

HIGHWAY WORK PROPOSAL

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

Proposal Number: Ø 7

<u>COUNTY</u>	<u>STATE PROJECT ID</u>	<u>FEDERAL PROJECT ID</u>	<u>PROJECT DESCRIPTION</u>	<u>HIGHWAY</u>
Milwaukee	1060-33-78	WISC 2013 376	Zoo IC - S. 76 th Street Bridge Over I94 Kearney St to O'Connor St	Local Street

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

Proposal Guaranty Required, \$ 840,000.00 Payable to: Wisconsin Department of Transportation	Attach Proposal Guaranty on back of this PAGE.
Bid Submittal Due Date: August 13, 2013 Time (Local Time): 9:00 AM	Firm Name, Address, City, State, Zip Code
Contract Completion Time August 31, 2014	SAMPLE NOT FOR BIDDING PURPOSES
Assigned Disadvantaged Business Enterprise Goal DISC %	This contract is exempt from federal oversight.

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

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

Subscribed and sworn to before me this date _____

(Signature, Notary Public, State of Wisconsin)

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

(Date Commission Expires)

Notary Seal

(Bidder Signature)

(Print or Type Bidder Name)

(Bidder Title)

For Department Use Only

Type of Work Removals, excavation common, base aggregate, concrete pavement, HMA pavement, concrete barrier, concrete curb and gutter, concrete sidewalk, storm sewer, storm water ponds, erosion control, traffic control, pavement marking, sign structures, permanent signing, street lighting, traffic signals, structures, retaining walls, restoration, streetscaping, and other incidental items.	Notice of Award Dated	Date Guaranty Returned

**PLEASE ATTACH
PROPOSAL GUARANTY HERE**

Effective with November 2007 Letting

PROPOSAL REQUIREMENTS AND CONDITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

BID PREPARATION

Preparing the Proposal Schedule of Items

A General

- (1) Obtain bidding proposals as specified in [section 102](#) of the standard specifications prior to 11:45 AM of the last business day preceding the letting. Submit bidding proposals using one of the following methods:
 1. Electronic bid on the internet.
 2. Electronic bid on a printout with accompanying diskette or CD ROM.
 3. Paper bid under a waiver of the electronic submittal requirements.
- (2) Bids submitted on a printout with accompanying diskette or CD ROM or paper bids submitted under a waiver of the electronic submittal requirements govern over bids submitted on the internet.
- (3) The department will provide bidding information through the department's web site at <http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm>. The contractor is responsible for reviewing this web site for general notices as well as information regarding proposals in each letting. The department will also post special notices of all addenda to each proposal through this web site no later than 4:00 P.M. local time on the Thursday before the letting. Check the department's web site after 5:00 P.M. local time on the Thursday before the letting to ensure all addenda have been accounted for before preparing the bid. When bidding using methods 1 and 2 above, check the Bid Express™ on-line bidding exchange at <http://www.bidx.com/> after 5:00 P.M. local time on the Thursday before the letting to ensure that the latest schedule of items Expedite file (*.ebs or *.00x) is used to submit the final bid.
- (4) Interested parties can subscribe to the Bid Express™ on-line bidding exchange by following the instructions provided at the www.bidx.com web site or by contacting:

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

- (5) The department will address equipment and process failures, if the bidder can demonstrate that those failures were beyond their control.
- (6) Contractors are responsible for checking on the issuance of addenda and for obtaining the addenda. Notice of issuance of addenda is posted on the department's web site at <http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm> or by calling the department at (608) 266-1631. Addenda can ONLY be obtained from the departments web site listed above or by picking up the addenda at the Bureau of Highway Construction, Room 601, 4802 Sheboygan Avenue, Madison, WI, during regular business hours.

B Submitting Electronic Bids

B.1 On the Internet

- (1) Do the following before submitting the bid:
 1. Have a properly executed annual bid bond on file with the department.
 2. Have a digital ID on file with and enabled by Info Tech Inc. Using this digital ID will constitute the bidder's signature for proper execution of the bidding proposal.
- (2) In lieu of preparing, delivering, and submitting the proposal as specified in [102.6](#) and [102.9](#) of the standard specifications, submit the proposal on the internet as follows:

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

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

- (1) Download the latest schedule of items from the Wisconsin pages of the Bid Express™ web site reflecting the latest addenda posted on the department's web site at <http://www.dot.wisconsin.gov/business/engrserve/bid-letting-information.htm>. Use Expedite™ software to prepare and print the schedule of items. Provide a valid amount for all price fields. Follow instructions and review the help screens provided on the Bid Express™ web site to assure that the schedule of items is prepared properly.
- (2) Staple an 8 1/2 by 11 inch printout of the Expedite™ generated schedule of items to the other proposal documents submitted to the department as a part of the bidder's sealed bid. As a separate submittal not in the sealed bid envelop but due at the same time and place as the sealed bid, also provide the Expedite™ generated schedule of items on a 3 1/2 inch computer diskette or CD ROM. Label each diskette or CD ROM with the bidder's name, the 4 character department-assigned bidder identification code from the top of the bidding proposal, and a list of the proposal numbers included on that diskette or CD ROM as indicated in the following example:

Bidder Name

BN00

Proposals: 1, 12, 14, & 22

- (3) If bidding on more than one proposal in the letting, the bidder may include all proposals for that letting on one diskette or CD ROM. Include only submitted proposals with no incomplete or other files on the diskette or CD ROM.
- (4) The bidder-submitted printout of the Expedite™ generated schedule of items is the governing contract document and must conform to the requirements of section 102 of the standard specifications. If a printout needs to be altered, cross out the printed information with ink or typewriter and enter the new information and initial it in ink. If there is a discrepancy between the printout and the diskette or CD ROM, the department will analyze the bid using the printout information.
- (5) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:
 1. The check code printed on the bottom of the printout of the Expedite™ generated schedule of items is not the same on each page.
 2. The check code printed on the printout of the Expedite™ generated schedule of items is not the same as the check code for that proposal provided on the diskette or CD ROM.

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

C Waiver of Electronic Submittal

- (1) The bidder may request a waiver of the electronic submittal requirements. Submit a written request for a waiver in lieu of bids submitted on the internet or on a printout with accompanying diskette or CD ROM. Use the waiver that was included with the paper bid document sent to the bidder or type up a waiver on the bidder's letterhead. The department will waive the electronic submittal requirements for a bidding entity (individual, partnership, joint venture, corporation, or limited liability company) for up to 4 individual proposals in a calendar year. The department may allow additional waivers for equipment malfunctions.
- (2) Submit a schedule of items on paper conforming to [section 102](#) of the standard specifications. The department charges the bidder a \$75 administrative fee per proposal, payable at the time and place the department designates for receiving bids, to cover the costs of data entry. The department will accept a check or money order payable to: "Wisconsin, Dept. of Transportation."
- (3) In addition to the reasons specified in [section 102](#) of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:
 1. The bidder fails to provide the written request for waiver of the electronic submittal requirements.
 2. The bidder fails to pay the \$75 administrative fee before the time the department designates for the opening of bids unless the bidder requests on the waiver that they be billed for the \$75.
 3. The bidder exceeds 4 waivers of electronic submittal requirements within a calendar year.
- (4) In addition to the reasons specified in [section 102](#) of the standard specifications, the department may refuse to issue bidding proposals for future contracts to a bidding entity that owes the department administrative fees for a waiver of electronic submittal requirements.

PROPOSAL BID BOND

DT1303 1/2006

Wisconsin Department of Transportation

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

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

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

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

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

PRINCIPAL

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

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

NOTARY FOR PRINCIPAL

(Date)

State of Wisconsin)
) ss.
_____ County)

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

(Signature, Notary Public, State of Wisconsin)

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

(Date Commission Expires)

Notary Seal

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

(Signature of Attorney-in-Fact)

NOTARY FOR SURETY

(Date)

State of Wisconsin)
) ss.
_____ County)

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

(Signature, Notary Public, State of Wisconsin)

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

(Date Commission Expires)

Notary Seal

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

CERTIFICATE OF ANNUAL BID BOND

DT1305 8/2003

Wisconsin Department of Transportation

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

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

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

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

(Signature of Authorized Contractor Representative)

(Date)

March 2010

LIST OF SUBCONTRACTORS

Section 66.0901(7), Wisconsin Statutes, provides that as a part of the proposal, the bidder also shall submit a list of the subcontractors the bidder proposes to contract with and the class of work to be performed by each. In order to qualify for inclusion in the bidder's list a subcontractor shall first submit a bid in writing, to the general contractor at least 48 hours prior to the time of the bid closing. The list may not be added to or altered without the written consent of the municipality. A proposal of a bidder is not invalid if any subcontractor and the class of work to be performed by the subcontractor has been omitted from a proposal; the omission shall be considered inadvertent or the bidder will perform the work personally.

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

[illegible]

DECEMBER 2000

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

Instructions for Certification

1. By signing and submitting this proposal, the prospective contractor is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective contractor shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective contractor to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department determined to enter into this transaction. If it is later determined that the contractor knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government the department may terminate this transaction for cause or default.
4. The prospective contractor shall provide immediate written notice to the department to whom this proposal is submitted if at any time the prospective contractor learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
6. The prospective contractor agrees by submitting this proposal that, should this contract be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department entering into this transaction.
7. The prospective contractor further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," which is included as an addendum to PR-1273 - "Required Contract Provisions Federal Aid Construction Contracts," without

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

8. The contractor may rely upon a certification of a prospective subcontractor/materials supplier that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A contractor may decide the method and frequency by which it determines the eligibility of its principals. Each contractor may, but is not required to, check the Disapproval List (telephone # 608/266/1631).
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a contractor in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department may terminate this transaction for cause or default.

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

- (1) The prospective contractor certifies to the best of its knowledge and belief, that it and its principals:
 - (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offense enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- (2) Where the prospective contractor is unable to certify to any of the statements in this certification, such prospective contractor shall attach an explanation to this proposal.

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 1060-33-78, Zoo IC – S. 76th Street Bridge Over IH 94, Kearney Street to O'Connor Street, Local Street, 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, 2013 Edition, as published by the department, and these special provisions.

Perform the sanitary sewer and water main work in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW). If there is a discrepancy or conflict between the referenced specification and the standard specifications regarding contract administration, part 1 of the standard specifications governs.

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

100-005 (20120615)

2. Scope of Work.

The work under this contract shall consist of removals, grading, base aggregate, concrete pavement, HMA pavement, concrete curb and gutter, concrete sidewalk, retaining walls, bridges, box culvert, erosion control, traffic signal, permanent signing, traffic control, pavement marking, lighting, restoration and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

104-005 (20090901)

3. Mandatory Pre-Bid Meeting.

Supplement standard spec 102.3.1 with the following:

Prospective bidders are required to attend a mandatory pre-bid meeting on Thursday, July 11, 2013 at 1:00 PM in the Fox Training Center Room of the Zoo Interchange Construction Field Office, located at 2424 S 102nd Street, West Allis, Wisconsin 53227.

