements for accurate fit before shop fabrication.

Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

> Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate from copper, 16 oz./sq. ft.

Base Flashing: Fabricate from copper, 20 oz./sq. ft.

Counterflashing and Flashing Receivers: Fabricate from copper, 16 oz./sq. ft.

C Construction

C.1 Preparation

Remove existing gutters, flashings and other materials as required to evaluate and repair leaks at roof of Bridge Operator's House.

C.2 Underlayment Installation

Install self-adhering sheet underlayment, wrinkle free under new areas of gutter and flashing required to correct leakage problems. Lap sides minimum of 2 inches over underlying course. Lap ends minimum of 4 inches. Install slip sheet over underlayment.

Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

C.3 Sheet Copper Installation

Anchor sheet metal flashing and other components of the work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective

coatings, separators, sealants, and other miscellaneous items as required to complete installation.

Install sheet metal flashing true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

Install sheet metal flashing to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

Torch cutting of sheet metal flashing is not permitted.

Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in "Joint Sealants" paragraph.

Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed work.

Do not use torches for soldering.

Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

Tin edges of uncoated sheets, using solder for copper.

Gutters: Join sections with soldered joints. Provide for thermal expansion. Slope to downspouts. Provide end closures and seal watertight with sealant.

Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches.

C.4 Cleaning

Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

Clean and neutralize flux materials. Clean off excess solder.

Clean off excess sealants.

D Measurement
The City will measure Replace Copper Gutter and Flashing, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment
The City will pay for the measured quantity at the contract price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.17	Replace Copper Gutter and Flashing	LS

Payment is full compensation for all materials, labor and incidentals for Replace Copper Gutter and Flashing, including preparation, underlayment and sheet copper installation in accordance with the drawings and as set forth in these specifications.

53. Temporary Lift Span Shoring, Item SPV.0105.18.

A Description
This special provision describes furnishing, installing or constructing, maintaining, and removing, temporary shoring for the lift span.

B Materials
Provide a shoring design for required temporary shoring. The shoring design shall include, but is not limited to; shoring location, shoring size, shoring spacing, anchorages required, and removal procedure. The design shall include all necessary schematics to show sufficient detail of the shoring, which shall include but not be limited to; jacking equipment specifications, temporary structural elements, whalers, and temporary foundation attachments necessary. During periods when the lift span is unbalanced, provide positive, sturdy supports, shoring, and/or false work to support the unbalanced loads. The design shall have the capacity to support the entire unbalanced load plus all additional loads resulting from wind forces, temporary erection forces, accumulations of snow, ice or dirt, or other loads or forces. The adequacy of each shoring design shall be verified by a professional engineer registered in the State of Wisconsin and knowledgeable of the specific site conditions and requirements. Submit to the City for documentation three (3) copies of each shoring design that is signed and sealed by the same professional engineer verifying the design. It remains the contractor's responsibility to ensure that the lift span is adequately shored in a safe manner during all phases of erection and construction.

C Construction
Obtain permission from the U.S. Coast Guard at least one month in advance to close the river to navigation for periods of time sufficient to accomplish work that must be performed in the closed position. If any change is needed during construction, inform the U.S. Coast Guard a minimum two weeks in advance before making the change.

Construct or install the temporary shoring at the required location in accordance with the designed developed.

Upon completion of the need for the temporary shoring the shoring must be removed as provided in the design. Any anchorages for the temporary shoring shall be removed. Any anchorages into concrete members shall be removed after use and patched in accordance with subsection 502.3.7.1 of the standard specifications.

D Measurement

The City will measure Temporary Lift Span Shoring, completed in accordance to the contract and accepted, as a single complete unit of work.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.18	Temporary Lift Span Shoring	LS

Payment is full compensation for preparing Temporary Lift Span Shoring design and plans; for furnishing, installing or constructing, maintaining, and removing all temporary shoring; for removing anchorages; for repair any damage caused by the shoring or anchorages; and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance to the contract.