The meeting agenda will include the following:

- Program Overview
- Project 1060-33-78 Proposal
- Safety
- Equity and Environmental Provisions
- Owner Controlled Insurance Program (OCIP)
 - The Zoo Interchange project will be constructed under the umbrella of an Owner Controlled Insurance Program (OCIP). For Contractors/Consultants that provide regular and ongoing work within the footprint of the Corridor Project, participation in the OCIP is mandatory and requires enrollment into the OCIP. The OCIP requires submitted bids to exclude the cost of the OCIP provided coverage.
 - This mandatory pre-bid meeting will provide understanding of the coverage provided by the OCIP, the bid deduction process and the coverage needed outside of the OCIP. It is critical that CFO's, Risk Manager/Insurance Broker or Agent, and Estimators attend this meeting.
 - If you have any questions regarding the OCIP, including questions on if your company needs to be enrolled into the OCIP, please contact Kevin Gehrmann at (608) 267-7722.

The meeting will discuss project specific issues for ID 1060-33-78 including construction staging and traffic control; construction of Structures B-40-892 and C-40-101; construction of Ramp NSA; Surcharge grading at Ramp NW; drainage; and utility coordination.

No meeting minutes will be prepared, but a published response will be sent out addressing all questions raised at the meeting.

4. Prosecution and Progress.

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

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

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

The completion date is based on an expedited work schedule and may require extraordinary forces and equipment; work on Saturdays, Sundays, and nationally recognized legal holidays; and work at night.

Indicate on the proposed schedule of operations that a large force and adequate equipment will be needed to assure that the work will be completed within the established contract time.

Be advised that there may be multiple mobilizations and/or remobilizations to complete construction operations, for example such items as: concrete pavement repair/replacement, paving, traffic control, signing, pavement marking, finishing items and other incidental items. No additional payment will be made, by the department, for additional mobilizations.

Winter weather work, grading, excavation of frozen ground, high ground water, dewatering during winter months, and mitigation efforts for high water table elevations shall not be considered adverse weather delays to construction. Cost for dewatering is considered incidental to construction.

Anticipate cold weather, late fall and early spring concrete paving and ancillary concrete work (curb, median, etc), and winter concrete work for box culvert construction. Plan to heat aggregates and water for mixes, and that the heating of the aggregate and water is considered incidental to those concrete items. There will be no adverse weather delay for cold weather construction.

After written notice to proceed, and prior to Final Acceptance of the work, assist with maintenance of existing roadways and bridges as specified in standard spec 104.6.1. This assistance may include performance of work covered under pay items or accommodating local repair forces within the work zones. Maintain all newly constructed work as specified in standard spec 104.6.1. Various pay items may be required to maintain the freeway and local streets during construction.

Milwaukee County will perform snow removal operations for freeway and ramp lanes that are open to traffic. The City of Milwaukee will perform snow removal operations for local streets that are open to traffic. Provide for snow removal in those areas closed to traffic as required to facilitate safe construction operations and as required to eliminate snow melt run-off from crossing active roadways. Provide Milwaukee County Highway Maintenance and Milwaukee County Sheriff's Department with a 24-hour emergency contact number for when maintenance is required.

Provide a concrete joint detail 14 days prior to paving for all doweled transverse joints on this project, including intersections, for approval by the engineer. Joint spacing must not exceed 15 feet, as shown on the standard detail drawing. Place joints at end-of-radii, center line and flange line extended, all zero face driveway openings for depressed driveways and, when feasible, at all manholes, catch basins or inlets, and water valve boxes. Include the cost of all preparing the detail and installing jointing and dowel baskets in the unit bid price for concrete pavement.

Place topsoil in all graded areas as designated by the engineer immediately after grading has been completed and fertilize or sod all areas within 5 calendar after placement of topsoil.

CPM Progress Schedule

Refer to the Baseline CPM Progress Schedule items elsewhere in these special provisions.

Schedule of Operations

Traffic shifts shown in a given stage may occur at different times during that stage depending on the controlling elements for a given traffic movement. The department anticipates that the schedule for each stage shall be as follows:

Anticipated schedule:

Stage 1A: September 23, 2013 to January 19, 2014
Stage 1B: January 20, 2014 to February 23, 2014
Stage 1C: February 24, 2014 to March 16, 2014
Stage 1D: March 17, 2014 to May 4, 2014
Stage 2: May 5, 2014 to May 25, 2014
Stage 3: May 26, 2014 to July 27, 2014
Stage 4: July 28, 2014 to August 31, 2014

Stage 1A Construction:

- Install temporary signals at S. 84th Street.
- Construct storm sewer from TLE217 to TLE218 prior to constructing jacking pit.
- Construct jacking and receiving pits for C-40-101.
- Begin pipe jacking of C-40-101.
- Begin construction on B-40-892.
- Construct sanitary sewer and storm sewer relocations at Honey Creek prior to beginning storm sewer between TLE 219 to TLE 220A.
- Construct storm sewer from TL219 to TL220A prior to beginning C-40-101 north of westbound entrance ramp.
- Construct sanitary sewer relocation at S. 84th Street.
- Begin water main construction at S. 76th Street.
- Close median opening along northbound S. 84th Street at the north terminal.
- Construct southbound median work along S. 84th Street at the north terminal.
- Begin and complete City of Milwaukee communication packages prior to October 21, 2013 to allow city forces to perform splicing operations. Splicing operations must be complete prior to B-40-892 construction across S. 84th Street.
- Construct IH 94 Lane and Joint Repair
- Remove portion of N-40-2.
- Begin construction of R-40-555.

- Begin Ramp NW Surcharge
- Begin Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 1B Construction:

- Continue pipe jacking of C-40-101.
- Continue construction on B-40-892.
- Complete water main construction at S. 76th Street.
- Construct water main construction at S. 84th Street.
- Remove portion of N-40-2.
- Continue construction of R-40-555.
- Begin permanent signal installation at S. 84th Street.
- Continue Ramp NW Surcharge
- Continue Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 1C Construction:

- Complete pipe jacking of C-40-101.
- Continue construction on B-40-892.
- Construct portion of B-40-892 across S. 84th Street.
- Complete roadway construction along Ramp FCA.
- Complete roadway construction along S. 84th Street.
- Remove portion of N-40-2.
- Continue construction of R-40-555.
- Continue permanent signals at S. 84th Street.
- Continue Ramp NW Surcharge
- Continue Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 1D Construction:

- Construct open-cut portion of C-40-101.
- Complete construction of C-40-101 Honey Creek.
- Construct Ramp FDA.
- Construct Ramp FBA.
- Remove B-40-89.
- Begin Construction of B-40-785.
- Remove portion of N-40-2.
- Continue construction on R-40-555.
- Begin IH 94 westbound widening.
- Construct storm sewer from TL113 to TLE116.
- Complete and have permanent signals operational at S. 84th Street.
- Continue Ramp NW Surcharge
- Continue Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 2 Construction:

- Continue construction of B-40-892.
- Continue construction of B-40-785.
- Continue construction of R-40-555.
- Complete IH 94 westbound widening.
- Begin construction of W. Kearney Street.
- Begin construction of N-40-71 and N-40-72.
- Begin construction of O'Connor Barrier.
- Begin construction of B-40-799 and Ramp NSA Temporary Underpass.
- Begin construction of R-40-524 and R-40-525.
- Begin construction of Ramp NSA.
- Continue Ramp NW Surcharge
- Continue Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 3 Construction:

- Complete construction of B-40-892.
- Complete construction of W. Kearney Street.
- Construct S. 76th Street south of W. Kearney Street.
- Begin construction of W. Kearney Street barrier.
- Continue construction of N-40-71 and N-40-72.
- Begin construction of N-40-70.
- Construct storm sewer from TL110 to TLE116.
- Begin construction of wall R-40-554.
- Continue construction of B-40-785, B-40-799, and Ramp NSA Temporary Underpass.
- Continue construction of R-40-524, R-40-525, and R-40-555.
- Continue construction of Ramp NSA.
- Complete Ramp NW Surcharge prior to June 14, 2014
- Complete Greenfield Berm grading using solid waste soil from B-40-892 structure excavation.

Stage 4 Construction:

- Complete construction of W. Kearney Street barrier.
- Complete construction of W. O'Connor Street barrier.
- Complete construction of N-40-70, N-40-71, N-40-72.
- Complete construction on S. 76th Street.
- Complete construction of B-40-785 and B-40-799.
- Complete construction of R-40-524, R-40-525, R-40-554, and R-40-555.
- Complete construction of Ramp NSA.

Contractor Coordination

Coordinate traffic signal operations on S. 76th Street with the City of Milwaukee – Signals. Allow 5 working days for city forces to perform work on S. 76th Street. Provide written notice to Mr. Joseph Blakeman of the City of Milwaukee, (414) 286-8070, ten business days in advance to coordinate construction activities.

Coordinate street lighting construction operations on S. 84th Street, S. 76th Street, W. Kearney Street, and W. O'Connor Street with the City of Milwaukee – Lighting. Provide written notice to Mr. Thomas Manzke of the City of Milwaukee, (414) 286-3265, ten business days in advance to coordinate construction activities.

The City of Milwaukee Water Utility staff will inspect the construction of the water main under this contract. Notify Mr. Steve Brengosz, (414) 708-2808, or Mr. Mark Scheller, (414) 286-2427, for materials inspection and the City of Milwaukee Construction Section, (414) 286-2497, for installation inspection four days prior to starting construction. The City of Milwaukee will perform safe water samples for the water main.

City of Milwaukee forces will perform splicing of the lines in the new communications package installed in this contract along W. Kearney Street and W. O'Connor Street, and in the previously installed package along W. Bluemound Road. Coordinate construction activities with City of Milwaukee – Cable. All City of Milwaukee activities must be completed before the installation of those portions of B-40-892 crossing South 84th Street. Provide written notice to Mr. Brian Pawlak, (414) 286-5970, of the City of Milwaukee, ten business days in advance to coordinate construction activities.

City of Milwaukee forces will perform splicing of the re-installed communications package along S. 84th Street. Coordinate construction activities with City of Milwaukee - Cable. Provide written notice to Mr. Brian Pawlak, (414) 286-5970, of the City of Milwaukee, ten business days in advance to coordinate construction activities.

We Energies will reinstall gas facilities impacted by construction of B-40-892 at S. 84th Street. Coordinate backfilling of B-40-892 trench with We Energies and allow 3-days to perform reinstallation of the gas facilities during backfilling. Coordinate gas construction operations with We Energies – Gas. Provide written notice to Dan Sande, (414) 221-4578, of We Energies, ten business days in advance to coordinate construction activities.

Advance Notification

Notify the engineer and WisDOT Region Work Zone Engineer at (414) 313-2276 if there are any changes in the schedule, early completions, or cancellations of scheduled work. Coordinate the locations of messages of portable changeable message sign with the engineer and WisDOT STOC. Notify WisDOT Signal Operations at (414) 750-2605 and WisDOT Electrical Field Unit at (414) 266-1170 regarding changes for alternate routes and detours.

Provide the engineer with a schedule of lane and ramp closures for the following week by noon on Thursday of the previous week. In addition, provide the following minimum advance notification to the engineer for incorporation into the Wisconsin Lane Closure System.

Service Ramp Closures	3 business days
System Ramp Closures	7 calendar days
Lane Closures	3 business days
Full Freeway Closures	14 calendar days
Construction Stage Changes	14 calendar days
Detours	14 calendar days

Obtain prior acceptance from the engineer and the WisDOT Statewide Traffic Operations Center for Full Freeway Closures. Notify local emergency and police agencies seven calendar days prior to freeway closure.

Portable Changeable Message Signs

Obtain acceptance from the engineer all messages for all portable changeable message signs.

Freeway and Ramp Work Restrictions

Definitions

The following definitions apply to this contract for freeway work restrictions:

System Ramps	Freeway to freeway ramps
Service Ramps	Freeway to local road ramps

Peak Hours

5:30 AM – 9:00 AM Monday, Tuesday, Wednesday, Thursday, and Friday

2:00 PM – 7:00 PM Monday, Tuesday, Wednesday, and Thursday, and Friday

Weekend Peak Hours

10:00 AM – 7:00 PM Saturday, Sunday

Weekend Off-Peak Hours

8:00 AM – 10:00 AM Saturday, Sunday

7:00 PM – 11:00 PM Saturday

7:00 PM – 9:30 PM Sunday

Weekday Off-Peak Hours

9:00 AM – 2:00 PM Monday, Tuesday, Wednesday, Thursday, and Friday

7:00 PM – 9:30 PM Monday, Tuesday, Wednesday, Thursday

7:00 PM – 11:00 PM Friday

Night Time Hours

9:30 PM – 5:30 AM (Sunday PM to Monday AM, Monday PM to Tuesday AM, Tuesday PM to Wednesday AM, Wednesday PM to Thursday AM, Thursday PM to Friday AM)

11:00 PM – 8:00 AM (Friday PM to Saturday AM, Saturday PM to Sunday AM)

Full Freeway Closure/Hours

11:00 PM – 4:30 AM (Sunday PM to Monday AM, Monday PM to Tuesday AM, Tuesday PM to Wednesday AM, Wednesday PM to Thursday AM, Thursday PM to Friday AM)

No Weekday or Weekend Peak Hour lane closures are allowed. No Weekday Off-Peak two-lane closures are allowed.

Provide a minimum of three lanes in each direction of the freeways and ensure that the freeways are entirely clear for traffic during Weekday Peak Hours, Weekend Peak Hours, and during Weekday Off-Peak Hours, except as shown in the traffic control plans. Provide a minimum of two lanes in each direction of the freeways and ensure that the freeways are entirely clear for traffic during Weekend Off-Peak Hours. Provide a minimum of one lane in each direction of the freeway and ensure that the freeways are entirely clear for traffic during Night Time Hours except as allowed during full closure.

Provide a minimum of one lane in each direction of the freeway and ensure that the freeways are entirely clear for traffic during Night Time Hours except as allowed during full closure.

Follow plan details for closures. Lane restrictions of the freeway beyond that shown on the traffic control plans are subject to lane rental assessments and must be approved by the engineer. If plan details are not provided in the traffic control plan, furnish plans for review by the engineer and the Region Work Zone Engineer, (414) 313-2276, so that approval, or disapproval, is obtained at least three business days prior coordination of roadway, lane, and ramp closures as identified in Contractor Coordination.

Do not, at any time, conduct construction operations in the median area and adjacent outside shoulder area of the freeway at the same time without obtaining prior permission of the engineer, beyond that shown on the traffic control plans.

Restrict work on freeway roads and freeway ramps to working in closed shoulders or closed lanes as allowed by the plans or engineer. Provide and utilize temporary access roads and ramps to access the work zones. Construct temporary access incidental to other items of work. Access into the work zones will not be allowed directly from freeway roads during peak hours. Access into the work zones from freeway roads will be allowed during off peak and night time hours, subject to approval by the engineer, if operations can be safely accomplished and do not result in non-construction traffic entering the work zones. Provide parallel deceleration and acceleration lanes for freeway access into and out of the work zones per plan details at locations approved by the engineer. Access from ramps will be allowed as shown in the plans or as modified with written approval from

the engineer. Exiting the work zones directly onto freeway roads will be allowed only when operations do not obstruct or slow traffic on the freeway.

Full closure and detouring of freeway roads will be restricted to Full Freeway Closure Hours. The freeway may be closed to facilitate the removal of structures and erection of girders and to perform work related to major traffic shifts. Provide signed detour routes, as shown in the plans that are fully open and free of construction during all full freeway and system ramp closures.

Short-term freeway mainline rolling closures may be allowed for a maximum of 15 minutes for the removal and erection of sign structures, equipment moves across the road, or other required work as determined by the engineer. The department will allow short-term rolling closures only between 2:00 AM and 4:00 AM and they may only be performed by freeway law enforcement. Coordinate these closures with freeway law enforcement 14 days in advance after obtaining approval from the engineer. Present the scheduled time for the short term rolling closure at the weekly traffic meeting a minimum of one week prior to the closure.

Full closure of system ramps and service ramps will be restricted to Night Time Hours beyond that shown on the traffic control plans.

A full freeway closure of IH 94 westbound and a median lane closure of IH 94 eastbound may be used in Stage 1D during night time hours to facilitate construction of the storm sewer construction across IH 94 westbound.

A full freeway closure of IH 94 eastbound may be used in Stage 3 during night time hours to facilitate the construction of the storm sewer across IH 94 eastbound.

The IH 94 eastbound exit ramp to S. 84th Street may be closed for a period not to exceed 6 consecutive weeks to facilitate construction of B-40-892. This closure shall not begin prior to January 5, 2014 and shall be completed no later than March 16, 2014.

The IH 94 westbound entrance from S. 84th Street may be closed from stage 1A to Stage 1D for construction activities except as required for an IH 94 westbound detour during Stage 1D for storm sewer construction and demolition of B-40-0089. Maintain one lane for emergency vehicles at all times except as required for open cut construction across entrance ramp. Provide advance notice to emergency personnel prior to trenching operations across the entrance ramp and in accordance to the Traffic Meetings and Traffic Control Scheduling specification in these special provisions.

The IH 94 westbound entrance ramp from S. 70th Street may be closed from Stage 1D to Stage 3 for construction activities. This closure shall not take place until the IH 94 westbound entrance ramp at S. 84th Street is opened to traffic.

The IH 94 eastbound entrance ramp from S. 84th Street may be closed from Stage 1A to Stage 1D to facilitate construction of B-40-892.

Do not begin or continue any work that closes traffic lanes or ramps outside the allowed time periods specified in this contract. If the contractor fails to open freeway lanes of traffic and/or ramps to traffic by the specified times, deductions shown in the Lane Rental Assessment Table in the article Lane Rental Assessment will be made from the monies due to the contractor based on the hourly rental rate for the closure type and hourly definition that the non-compliant closure occurs. This reduction will be quarterly fraction of the hourly reduction for each 15-minute increment during which the roadway, lane or ramp closure violation occurs. The total reduction of monies due to the contractor will be the summation of the separate reductions for each lane and each ramp closure violation.

These sums will be considered and treated not as a penalty but as fixed, agreed liquidated damages due the department from the contractor caused by the inconvenience to the traveling public, additional costs incurred for engineering and supervision, additional maintenance of detours and other incidental items that collectively cause an increased expenditure of public funds by the contractor's failure to open freeway lanes and ramps in a timely manner.

Permitting the contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the department of any of its rights under the contract.

Work Zone Ingress/Egress.

Provide engineer approved signage and parallel deceleration and acceleration lanes for freeway access into and out of the work zones at locations approved by the engineer.

At the weekly traffic meetings, provide an Emergency Work Zone Access Plan and required updates, as approved by the engineer, to direct emergency responders accessing a mainline median barrier restricted work zone.

Locations of work zone egress or ingress for construction vehicles, other than as shown in the plans, is subject to approval from the engineer. Access into the work zones are not allowed directly from the freeway during peak hours. Access into the work zones from the freeway will be allowed during off peak and night-time hours, subject to approval by the engineer, if operations can be safely accomplished and do not result in non-construction traffic entering the work zones. Exiting work zones directly onto the freeway are only allowed when operations do not obstruct or slow traffic on the freeway. All construction vehicles shall yield to all through traffic at all locations.

Local Street Work Restrictions

Definitions

The following definitions apply to this contract for local street work restrictions:

Peak Hours

6:00 AM – 9:00 PM Monday, Tuesday, Wednesday, Thursday
6:00 AM – 8:00 PM Friday
11:00 AM – 8:00 PM Saturday
1:00 PM – 5:00 PM Sunday

Off-Peak Hours

9:00 PM – 6:00 AM Monday, Tuesday, Wednesday, Thursday
9:00 PM – 11:00 AM Friday PM to Saturday AM
8:00 PM – 1:00 PM Saturday PM to Sunday PM
5:00 PM – 6:00 AM Sunday PM to Monday AM

Provide Milwaukee County Transit System - Coordinator of Street Supervision, Dave Ziarek, (414) 343-1764, with a schedule of the S. 76th Street, S. 84th Street, and W. Kearney Street closures 14 calendar days prior to closure. Also coordinate the location of each Temporary Bus Stop Pad with Dave Ziarek, 14 days prior to installation.

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.

Keep sidewalks open unless otherwise shown on the plans, or to facilitate the removal of structures and erection of girders or as approved by the engineer. Maintain pedestrian access to adjacent properties, businesses, schools, and at bus stops or provide where necessary, as directed by the engineer. Protect pedestrians from falling debris at all times when sidewalks are open.

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, as directed by the engineer.

Construct temporary sidewalk surfaces with a minimum of 2 inches of asphaltic surface temporary or salvaged millings and a minimum of 4-feet wide. Compact the surface of temporary sidewalks until smooth and capable of supporting a wheelchair. The separate payment for the construction of temporary sidewalks including materials, labor, removal and restoration, will be made by the department under the bid item Temporary Crosswalk/Sidewalk, unless otherwise shown on the plans.