54. Fiberglass Sidewalk Floor Plates, Item SPV.0165.01.

A Description

This special provision describes furnishing, fabricating, and installing fiberglass sidewalk plates, splice bars and stainless steel hardware as called for on the plans.

All items, details of construction, services or features not specifically mentioned which are regularly furnished in order to provide fiberglass sidewalk plates and stainless steel hardware shall be furnished at the square foot bid price and shall confirm in strength, quality and workmanship to that usually provided by the practice indicated in this specification.

B Materials

The fiberglass plates shall be of Extren Series 525 pultruded fiberglass sheet, as manufactured by Morrison Molded Fiber Glass Company, with the Duradek anti-skid surface, as applied by AFC, or equal with the following minimum properties.

Properties:

1. Color	Haze Gray
2. Resin	Isophthalic Polyester
3. Fire Retardant Properties	Meets Class I Frame Rating of 25 or less per ASTM E-84

4. Anti-Skid Surface — Permanently bonded grit baked epoxy surface

1. MINIMUM ULTIMATE COUPON PROPERTIES. Following are the required test results for the ultimate coupon properties as per the referenced ASTM procedures.

PROPERTY	ASTM TEST	UNITS	THICKNESS
Mechanical			3/8"-1"
Flexural stress, Flatwise LW	D790	psi	30,000
Flexural stress, Flatwise CW	D790	psi	18,000
Flexural Modulus, Flatwise LW	D790	1,000,000 psi	2
Flexural Modulus, Flatwise CW	D790	1,000,000 psi	1.4
Tensile Stress, LW	D638	psi	20,000
Tensile Stress, CW	D638	psi	10,000
Tensile Modulus, LW	D638	1,000,000 psi	1.8
Tensile Modulus, CW	D638	1,000,000 psi	1.4
Comprehensive Stress, Edgewise, LW	D695	psi	4,000
Comprehensive Stress, Edgewise, CW	D695	psi	20,000
Comprehensive Modulus, Edgewise LW	D695	1,000,000 psi	1.8
Comprehensive Modulus, Edgewise CW	D695	1,000,000 psi	1.0
Notched Izod Impact, LW	D256	ft-lbs/in.	20
Notched Izod Impact, CW	D256	ft-lbs/in.	5
Bearing Stress, LW	D953	psi	32,000
Bearing Stress, CW	D953	psi	32,000
Perpendicular Shear Stress, LW(1)	D3946	psi	6,000
Perpendicular Shear Stress, CW	D3946	psi	6,000
Poisson's Ratio, LW	---	in/in	0.31
Poisson's Ratio, CW	---	in/in	0.29

PHYSICAL	ASTM TEST	UNITS	THICKNESS
Barcol Hardness	---	---	40
24 Hr. Water Absorption (2)	D570	%Max	0.6
Density	D792	lbs/in(3)	.060-068
Coefficient of Thermal Expansion	D696	1,000,000	8.0in/in/°F
ELECTRICAL			
Arc Resistance	D495	seconds	120
Dielectric Strength, PF	D149	volts/mil	N.T.
Dielectric Strength, LW[1]	D149	KV/in	35
Dielectric Constant, PF	D150	@60Hz	5

LW = lengthwise
CW = crosswise
PF = perpendicular to the laminate face
N.T. = not tested

2. American Society for Testing and Materials Designations. Reference to the American Society for Testing and Materials (ASTM) designations mentioned herein shall mean the latest particular ASTM specification and/or test procedure in effect at the time this bid is let.
3. BRAND NAMES. 1. References. If articles have been identified in the bid by a "Brand Name" and Model number, such reference is intended to be descriptive, but not restrictive. Other items of equal description of articles that will be satisfactory. Other items of equal quality will be considered. Samples and/or demonstrations may be requested.

Submit a sample of the sidewalk plate for approval by the engineer with the shop drawing submittal.

C Construction

Use the Plan Drawings and these specifications to prepare shop drawing to deliver the products required to make a complete and acceptable sidewalk.