Existing trees, street light poles, hydrants and other utility poles are to remain in place during construction unless otherwise noted in the plan. Conduct an on-site visit prior to bidding to determine any special measures required for proper clearance between the trees, hydrants and poles and the paving equipment.

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

Do not close residential approaches or remove from service without giving sufficient notice to the occupants of the premises to remove their vehicles prior to driveway removal or closing of the driveway approach access. If necessary, make other access arrangements, agreed to in writing and signed by the contractor and the property owner serviced by the driveway. Obtain approval from the engineer prior to alternating construction sequencing.

At all times maintain access to the City of Milwaukee Fire Department's Fire station located in the southeast corner of S. 84th Street and W. Honey Creek Parkway.

S. 84th street may be closed for a period not to exceed 6 consecutive weeks to facilitate construction of B-40-892, utility construction, and pavement restoration. This closure shall not begin prior to January 5, 2014 and shall be completed no later than March 16, 2014.

S. 76th Street may be closed from Stage 1D to Stage 4 to facilitate construction of B-40-785, utility construction, permanent signals, and S. 76th Street reconstruction. This closure shall not take place prior to the opening of S. 84th Street to traffic.

W. Kearney Street may be closed from Stage 1A to Stage 3 to facilitate construction of B-40-892, utility construction, and W. Kearney Street reconstruction.

W. Schlinger Ave may be closed from Stage 2 to Stage 4 for utility construction and construction of B-40-799. Maintain access for residents and emergency vehicles except as required for utility construction and overhead bridge work.

Provide Milwaukee County Transit Dave Ziarek, Coordinator of Street Supervision, (414) 343-1764, with a schedule of the S. 84th Street, S. 76th Street, and W. Kearney Street closures 14 calendar days prior to closure.

All Work Restrictions

When engaged in roadway cleaning operations, use equipment having vacuum or water spray mechanisms to eliminate the dispersion of particulate matter into the atmosphere. If vacuum equipment is employed, it must have suitable self-contained particulate collectors to prevent discharge from the collection bin into the atmosphere.

Excavation material and cleared and grubbed material should be stockpiled on upland areas an adequate distance away from wetlands, storm sewer inlets, floodplains, and the waterways as determined by engineer.

Provide Milwaukee County Highway Maintenance and Milwaukee County Sheriff's Department with a 24-hour emergency contact number for when maintenance is required.

WE Energies has facilities in conflict with work along Ramp NSA that will not be moved until early March, 2014.

Construction activities along the Hank Aaron State Trail shall not begin prior to November 1, 2013.

Traffic Control Deficiency Response Time Penalty

Supplement standard spec 643.3.1(7) with the following:

Upon receiving electronic notification from the engineer, clean, repair or replace all noted traffic control devices not performing as intended to the satisfaction of the engineer within 2 hours. Failure to clean, repair or replace each required traffic control item within the time limits specified above will result in daily monetary deductions of \$500 for each 24-hour period (or portion thereof starting 2 hours after time of notification) in which the traffic control deficiency exists.

Interim and Final Completion of Work

Modify standard spec 108.11 by adding the following to the end of the subsection:

The department will not grant time extensions for the following:

- Severe weather as specified in standard spec 108.10.2.2.
- Labor disputes that are not industry wide.
- Delays in material deliveries.

Each day is defined as a twenty-four hour period beginning at 12:00 AM.

Interim Completion of Work 03/16/2014

Supplement standard spec 108.11 as follows:

Complete all roadway and utility construction along the IH 94 eastbound exit ramp to S. 84th Street and S. 84th Street for opening of all travel lanes in this contract for vehicular traffic prior to 12:01 AM, March 17, 2014.

If the contractor fails to complete the above work on the IH 94 eastbound exit ramp to S. 84th Street or S. 84th Street prior to 12:01 AM March 17, 2014, the department will assess the contractor \$10,000 in interim damages for each calendar day that utility or roadway construction continues. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM, March 17, 2014.

Interim Completion of Work 07/27/2014

Supplement standard spec 108.11 as follows:

Complete all roadway work on W. Kearney Street between S. 84th Street and S. 76th Street, and S. 76th Street at the W. Kearney Street intersection for opening of all travel lanes in this contract for vehicular traffic. Complete all work along S. 84th Street and Kearney Street including sidewalks and landscaping prior to 12:01 AM July 28, 2014. Evacuate sites 10 and 11, Pettit National Ice Center and Wisconsin State Fair Board, and complete all parking lot restoration and landscaping prior to 12:01 AM July 28, 2014.

If the contractor fails to complete the above work on S. 84th Street, W. Kearney Street, S. 76th Street or within sites 10 or 11 by the specified completion date, the department will assess the contractor \$50,000 in interim liquidated damages for each calendar day that the temporary signals, roadway, sidewalks, and parking lots remain closed after 12:01 AM, July 28, 2014. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM, July 28, 2014.

Final Completion of Work 08/31/2014

Supplement standard spec 108.11 as follows:

If the contract time expires prior to completing all contract work prior to 12:01 AM September 1, 2014 the contractor shall be subject to \$5000 in liquidated damages for each calendar day after 12:01 AM, September 1, 2014 that the project is not completed. An entire calendar day will be charged for any period of time within a calendar day that the project is not completed beyond 12:01 AM, September 1, 2014.

Migratory Birds

Swallow and other migratory birds' nests have been observed on or under the existing bridge. All active nests (when eggs or young are present) of migratory birds are protected under the federal Migratory Bird Treaty Act.

The nesting season for swallows and other birds is usually between May 1 and August 30. Either prevent active nests from becoming established, or apply for a depredation permit from the US Fish and Wildlife Service for work that may disturb or destroy active nests. The need for a permit may be avoided by removing the existing bridge structure prior to nest occupation by birds, or clearing nests from all structures before the nests become active in early spring. As a last resort, prevent birds from nesting by installing a suitable netting device on the remaining structure prior to nesting activity. Include the cost for preventing nesting in the cost of Removing Old Structure.

5. Traffic.**A General**

Keep S. 76th Street, S. 84th Street, and W. Kearney Street open to through traffic at all times for the duration of this project except where noted below and in the Prosecution and Progress article in these special provisions.

B Residential and Business Property Access

Maintain access to properties along S. 76th Street, S. 84th Street, and W. Kearney Street for local residents, businesses, and emergency vehicles. Maintain and keep open the access to all driveways and parking lots where alternative access is not available at all times by closing one driveway at a time, building half the driveway at a time and/or plating concrete work. Plating of concrete work, as directed by the engineer, is included in the item that is being plated. In parking lots that are being reconstructed, stage operations so that parking and access is maintained on existing or proposed base aggregate or pavement.

C Pedestrian Access

Maintain sidewalk at all times except under direction of the engineer. Provide a temporary surface for pedestrian access at all times in areas of sidewalk construction. Construct the temporary surface to meet Americans with Disabilities Act Accessibility Guidelines (ADAAG) requirements consisting of temporary asphaltic surface, any grade of concrete, skid resistant steel plating, or alternative material as approved by the engineer. Gravel or base course material is not acceptable. Maintain sidewalk access to all businesses and residences at all times. The Temporary Crosswalk/Sidewalk bid item is payment for maintaining crosswalks and sidewalks through the construction zone at signalized intersections.

Maintain pedestrian movements crossing the construction zone at all intersections at all times, unless otherwise directed by the engineer. Construct pedestrian crossings of intersections to meet the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) consisting of temporary asphaltic surface, any grade of concrete, skid resistant steel plating, or alternative material as approved by the engineer. Gravel or base course material is not acceptable. Maintain ADAAG accessible pedestrian walkways that are free from mud, sand, and construction debris. The Temporary Crosswalk/Sidewalk bid item is payment for maintaining crosswalks through the construction zone where existing crosswalks exist. Closures of sidewalk must be approved by the engineer and conform to signing shown on the traffic control plan. At locations where crosswalks crossing S. 76th Street, S. 84th Street, W. Kearney Street, and W. O'Connor exist on both sides of the intersection, closure of one of the two crosswalks is permitted as long as all other crossings are completely open. At intersections where only one crosswalk exists crossing S. 76th Street, S. 84th Street, W. Kearney Street, and W. O'Connor, stage work to maintain the crosswalk at all times.

Stage 1A Traffic:

Close IH 94 westbound entrance ramp from S. 84th Street

Close IH 94 eastbound entrance ramp from S. 84th Street

Close W. Kearney Street access from S. 84th Street

W. O'Connor Street reduced to one lane from S. 73rd to S. 78th Street

Southbound S. 84th reduced to one lane from W. Honey Creek Parkway to W. Adler Street

Stage 1B Traffic:

Close IH 94 westbound entrance ramp from S. 84th Street
Close IH 94 eastbound entrance ramp from S. 84th Street
Close IH 94 eastbound exit ramp for S. 84th Street
Close W. Kearney Street access from S. 84th Street
W. O'Connor Street reduced to one lane from S. 73rd to S. 78th Street
Northbound S. 84th Street reduced to one lane from W. Adler Street to W. O'Connor Street

Stage 1C Traffic:

Close IH 94 westbound entrance ramp from S. 84th Street
Close IH 94 eastbound entrance ramp from S. 84th Street
Close IH 94 eastbound exit ramp for S. 84th Street
Close S. 84th Street at IH 94
Close W. Kearney Street access from S. 84th Street
W. O'Connor Street reduced to one lane from S. 73rd to S. 78th Street

Stage 1D Traffic:

Open IH 94 eastbound exit ramp to S. 84th Street
Open S. 84th Street
Close IH 94 westbound entrance ramp from S. 84th Street
Close IH 94 eastbound entrance ramp from S. 84th Street and W. Kearney Street Access
W. O'Connor Street reduced to one lane from S. 73rd to S. 78th Street
Close S. 70th Street entrance ramp to IH 94 westbound after S. 84th Street entrance ramp to IH 94 is opened to traffic
Close S. 76th Street from W. Kearney Street to W. O'Connor Street after S. 84th Street is opened to traffic
Close W. Kearney Street access from S. 84th Street

Stage 2 Traffic:

Close S. 76th Street from W. Kearney Street to W. O'Connor Street
W. O'Connor Street traffic reduced to one lane from S. 73rd Street to S. 78th Street
Close S. 70th Street entrance ramp to IH 94 westbound
Close W. Kearney Street access from S. 84th Street

Stage 3 Traffic:

Shift IH 94 eastbound and westbound traffic at S. 76th Street
W. O'Connor Street traffic reduced to one lane from S. 73rd Street to S. 78th Street
Close S. 70th Street entrance ramp to IH 94 westbound
Full closure of S. 76th Street at W. Kearney Street and W. O'Connor Street
W. Kearney Street reduced to one lane from S. 75th Street to S. 72nd Street
Close W. Kearney Street access from S. 84th Street

Stage 4 Traffic:

Shift IH 94 westbound to the south at S. 76th Street

Open W. Kearney Street

W. O'Connor Street traffic reduced to one lane from S. 73rd Street to S. 78th Street

W. Kearney Street and W. Kearney Street/S. 76th Street Intersection shall be fully open for the duration of Wisconsin State Fair

6. Traffic Meetings and Traffic Control Scheduling.

Every Wednesday by 10:00 AM, submit a detailed proposed 2-week look-ahead traffic closure schedule to the engineer. Type the detailed proposed 2-week look-ahead closure schedule into an excel spreadsheet provided by the engineer. Enter information such as closure dates, duration, work causing the closure and detours to be used. Also enter information such as ongoing long-term closures, emergency contacts and general 2-month look-ahead closure information into the excel spreadsheet.

Meet with the engineer between 11:00 - 11:30 AM on at the Zoo Interchange project office located at 2424 S. 102nd Street, West Allis, WI 53227 to discuss and answer questions on the proposed schedule. Edit, delete and add closures to the detailed proposed 2-week look-ahead schedule, as directed by the engineer, so that proposed closures meet specification requirements. Other edits, deletions or additions unrelated to meeting specification requirements may also be agreed upon with the engineer during the 11:00 AM meeting.

Every Wednesday at 2:00 PM, or as scheduled by the engineer, attend a weekly traffic meeting. The meeting will bring local agencies, project stakeholders, owner managers, owner engineers, contractors, document control and construction engineering personnel together to discuss traffic staging, closures and general impacts. Upon obtaining feedback from the meeting attendees, edit, delete and add information to the detailed 2-week look-ahead closure schedule, as needed. Submit the revised 2-week look-ahead to the engineer.

Obtain approval from the engineer for any mid-week changes to the closure schedule. Revise the 2-week look-ahead as required and obtain engineer approval.

Notify the engineer and affected stakeholders such as City of Milwaukee Police and Fire Departments, Milwaukee County Sheriffs Department, Milwaukee County Transit, School Districts, Milwaukee DPW, local business owners and residents at least 3 days (72 hours) in advance of all traffic switches and closures of existing streets.

Notify business owners and residents 2 days (48 hours) prior to restricting access and 3 days (72 hours) prior to closing access. See the traffic article of these special provisions for information on property access.

7. Traffic Control.

The work under this item shall be in accordance to the requirements of standard spec 643, and as shown on the plans, or as approved by the engineer, except as hereinafter set forth.

No operation shall proceed until all traffic control devices for such work are in the proper location. Traffic Control is subject to change at the direction of the engineer in the event of an emergency.

Provide the Milwaukee County Sheriff's Department, City of Milwaukee Police Department, City of West Allis Police Department, City of Wauwatosa Police Department, Wisconsin State Patrol, the Statewide Traffic Operations Center, and the engineer a current telephone number with which the contractor or his representative can be contacted during non-working hours in the event a traffic control safety hazard develops.

Do not park or store equipment, vehicles, or construction materials within 30 feet of the edge of freeway traffic lanes without barrier separation for any roadway carrying freeway traffic; or within 20 feet off the edge of a freeway service interchange ramp during any time except as approved by the engineer. At such locations, the materials and equipment involved shall not constitute a hazard to the traveling public.

Do not park personal vehicles within the access control limits of the freeway. Do not cross live freeway traffic lanes with equipment or vehicles.

Do not use flag persons to direct, control, or stop freeway traffic. Obtain approval from the engineer to use a flag person to direct, control, or stop local street traffic. Adhere to Manual of Uniform Traffic Control Devices chapter 6E standard requirements for flagger control.

Do not disturb, remove or obliterate any traffic control signs, advisory signs, shoulder delineators, sand barrel array or beam guard in place along the traveled roadways not shown on the plans without the approval of the engineer.

One flashing arrow board shall be placed in advance of each lane closure taper and one flashing arrow board shall be placed within each lane closure taper at locations directed by the engineer.

8. Holiday and Special Event Work Restrictions.

Do not perform work on, nor haul materials of any kind along or across any portion of the highway lanes carrying I-94/ US 45 traffic, and entirely clear the traveled way of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following holiday periods:

- From noon Wednesday, November 27, 2013 to 6:00 AM Monday, December 2, 2013 for Thanksgiving;
- From 6:00 AM Tuesday, December 24, 2013 to 6:00 AM Thursday, December 26, 2013 for Christmas;
- From noon Tuesday, December 31, 2013 to 6:00 AM Thursday, January 2, 2014 for New Years;
- From noon Friday, May 23, 2014 to 6:00 AM Tuesday, May 27, 2014 for Memorial Day;
- From noon Thursday, July 3, 2014 to 6:00 AM Monday, July 7, 2014 for Independence Day;
- From noon Friday, August 29, 2014 to 6:00 AM Tuesday, September 2, 2014 for Labor Day;
- From noon Wednesday, November 26, 2014 to 6:00 AM Monday, December 1, 2014 for Thanksgiving.

Provide any proposals to work within the work zone(s) adjacent to the highway carrying I-94/US 45 traffic during the established holiday periods to the engineer for approval. Proposals will include a plan that establishes work type, hours of operations, and will certify no ingress/egress to the site by construction or worker vehicles from I-94/US 45 consistent with the above restrictions for equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic as noted above.

Holiday work restrictions do not apply to roadways or ramps closed long/short term during construction as shown on the plans.

Special event work restrictions do not apply to roadways or ramps closed long/short term during construction as shown on the plans.

Freeway Restrictions

Do not perform work on, nor haul materials of any kind along or across any portion of the designated highway lanes carrying I-94/US 45 traffic, and entirely clear the traveled way of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following special event periods:

- During the Milwaukee County Zoo's A la Carte event, August 15, 2014 to August 17, 2014 no closures will be allowed for the duration of the event.
- During Family Free Days at the Milwaukee County Zoo, no closures will be allowed for the duration of the event.
- During Summer Fest no full or system ramp closures on I-94 and US 45 in both directions until one hour after the event.
- During Wisconsin State Fair no full or system ramp closures, including 84th street ramps, on I-94 and US 45 in both directions for the duration of the event.

- During a concert or other special event at Miller Park, no I-94 closures allowed until one hour after the event ends.
- On days with a Milwaukee Brewer home game at Miller Park, maintain all inbound travel lanes on I-94 to Miller Park starting at three hours before the game. Maintain all outbound lanes on I-94 from Miller Park until four hours after the start of the game.
- On days with a University of Wisconsin-Madison football home game at Camp Randall, maintain all outbound travel lanes on I-94 starting at three hours before the game. Maintain all inbound lanes starting at one hour after the end of the game until three hours after the end of the game.

Local Road Restrictions

These restrictions only apply to hauling of materials. Work can be performed on local roads during these special events:

- On days with the Wisconsin State Fair festival at State Fair Park.

9. Utilities.

This contract comes under the provisions of Administrative Rule TRANS 220.

Provide an individual to serve as the contractor's sole point of contact for field utility coordination and communication for the duration of the project.

Additional information regarding recently relocated utility facilities may be available on permits issued to the utility companies. These permits can be viewed at the Region Office during normal working hours. Contact WisDOT SE Freeways Utility Coordinator Maria Rojas at (414) 750-4362 for further information.

Underground and overhead utility facilities are located within the project limits. Utility adjustments are required for this construction project as noted below. Coordinate construction activities with a call to Diggers Hotline or a direct call to the utilities that have facilities in the area as required per state statute. Use caution to ensure the integrity of underground facilities and maintain code clearances from overhead facilities at all times.

Some utility work, as described below, is dependent on prior work being performed by the contractor at a specific site. Provide the engineer and the affected utility a good faith notice of when the utility is to start work at the site. Notice shall be given 14 to 16 calendar days in advance of when the site will be available to the utility. Follow up with a confirmation notice to the engineer and the utility not less than 3 working days before the site will be ready for the utility to begin its work.

Contact utility companies listed in the plans prior to preparing bids to obtain current information on existing utility locations and the status of any new utility relocation work.

Utility companies will be performing utility work and adjustments within the limits and during the life of the project. The contractor shall cooperate and coordinate construction activities with these companies.

There may be abandoned utility facilities within the project limits. If a conflict with an abandoned utility facility is encountered, contact the appropriate utility owner/representative to coordinate construction activities and proper removal and disposal of said facility as necessary.

Utility working days shown herein are as defined in Wisconsin Administrative Code Chapter Trans 220.

Known utilities in the projects are as follows:

American Transmission Company has two overhead electric transmission circuits running north-south along the east side of IH 894/USH 45 throughout the project limits in the area of Ramp NSA and the fill area, south of Greenfield Avenue. ATC will be reconstruction these overhead electric transmission towers and pulling new overhead circuits during the entire life of the project in the following locations:

- Station 35NSA+37, 102' RT	- Station 35NSA+91, 213' RT
- Station 29NSA+84, 35' LT	- Station 29NSA+60, 32' RT
- Station 24NSA+83, 37' LT	- Station 24NSA+90, 37' RT
- Station 18NSA+87, 47' RT	- Station 19NSA+02, 121' RT
- Station 10NSA+79, 82' RT	- Station 9NSA+83, 164' RT
- Station 749GBB+99, 199' LT	- Station 750GBB+14, 125' LT
- Station 745GBB+15, 122' LT	- Station 745GBB+00, 28' LT

ATC also has three overhead electric transmission circuits running east-west along the north side of IH 94 throughout the project limits in the area of the NW Ramp. ATC will be reconstruction these overhead electric transmission towers and pulling new overhead circuits during the entire life of the project in the following locations:

- Station 476NW+41, 59' LT	- Station 478NW+06, 26' LT
- Station 483NW+38, 108' LT	- Station 483NW+48, 207' LT

Coordinate construction activities with ATC. Due to outage constraints for the multi-state electric grid, these transmission lines cannot be de-energized during construction. Use caution when operating overhead equipment in this area and maintain OSHA safe working clearance to the overhead conductors at all times.

Contact Jim Briggs (414-651-1830) of American Transmission Company 7 days in advance to coordinate locations and any excavation near American Transmission Company facilities.