Fiberglass sheets to have gray-ultra-violet resistant polyurethane top coat.

Supply fiberglass plate, splice plates and stainless steel hardware according to sizes shown on the plans.

Fiberglass abrasive sidewalk plates shall be supplied with stainless bolts, washers and nuts, and fiberglass support bars 5 inches wide to transfer deflections between adjacent plates at the joint gaps. These support bars should have the longitudinal fibers in the 5 inches wide direction. For the sidewalk plates, the main fibers should be placed in the longitudinal direction of the span.

Stainless steel 1/2 inches diameter CTSK head screws, 1/2 inches nylon plug type key lock nuts, 1/2 inch washers and beveled washers shall be Ryerson and AISI Stainless Steel 304, or approved equal.

Drilled holes in fiberglass plates are to have a minimum edge distance equal to 1-1/2 inches measured from the center of the hole to the free edge of the material.

Fasteners for the non-metallic sidewalk plates shall comply with Standard Specifications par. 513.2.2.5.

Bolts shall be socket type flat countersunk head cap screws, with washer and prevailing torque locking hex nuts.

The lock nuts shall be ANCO lock nuts with a locking pin as manufactured by Lok-Mor Inc. or an approved equal.

Pre-drill at the shop before delivery all holes where the plates are attached to adjacent plates and 5 inch splice plates and field drill where the plates are attached to the supporting hot dip galvanized(HGD) steel members. The splice plates shall be drilled in order that the smooth surface is up against the bottom of the walk plates.

Furnish sufficient fiberglass patch kits to patch all drilled holes and cuts to be made in the field.

Coat drilled holes in the supporting hot dipped galvanized steel members with cold galvanizing compound such as "ZRC."

Use the proper type of tools and methods to install and fabricate the fiberglass plates.

D Measurement
The City will measure the Fiberglass Sidewalk Floor Plates by square feet acceptable completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.01	Fiberglass Sidewalk Floor Plates	SF

Payment is full compensation for furnishing, fabricating and installing all fiberglass sidewalk floor plates in conformance with the plans and this special provision; and for furnishing all labor, materials, tools, equipments, and incidentals necessary to complete the work.

55. Galvanized Abrasive Perforated Plates, Item SPV.0165.02.

A Description
This special provision describes the slip resistant galvanized abrasive perforated plates on top of the steel grating as shown on the plans, and as herein after provided.

B Materials
Furnish 3/16" thick hot dip galvanized perforated steel plates for the bike lanes. The bond strength for the anti-slip, non-gritted steel surface shall have bond strength between surface and substrate in accordance with ASTM C633: Minimum of 4000psi, or permanent bond. The coefficient of friction for Anti-Slip surface shall be minimum of 0.8 for both wet and dry conditions.

Acceptable manufacturers of slip resistant surface include:

W.S. Molnar Company – SlipNOT Grade 2, Steel
Ross Technology Corporation – ALGRIP, Steel

Provide countersunk holes in the galvanized abrasive perforated plates for connection with the steel grating based on the field measurements. Care must be taken to avoid any interaction with the bars on the steel grating.

All associated attachment hardware shall be made of stainless steel.

C Construction

Examine the areas to receive slip resistant galvanized abrasive perforated plates before installation. Install the galvanized abrasive perforated plates at locations indicated on the drawings and in accordance with the product manufacturer's instructions. Install the galvanized abrasive perforated plates as level, square, rigid with flush installation. The exterior edges of the galvanized abrasive perforated plates shall be beveled and countersunk holes shall be used for attachment over the steel grating. Replace any defective or damaged slip resistant metal plate as directed by the engineer.

D Measurement

The City shall measure the Galvanized Abrasive Perforated Plates per square feet acceptably completed.

E Payment

The City will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.02	Galvanized Abrasive Perforated Plates	SF

Payment is full compensation for furnishing, fabricating and installing all galvanized abrasive perforated plates in conformance with the plans and this special provision; and for furnishing all labor, materials, tools, equipments, and incidentals necessary to complete the work.