AT&T Corporation has existing underground communications facilities within the project limits in the following locations:

- An underground communications package beginning beyond the easterly project limits running westerly along the south side of the fence between O'Connor Street and IH 94, crossing 76th Street at Station 23TL+37, and continuing westerly, crossing 84th Street at Station 42F+14, to beyond the westerly project limits. AT&T Corporation will abandon this line in place prior to construction.
- An underground communications package beginning beyond the easterly project limits running westerly along the north side of the fence between Kearney Street and IH 94, crossing 76th Street at Station 20TL+27, continuing westerly to Station 251EW+20, 56' LT where it turns and runs southerly to the south side of Kearney Street. From there it turns and runs westerly along the south side of Kearney Street, crossing 84th Street at Station 39F+08, continuing westerly between Adler Street and IH 94 to beyond the westerly project limits. AT&T Corporation will abandon this line in place prior to construction.
- An underground communications package beginning from beyond the northerly project limits in the area of Ramp NSA running southerly along the east fence of USH 45/IH 894, crossing Ramp NSA at Station 32NSA+78, continuing southerly, crossing Schlinger Avenue at Station 530SCH+23. From there it continues southerly along the east fence, crossing Ramp NSA at Station 20NSA+25, continuing southerly to beyond the southerly project limits. AT&T Corporation will abandon this line in place from beyond the northerly project limits to Station 31NSA+00, 45' LT prior to construction. The remaining portions of this line will remain in place without adjustment.
- An underground communications package beginning from beyond the northerly project limits in the area of the fill area running southerly along the east side of the USH 45/IH 894 northbound off ramp to Station 750GBB+00, 29' LT where it turns and runs easterly to the east right of way of USH 45/IH 894 at Station 750GBB+ 14, 181' RT. From there it turns and runs southerly to beyond the southerly project limits. This line will remain in place without adjustment.
- An underground communications package beginning from beyond the easterly project limits in the area of NW Ramp running westerly along the north side of the existing north to west ramp. This line will remain in place without adjustment.

AT&T Corporation will construct a new underground communications package from beyond the easterly project limits running westerly along the south side of the Hank Aaron State Trail to Station 32NSA+05, 154' RT where it turns and runs southerly along the east right of way of USH 45/IH 894 to Station 31NSA+00, 101' RT. From there it turns and runs westerly, crossing Ramp NSA at Station 31NSA+00, to Station 31NSA+00, 45' LT.

Contact Rich Meyers (630-215-7567 cell) of JMC Engineers and Associates 7 days in advance to coordinate locations and any excavation near AT&T facilities.

AT&T Wisconsin has existing underground communications facilities within the project limits in the following locations:

- An existing underground communications line beginning from beyond the easterly project limits running westerly along the north side of Kearney Street to a DOT camera at Station 20TL+47, 52' RT. Coordinate with AT&T Wisconsin to disconnect this service during construction.
- An existing underground communications line beginning from beyond the northerly project limits running southerly in the northbound lanes of 84th Street to beyond the southerly project limits. AT&T Wisconsin will relocate this line to outside the project limits prior to construction. AT&T Wisconsin will abandon this line in place.
- An existing overhead communications line on We Energies poles beginning from beyond the southerly project limits running northerly along the east right of way of USH 45 to the south side of Schlinger Avenue. AT&T Wisconsin will relocate this line to new We Energies poles along the east right of way of USH 45 throughout the project limits during construction.

Contact Mark Szymanski (414-535-7417 office/ 414-491-2853 cell) of AT&T Wisconsin 7 days in advance to coordinate locations and any excavation near their facilities.

Midwest Fiber Networks has existing underground communications facilities within the project limits in the following locations:

- An underground communications line in the existing WisDOT STOC duct package running east-west along IH 94 throughout the project limits. Midwest Fiber Networks will be vacating this conduit and relocating outside the project limits prior to construction.
- An overhead communications line on We Energies poles beginning from beyond the easterly project limits of Ramp NSA area running westerly to a pole at Station 32NSA+75, 137' RT where it turns and runs southerly to a pole at Station 32NSA+19, 102' RT. From there it continues southerly on We Energies poles, crossing Schlinger Avenue at Station 531SCH+71, to beyond the southerly project limits of Ramps NSA area. Midwest Fiber Networks will relocate this line to new We Energies poles along the east right of way of USH 45 throughout the project limits during construction.
- An overhead communications line on We Energies poles beginning from beyond the northerly project limits of the grading berm at Greenfield Avenue running southerly to beyond the southerly project limits. Midwest Fiber Networks will relocate this line to new We Energies poles from Station 747GBB+05, 14' RT to beyond the southerly project limits. The remaining portions of this line will remain in place without adjustment.

Milwaukee, City of - Cable has existing cable facilities in City of Milwaukee conduit within the project limits in the following locations:

- An underground cable in City of Milwaukee conduit beginning from beyond the southerly project limits running north along the west side of 76th Street, crossing IH 94 in the parapet at Station 264EW+52, to a manhole at Station 23TL+67, 50' LT where it turns and runs northeasterly to beyond the northerly project limits. Abandon, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground cable in City of Milwaukee conduit beginning at a manhole at Station 23TL+67, 50' LT running westerly in the westbound lanes of O'Connor Street to beyond the westerly project limits of the 76th Street area. This line will remain in place without adjustment.
- An underground cable in City of Milwaukee conduit beginning from beyond the southerly project limits running northerly in the southbound lanes of 84th Street to beyond the northerly project limits. Contact Brian Pawlak (414-286-5970) of City of Milwaukee - Cable 10 working days prior to the installation of the box culvert so City of Milwaukee can remove the cable in the vicinity of the box culvert. City of Milwaukee - Cable will take an outage on this line during the duration of the box culvert installation. Abandon, remove, leave in place, and reconstruct this line as shown in the plans. Contact Brian Pawlak (414-286-5970) of City of Milwaukee - Cable 10 working days prior to the completion of the installation of the box culvert and conduit to coordinate reinstallation of cable facilities.
- An underground cable in City of Milwaukee conduit beginning at a manhole at Station 42F+28, 13' LT running easterly along the north side of O'Connor Street to beyond the easterly project limits or the 84th Street Area. Abandon, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground cable in City of Milwaukee conduit beginning at a manhole at Station 36F+84, 20' LT running westerly in the westbound lanes of Adler Street to beyond the westerly project limits. This line will remain in place without adjustment.
- An underground cable in City of Milwaukee conduit beginning at a manhole at Station 38F+93, 21' LT running easterly along the south side of Kearney Street to Station 38F+93, 156' RT. This line will remain in place without adjustment.

Construct additional City of Milwaukee - Cable items as shown in the plans.

Contact Brian Pawlak (414-286-5970 office) of the City of Milwaukee - Cable 7 days in advance to coordinate locations and construction activities.

Milwaukee, City of - Conduit has existing conduit facilities within the project limits in the following locations:

- An underground conduit package beginning from beyond the southerly project limits running north along the west side of 76th Street, crossing IH 94 in the parapet at Station 264EW+52, to a manhole at Station 23TL+67, 50' LT where it turns and runs northeasterly to beyond the northerly project limits. Abandon, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground conduit package beginning at a manhole at Station 23TL+67, 50' LT running westerly in the westbound lanes of O'Connor Street to beyond the westerly project limits of the 76th Street area. This line will remain in place without adjustment.
- An underground conduit package beginning from beyond the southerly project limits running northerly in the southbound lanes of 84th Street to beyond the northerly project limits. Karen Rogne (414-286-3243) of the City of Milwaukee – Conduit 10 working days prior to the installation of the box culvert. City of Milwaukee - Conduit will take an outage on this line during the duration of the box culvert installation. Abandon, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground conduit package beginning at a manhole at Station 42F+28, 13' LT running easterly along the north side of O'Connor Street to beyond the easterly project limits or the 8th Street Area. Abandon, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground conduit package beginning at a manhole at Station 36F+84, 20' LT running westerly in the westbound lanes of Adler Street to beyond the westerly project limits. This line will remain in place without adjustment.
- An underground conduit package beginning at a manhole at Station 38F+93, 21' LT running easterly along the south side of Kearney Street to Station 38F+93, 156' RT. This line will remain in place without adjustment.

Contact Karen Rogne (414-286-3243) of the City of Milwaukee – Conduit 7 days in advance to coordinate locations and construction activities.

Milwaukee, City of - Lighting has overhead and underground street lighting facilities along Adler Street, 84th Street, Kearney Street, Chester Street, O'Connor Street, and 76th Street. The City of Milwaukee - Lighting forces will install temporary overhead lighting facilities and remove permanent lighting required for construction. City forces will install permanent lighting facilities during construction and will need a minimum of 15 working days to install the permanent overhead.

Contact Dennis Miller (414-286-5942 office/ 414-708-4251 cell) or George Berdine (414-708-4245) or Thomas Hughs (414-286-3457 office/ 414-708-3175 cell) of the City of Milwaukee - Lighting 10 days in advance to coordinate installation of the temporary lighting as well as the removal, reconstruction, and reconnection of the street lighting system.

Milwaukee, City of - Sanitary has existing underground sanitary sewer facilities within the project limits in the following locations:

- An underground sanitary sewer beginning from beyond the southerly project limits running north along the east right of way of 76th Street to a manhole at Station 19TL+73, 42' RT. This line will remain in place without adjustment. Adjust manhole at Station 19TL+73, 42' RT as shown in the plans.
- An underground sanitary sewer beginning from beyond the northerly project limits running south along the west right of way of 76th Street to a manhole at Station 23TL+73, 40' LT. This line will remain in place without adjustment.
- An underground sanitary sewer beginning from beyond the westerly project limits running easterly in the eastbound lane of Adler Street to a manhole at Station 36F+57, 73' LT where it turns and runs northeasterly, crossing 84th Street at Station 37F+00, to a MMSD manhole at Station 37F+08, 12' RT. This line will remain in place without adjustment.
- An underground sanitary sewer beginning from beyond the southerly project limits running north in the median of 84th Street to a manhole at Station 39F+41, 2' RT where it turns and runs northeasterly to a MMSD manhole at Station 39F+57, 13' RT. Abandon, adjust, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground sanitary sewer beginning from beyond the easterly project limits of 84th Street running westerly along the north side of O'Connor Street to a MMSD manhole at Station 43F+32, 13' RT. This line will remain in place without adjustment.
- An underground sanitary sewer beginning in the median of 84th Street at a MMSD manhole at Station 44F+96, 12' RT running westerly to a manhole at Station 44F+95, 61' LT and continues westerly to a manhole at Station 44F+98, 100' LT. From there it turns into a private sanitary sewer continuing westerly to beyond the westerly project limits. Abandon, adjust, remove, leave in place, and reconstruct this line as shown in the plans.

Contact Joshua Radomski (414-286-0506 office) of the City of Milwaukee - Sanitary 7 days in advance to coordinate locations and any excavation near their facilities.

Milwaukee, City of - Signals has overhead and underground signal facilities at Kearney Street/76th Street, Kearney/84th Street, O'Connor/76th Street, and O'Connor/84th Street. The City of Milwaukee will remove existing signals at Kearney Street/76th Street, Kearney/84th Street, O'Connor/76th Street, and O'Connor/84th Street during construction. The City of Milwaukee will also install temporary and permanent signals at Kearney Street/76th Street and O'Connor/76th Street during construction

Contact Dennis Miller (414-286-5942 office/ 414-708-4251 cell) of the City of Milwaukee - Signals 7 days in advance to coordinate abandonment and removal of the existing signal facilities and the installation of the temporary and permanent signals.