56. Repair Planters, Item SPV.0165.03

A Description

Furnish all labor, material and tools required for the satisfactory completion of Repair Planters at the Pleasant Street Lift Bridge in accordance with the drawings and as set forth in these specifications. Included are the following:

Replace deteriorated masonry on flat face of planters.
Remove and replace planter fill materials to inspect waterproofing for deterioration and leakage.
Patch or replace waterproofing as approved by the engineer.

B Materials

B.1 Masonry Materials

B.1.1 Submittals

Product Data: For each type of product indicated.

Samples: For the following:

Face brick
Mortar

Mix Designs: Include description of type and proportions of ingredients.

B.1.2 Quality Assurance
Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

Sample Panel: Build sample panel to verify selections made under sample submittals and to demonstrate aesthetic effects.

Build sample panel approximately 36 inches long by 24 inches high by full thickness.

Erect panel adjacent and parallel to existing surface.
Protect approved sample panel from the elements with weather-resistant membrane.

Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar color to masonry unit color; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by the engineer in writing.

Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by the city in writing.

B.1.3 Delivery, Storage, and Handling
Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

B.1.4 Project Conditions
Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry

damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B.1.5 Face Brick
Facing brick complying with ASTM C216

Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork.

B.1.6 Mortar Materials
Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

Hydrated Lime: ASTM C207, Type S.

Aggregate: ASTM C144.

Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

Water: Potable.

B.1.7 Ties and Anchors
Materials: Provide ties and anchors that are made from materials that comply with the following unless otherwise indicated.

> Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M; with ASTM A153/A153M, Class B-2 coating.
>
> Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.

Adjustable Masonry-Veneer Anchors: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

Anchor Section: One of the following:

Rib-stiffened, sheet metal plate with screw holes top and bottom, having slotted holes for inserting wire tie.

Fabricate sheet metal anchor sections and other sheet metal parts from 0.075 inch thick, steel sheet, galvanized after fabrication.

Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.

Wire Ties: Triangular, rectangular, or T-shaped wire ties fabricated from 0.187 inch diameter, hot-dip galvanized steel wire.

Dowels: 1/2 inch diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666.

B.1.8 Drainage Panels

Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core; and with a vertical flow rate of 9 to 15 gpm per ft.

Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, the following:

American Hydrotech, Inc.; Hydrodrain 400
Carlisle Coatings & Waterproofing Inc.; CCW MiraDRAIN 6000
Protecto Wrap Company; Protecto Drain 2000-V.

B.1.9 Mortar Mixes

ASTM C270, Type N, portland cement-lime mortar.

Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.

Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

Do not use calcium chloride in mortar or grout.

Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B.2 Sheet Metal Flashing

B.2.1 Summary

Stainless steel masonry flashing for planters

B.2.2 Submittals

Product Data: For each type of product indicated.

Shop Drawings: For sheet metal flashing: include:

Plans, elevations, sections, and attachment details.
Details of termination points and connections to adjoining work.

Samples: For each exposed product.

B.2.3 Performance Requirements

Sheet Metal Standard for Flashing: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

B.2.4 Sheet Metals

Stainless-Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; 2D (dull, cold rolled) finish.

B.2.5 Miscellaneous Sheet Metal Materials

Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

Fasteners: Series 300 stainless steel self-locking rivets and other fasteners recommended by manufacturer of primary sheet metal.

Solder: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

B.2.6 Fabrication

Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12 foot long, sections, under copings and at wall base. Fabricate from stainless steel, 0.016 inch thick.

Custom fabricate sheet metal flashing to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing in shop to greatest extent possible.

Form sheet metal flashing to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

Conceal fasteners where possible. Do not use exposed fasteners on faces exposed to view.

Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

B.3 Miscellaneous Materials

B.3.1 Filter Fabric
Geotextile Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.

Structure Type: Nonwoven, needle-punched continuous filament.

Survivability: AASHTO M288 Class 2.

Styles: Flat and sock.

Rubberized Asphalt Sheet Waterproofing: Self-adhering membrane of rubberized asphalt integrally bonded to polyethylene sheeting, formed into uniform flexible sheets not less than 56 mils thick.

Subject to compliance with requirements, available products include, but are not limited to, the following:

American Hydrotech, Inc.; VM 75.
Carlisle Coatings & Waterproofing Inc.; CCW MiraDRI 860/861.
Grace, W. R. & Co.; Bituthene 3000 or 4000.
Henry Company; Blueskin WP 200.
Meadows, W. R., Inc.; SealTight Mel-Rol.
Polyguard Products; Polyguard 650.
Tamko Roofing Products, Inc.; TW-60.

Primer: As recommended by Manufacturer of fluid applied waterproofing compound.

C Construction
C.1 Masonry Rebuilding
C.1.1 Preparation
Remove masonry to the extent indicated on the drawings. Salvage undamaged cast stone coping units for reuse. Remove mortar, loose particles, and soil from units by cleaning

with hand chisels, brushes, and water.

C.1.2 Drainage-Panel Installation

Place and secure drainage panels, with geotextile facing away from wall substrate, according to manufacturer's written instructions. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

C.1.3 Laying Masonry

Match coursing, bonding, color, and texture of existing masonry; do not use units with less than nominal 4 inch horizontal face dimensions at corners or jambs.

Lay brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

Anchor masonry veneers to concrete backup with masonry-veneer anchors to comply with the following requirements:

> Fasten screw-attached anchors to concrete backup with metal fasteners of type recommended by anchor manufacturer. Use two fasteners unless anchor design only uses one fastener.
>
> Embed tie sections in masonry joints.
>
> Locate anchor sections to allow maximum vertical differential movement of ties up and down.
>
> Space anchors not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

Where existing cast stone coping units are damaged replace with new units as specified in bid item New Cast Stone Coping. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

> Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
>
> Wet joint surfaces thoroughly before applying mortar.

Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C.1.4 Flashing and Weep Holes
Install sheet metal flashing and weep holes in masonry at obstructions to downward flow of water in wall, and under copings.

Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

Install weep holes in head joints of first course of masonry immediately above embedded flashing.

Use open head joints to form weep holes.

Space weep holes 24 inches o.c.

C.1.5 Repairing, Pointing, and Cleaning
Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

C.1.6 Masonry Waste Disposal
Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

C.2 Planter Waterproofing
C.2.1 Preparation
Remove plantings, soil, geotextile fabric and stone drainage layer from planters as

required to evaluate condition of existing waterproofing. Salvage materials to extent possible. Recommend new geotextile fabric and stone drainage layer.

Test each planter for leaks, according to recommendations in ASTM D5957, after cleaning existing waterproofing. Plug drains, and fill with potable water.

Maintain 2 inches of clearance from top of sheet flashings.

Test each planter for 48 hours.

If water test is inconclusive regarding leakage locations. Is one option to just reapply the waterproofing for the entire planter?

After testing, repair leaks or replace waterproofing as determined by the engineer. Repeat tests, and make further repairs until waterproofing installation is watertight.

C.2.2 Waterproofing Installation
Comply with manufacturer's written installation recommendations, including preparation of substrate surfaces and priming of substrates.

Clean substrate of projections and substances detrimental to work.

Prime substrate: as recommended by waterproofing manufacturer

Install rubberized asphalt sheets according to recommendations in ASTM D6135.

Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2 inch minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.

When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

C.2.3 Planter Restoration
Replace stone drainage layer, geotextile fabric and soil in planters.

Place layer of flat-style geotextile filter fabric over top of drainage layer overlapping edges at least 4 inches.

Place satisfactory soil fill material to 2 inches below coping.

D Measurement
The City will measure Patch Waterproofing at Planters, by the square foot, acceptably completed.

E Payment

The City will pay for the measured quantity at the contract price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.03	Repair Planters	SF

Payment is full compensation for all materials, labor and incidentals for Repair Planters, including masonry rebuilding and waterproofing installation, in accordance with the drawings and as set forth in these specifications.