Milwaukee, City of – Water has existing underground water facilities within the project limits in the following locations:

- An underground water main beginning from beyond the easterly projects running westerly in the eastbound lane of Kearney Street to Station 127K+81, 21' RT where it turns and runs southerly around the right turn lane of 76th Street and continues south along the east curb to beyond the southerly project limits. This line will remain in place without adjustment.
- An underground water main beginning from beyond the southerly project limits running northerly in the median of 76th Street to Station 19TL+33, 1' LT where it turns and runs northwesterly to Station 19TL+92, 59' LT. From there it turns and runs north, crossing IH 94 at Station 264EW+32, to Station 23TL+11, 55' LT where it turns and runs northeasterly to Station 23TL+59, 2' LT. From there it turns and runs north in the median of 76th Street to beyond the northerly project limits. Abandon, adjust, remove, leave in place, and reconstruct this main as shown in the plans.
- An underground water main connecting two water mains beginning at Station 19TL+26, 1' LT running easterly to Station 19TL+26, 36' RT. This line will remain in place without adjustment.
- An underground water main beginning in the southbound lanes of 76th Street at Station 23TL+40, 22' LT running northwesterly to Station 23TL+77, 36' LT where it turns and runs northerly to beyond the northerly project limits. Abandon, adjust, remove, leave in place, and reconstruct this main as shown in the plans.
- An underground water main beginning from beyond the northerly project limits running south along the east curb of 76th Street to Station 23TL+82, 35' RT where it turns and runs west in the eastbound lanes of O'Connor Street to beyond the westerly project limits of the 76th Street area. This line will remain in place without adjustment.
- An underground water main beginning from beyond the northerly project limits running south along the east curb of 84th Street to Station 43F+14, 41' RT where it turns and runs southwestly to Station 42F+38, 11' RT. From there it turns and runs southerly in the northbound lane of 84th Street to beyond the southerly project limits. Abandon, adjust, remove, leave in place, and reconstruct this main as shown in the plans.
- An underground water main beginning at Station 43F+14, 41' RT running easterly along the north side of O'Connor Street to beyond the easterly project limits of the 84th Street area.
- An underground water main beginning from beyond the southerly project limits running northerly in the southbound lanes of 84th Street to Station 36F+71, 17' LT where it turns and runs northwesterly to Station 36F+88, 40' LT. From there it turns and runs west in the westbound lanes of Adler Street to beyond the westerly project limits. This line will remain in place without adjustment.
- An underground water main connecting two water mains beginning at Station 36F+71, 17' LT running easterly to Station 36F+71, 18' RT. This line will remain in place without adjustment.

Contact Dave Goldapp (414-286-6301) of City of Milwaukee - Water 7 days in advance to coordinate locations and any excavation near their facilities.

MMSD has existing underground sanitary sewer facilities within the project limits in the following locations:

- A 96" MIS sanitary sewer beginning from beyond the southerly project limits running north along the southbound lanes of 84th Street to beyond the northerly project limits. This line will remain in place without adjustment.
- An underground sanitary sewer beginning from beyond the southerly project limits running north in the southbound lanes of 84th Street to a manhole at Station 35F+52, 27' LT where it turns and runs northeasterly to a manhole at Station 36F+84, 12' RT. From there it turns and runs north in the median of 84th Street to a manhole at Station 37F+08, 13' RT and continues north to a manhole at Station 37F+33, 14' RT, Station 39F+58, 12' RT, Station 41F+56, 13' RT, and Station 43F+32, 13' RT and continues north to beyond the northerly project limits. Abandon, adjust, remove, leave in place, and reconstruct this line as shown in the plans.
- An underground sanitary sewer beginning in the median of 84th Street at a manhole at Station 37F+33, 14' RT running westerly to a manhole at Station 37F+36, 33' LT. This line will remain in place without adjustment.
- An underground sanitary sewer beginning from beyond the easterly project limits of 84th Street running westerly to a manhole at Station 37F+06, 47' RT and continues to a manhole at Station 37+08, 13' RT. This line will remain in place without adjustment.
- An existing flow meter at Station 37+47, 3' RT that will remain in place without adjustment.
- An underground sanitary sewer line beginning beyond the westerly project limits of the NW Ramp area running easterly, crossing I-94 at Station 168EW+88, and continuing easterly to a manhole at Station 474NW+40, 18'RT where it continues easterly to a manhole at Station 480NW+25, 40'RT. From there it turns northeasterly to a manhole at Station 481NW+82, 31'RT where it continues northeasterly to a manhole at Station 483NW+43, 35'RT. From there it turns and runs northerly to a manhole at Station 484NW+49, 131'LT where it continues northerly beyond the project limits. Extend the MMSD manholes at the following locations; Station 480NW+25, 40'RT, Station 481NW+83, 31'RT, and Station 483NW+43, 36'RT as shown in plans. Contact Larry Anderson (414-225-2241) of MMSD 7 days prior to any filling near their facilities.

MMSD also has abandoned sanitary sewer and storm sewer within the project limits in the following locations:

- An underground sanitary sewer beginning in the median of 84th Street at a manhole at Station 36F+84, 11' RT running east to a manhole at Station 36F+86, 32' RT where it turns and runs northeasterly to a manhole at Station 37F+06, 47' RT.

- An underground sanitary sewer beginning in the northbound lanes of 84th Street at a manhole at Station 36F+86, 32' RT running north to a manhole at Station 37F+24, 37' RT.
- An underground storm sewer overflow beginning in the median of 84th Street at a manhole at Station 37F+08, 12' RT running northeasterly to a manhole at Station 37F+24, 37' RT where it turns and runs northerly to Station 39F+29, 37' RT. From there it turns and runs northwesterly to an existing storm sewer at Station 40F+07, 8' LT.

Contact Debra Jensen (414-225-2143) of MMSD 7 days in advance to coordinate locations and any excavation near their facilities.

TCA has an overhead communications line on We Energies poles beginning from beyond the easterly project limits of Ramp NSA area running westerly to a pole at Station 32NSA+75, 137' RT where it turns and runs southerly to a pole at Station 32NSA+19, 102' RT. From there it continues southerly on We Energies poles to a pole at Station 531SCH+77, 27' LT where it drops into an underground facility and turns and runs westerly along the north side of Schlinger Avenue to beyond the westerly project limits. TCA will relocate this line on new We Energies poles along the east right of way from Station 31NSA+38, 108' RT running northerly to beyond the easterly project limits.

TCA has an abandoned underground cable beginning at a pole at Station 32NSA+75, 137' RT running southwestly, crossing Ramp NSA at Station 29NSA+75, to Station 530SCH+53, 28' LT.

Contact Don Dietsch (262-646-5602 office/ 414-651-2862 cell) of Northwind Technical Services 7 days in advance to coordinate locations and any excavation near their facilities.

Time Warner Cable has existing underground communications facilities within the project limits in the following locations:

- An existing underground communications line beginning at a pole at Station 36F+85, 49' RT running northerly along the east right of way of 84th Street to Station 38F+09, 70' RT where it turns and runs northeasterly along the right of way to Station 38F+53, 101' RT. From there it turns and runs easterly along the south side of Kearney Street to Station 105K+86, 25' RT. Time Warner Cable will relocate the portion of this line along the south side of Kearney Street prior to construction.
- An existing overhead communications line beginning from beyond the easterly project limits running westerly on We Energies poles along the north side of Schlinger Avenue to a pole at Station 531SCH+77, 27' LT where it turns and runs southerly along the east right of way of USH 45 to beyond the southerly project limits. Time Warner Cable will relocate portions of this line from Station 531SCH+77, 27' LT to beyond the southerly project limits to new We Energies pole during construction.

- An existing underground communications line beginning at a pole at Station 531SCH+12, 60' RT running westerly along the south side of Schlinger Avenue to beyond the westerly project limits. Time Warner Cable will relocate this line prior to construction.

Time Warner Cable has an abandoned communication facility beginning at a pole at Station 531SCH+12, 60' RT running westerly along the south side of Schlinger Avenue to beyond the westerly project limits.

Contact Lukas LaCrosse (414-908-4766 office/ 414-430-9321 cell) of Time Warner Cable 7 days in advance to coordinate locations and any excavation near their facilities.

West Allis, City of – Lighting has facilities along both sides of Schlinger Avenue throughout the project. These lines will remain in place without adjustment.

Contact Peter Daniels (414-302-8374) of City of West Allis - Lighting 7 days in advance to coordinate locations and any excavation near their facilities.

West Allis, City of – Water has an underground water main beginning from beyond the westerly project limits and running easterly along the south curb of Schlinger Avenue to beyond the easterly project limits. This line will remain in place without adjustment.

Contact Joseph Burtch (414-302-8379) of City of West Allis –Water 7 days in advance to coordinate locations and any excavation near their facilities.

We Energies – Electric has existing underground and overhead electric facilities within the project limits in the following locations:

- An existing overhead electric line beginning at a pole at Station 128K+83, 36' RT running northeasterly along the south side of Kearney Street to beyond the easterly project limits. We Energies will remove two guy pole and anchor systems that cross Kearney Street at Station 132K+52, 15' LT and Station 135K+98, 14' LT and new guy wires will be installed. The remaining portions of this line will remain in place without adjustment.
- An existing overhead electric line beginning at a pole at Station 128K+83, 36' RT running northerly, crossing Kearny Street at Station 129K+00, to a pole at Station 129K+07, 16' LT. From there it continues northerly, crossing IH 94 at Station 266EW+87, to a pole at Station 567CR+00, 24' RT where it continues northerly, crossing O'Connor Street at Station 567CR+03, to beyond the northerly project limits. We Energies will replace the existing pole at Station 129K+07, 16' LT and Station 567CR+00, 24' RT with taller poles prior to construction. The remaining portions of this line will remain in place without adjustment. This line is to remain energized during the duration of construction.

- An existing overhead electric line beginning at a pole at Station 129K+07, 16' LT running westerly along the north side of Kearney Street to a pole at Station 128K+03, 25' LT where it drops to an underground facility as a service to the existing DOT Signal Cabinet in the northeast quadrant of 76th Street/Kearney Street. Coordinate with We Energies to disconnect this service during construction.
- An existing overhead electric line beginning at a pole at Station 128K+83, 36' RT running westerly along the south side of Kearney Street, crossing 76th Street at Station 19TL+62, to a pole at Station 19TL+35, 55' LT where it turns and runs northwesterly, crossing Kearney Street at Station 125K+16, to a pole at Station 124K+89, 12' LT. From there it drops to an underground facility and runs westerly along the north side of Kearney Street to a transformer at Station 123K+13, 13' LT. We Energies will relocate the pole at Station 124K+89, 12' LT and abandon the underground facilities prior to construction. The remaining portions of this line will remain in place without adjustment.
- An existing underground electric line beginning from beyond the southerly project limits running northerly, crossing Kearney Street at Station 115K+76, to Station 115K+70, 20' LT where it turns and runs westerly along the north side of Kearney Street to a transformer at Station 114K+90, 27' LT. From there it continues westerly to a transformer at Station 110K+24, 44' LT. We Energies will abandon this line in place within the construction limits prior to construction.
- An existing overhead electric line beginning from beyond the southerly project limits and running northerly along the east side of 84th Street, crossing IH 94 at Station 238EW+10, to beyond the northerly project limits. This line will remain in place without adjustment.
- An existing underground electric line beginning at a pole at Station 38F+02, 52' RT running northeasterly along 84th Street onto Kearney Street where it turns and runs easterly along the south side of Kearney Street to a pedestal at Station 105K+00, 20' RT. We Energies will abandon this line in place and relocate the pedestal prior to construction.
- An existing underground electric line beginning from beyond the southerly project limits running northerly in the median of 84th Street, crossing IH 94 at Station 237EW+60, to beyond the northerly project limits. Contact Rhonda Helwer (414-944-5538) of We Energies - Electric 10 working days prior to the installation of the box culvert. We Energies - Electric will take an outage on this line during the duration of the box culvert installation and will reconnect this electric line once the box culvert is installed. Allow We Energies - Electric 3 working days to complete their work. Contact Rhonda Helwer (414-944-5538) of We Energies - Electric 10 working days prior to the completion of the installation of the box culvert. The remaining portions of this line will remain in place without adjustment.
- An existing underground electric line beginning at Station 38+56, 4' RT running westerly to a pole line beyond the westerly project limits. This line will remain in place without adjustment.
- An existing overhead electric line beginning at a pole at Station 41F+87, 50' RT running westerly, crossing 84th Street at Station 42F+05, to a pole at Station 42F+30, 71' LT where it drops to an underground line and connects to an existing cabinet. Coordinate with We Energies to disconnect this service during construction.

- An existing overhead electric line beginning from beyond the northerly project limits running southerly along the east fence of USH 45, crossing Ramp NSA at Station 32NSA+30, continues southerly, crossing Schlenger Avenue at Station 530SCH+14, continues southerly, crossing Ramp NSA at Station 23NSA+48, continues southerly to beyond the southerly project limits. We Energies will relocate the entire line prior to and during construction. Coordinate construction activities with We Energies.
- An existing overhead electric line beginning from beyond the northerly project limits running southerly along the east right of way of USH 45, crossing Schlenger Avenue at Station 531SCH+71, continues southerly along the east right of way of USH 45 to beyond the southerly project limits. We Energies will relocate the entire line prior to and during construction. Coordinate construction activities with We Energies.
- An existing overhead electric line beginning from beyond the northerly project limits in the Ramp NSA area running southerly along the northbound off ramp of USH 45 to Station 747GBB+06, 14' RT where it turns and runs southwesterly to Station 745GBB+46, 31' LT. From there it turns and runs southerly to beyond the southerly project limits. We Energies will relocate portions of this line from Station 747GBB+06, 14' RT to beyond the southerly project limits prior to and during construction.
- An existing underground electric conduit system beginning at a pole at Station 751GBB+58, 14' LT running westerly, crossing the northbound off ramp of USH 45, to Station 751GBB+65, 102' LT where it turns and runs northerly to beyond the northerly project limits of the berm area. This line will remain in place without adjustment.
- An overhead electric line beginning southwest of the NW Ramp area running northeasterly, crossing I-94 at Station 174EW+00, and continuing northeasterly to a power pole at Station 488NW+48, 11' LT. This facility will remain in place without adjustment during construction and is anticipated to be removed after December 31, 2013. Do not place fill within 20 feet of any We Energies poles.

We Energies - Electric will relocate, construct and reconstruct underground and overhead electric facilities in the project area at the following locations prior to construction:

- A new electric overhead pole line beginning at an existing pole at Station 19TL+34, 55' LT running northwesterly to a new pole at Station 124K+62, 27' LT where it drops to an underground line running westerly to a new transformer at Station 123K+15, 25' LT and continues southwesterly to splice back into an existing electric line.

We Energies - Electric will finish with the following relocations prior to March 1st, 2013:

- A new electric underground conduit system beginning from beyond the northerly project limits in the Ramp NSA area running southerly to Station 31NSA+67, 35' RT where it turns and runs southeasterly to Station 30NSA+83, 92' RT. From there it turns and runs southerly along the east right of way of USH 45, crossing Schlinger Avenue at Station 531SCH+61, continues southerly along the east right of way of USH 45 to beyond the southerly project limits.
- A new electric overhead pole line beginning from beyond the northerly project limits in the Ramp NSA area running southerly along the east right of way throughout the project limits. We Energies will be Setting new poles and consolidating lines on the existing pole line along the east right of way.
- A new electric overhead pole line beginning at an existing pole at Station 747GBB+06, 14' RT running southerly to a pole at Station 745GBB+15, 50' RT and continues southerly to beyond the southerly project limits.

Contact Rhonda Helwer (414-944-5538) of We Energies - Electric 7 days in advance to coordinate locations and any excavation near their facilities.

We Energies – Gas has existing underground gas facilities within the project limits in the following locations:

- An underground gas line beginning from beyond the southerly project limits running northerly in the northbound lanes of 76th Street to Station 20TL+30, 21' RT where it turns and runs northeasterly to Station 20TL+66, 50' RT. From there it turns and runs northerly, crossing IH 94 at Station 265EW+42, to Station 23TL+24, 52' RT where it turns and runs northwesterly to Station 23TL+56, 20' RT. From there it turns and runs northerly in the northbound lanes of 76th Street to beyond the northerly project limits. We Energies - Gas will abandon this line in place from Station 18TL+75, 20' RT to Station 23TL+87, 20' RT prior to construction. The remaining portions of this line will remain in place without adjustment.
- An underground gas line beginning in the northbound lanes of 76th Street running westerly along the north side of O'Connor Street to beyond the westerly project limits of the 76th Street area. This line will remain in place without adjustment.
- An underground gas line beginning in the southbound lanes at Station 23TL+90, 20' LT running northerly to beyond the northerly project limits. This line will remain in place without adjustment.
- An underground 16" steel gas main beginning from beyond the southerly project limits running northerly in the southbound lanes of 76th Street to Station 18TL+85, 30' LT where it turns and runs northeasterly to Station 18TL+92, 25' LT. From there it turns and runs northerly in the southbound lanes of 76th Street to Station 20TL+19, 25' LT where it turns and runs northwesterly to Station 20TL+44, 49' LT. From there it turns and runs north, crossing IH 94 at Station 264EW+40 as a 12" steel gas main, to Station 22TL+94, 48' LT where it turns and runs northeasterly as a 16" steel gas main to Station 23TL+32, 17' LT. From there it turns and runs northerly in the southbound lanes of 76th Street to beyond the northerly project

limits. We Energies - Gas will abandon this line in place from Station 18TL+85, 30' LT to Station 23TL+68, 14' LT prior to construction. The remaining portions of this line will remain in place without adjustment.

- An underground gas line beginning from beyond the easterly project limits of the 84th Street area running westerly along the north side of O'Connor Street, crossing 84th Street at Station 43F+32, to Station 43F+42, 26' LT. This line will remain in place without adjustment.
- An underground gas line beginning from beyond the southerly project limits running northerly in the southbound lanes of 84th Street to Station 44F+15, 25' LT where it turns and runs west to Station 44F+15, 57' LT. From there it turns and runs northerly to beyond the northerly project limits. We Energies will abandon this main in place from Station 38F+90 to Station 39F+90 prior to the box culvert installation across 84th Street. Contact Paul Osmanski (414-315-1278) of We Energies - Gas 10 working days prior to the installation of the box culvert. We Energies - Gas will take an outage on this line during the duration of the box culvert installation and will reconnect this gas line once the box culvert is installed. Allow We Energies - Gas 3 working days to complete their work. Contact Paul Osmanski (414-315-1278) of We Energies - Gas 10 working days prior to the completion of the installation of the box culvert. The remaining portions of this line will remain in place without adjustment.

We Energies - Gas will relocate, construct and reconstruct underground gas facilities in the project area at the following locations prior to construction:

- A new underground gas line beginning in the northbound lanes of 76th Street at Station 18TL+74, 24' RT running east to the east side of 76th Street at Station 18TL+73, 41' RT where it turns and runs northeasterly along the back of curb to Station 19TL+63, 60' RT.
- A new underground gas line beginning in the northbound lanes of 76th Street at Station 18TL+74, 24' RT running west to the west side of 76th Street at Station 18TL+75, 49' LT where it turns and runs northerly along the west right of way of 76th Street to Station 19TL+29, 49' LT. From there it turns and runs west to Station 123K+63, 65' RT where it turns and runs northwesterly, crossing IH 94 at Station 260EW+90, to Station 560CR+64, 19' LT.
- A new underground 16" steel gas line beginning in the southbound lanes of 76th Street at Station 18TL+85, 30' RT running west to the west side of 76th Street at Station 18TL+85, 37' LT where it turns and runs northerly along the back of curb of 76th Street to Station 19TL+40, 37' LT. From there it turns and runs west to Station 123K+70, 56' RT where it turns and runs northwesterly, crossing IH 94 at Station 260EW+98, to Station 560CR+70, 5' RT. From there it turns and runs northeasterly in the eastbound lanes of O'Connor Street to Station 23TL+68, 14' LT.

Additionally, We Energies - Gas will abate and abandon two existing gas main running on either side of 76th Street by removing portions of the main during construction.

Contact Paul Osmanski (414-944-5796) of We Energies 10 days prior to any activity that will expose the existing gas main to coordinate abatement and abandonment activities.

Contact Thomas Minesal (414-944-5755) of We Energies - Gas 7 days in advance to coordinate locations and any excavation near their facilities.

Windstream has existing underground and overhead communications facilities within the project limits in the following locations:

- An overhead communications line on We Energies poles beginning from beyond the southerly project limits running northerly, crossing Kearney Street at Station 129K+00, to a pole at Station 129K+07, 16' LT where it continues northerly, crossing IH 94 at Station 266EW+87, to a pole at Station 566CR+98+17' RT. From there it continues northerly, crossing O'Connor at Station 567CR+03, to beyond the northerly project limits. Windstream will reattach this line to new We Energies poles to be placed in the same location once new poles have been set. Windstream will perform this work prior to construction.
- An underground communications line in We Energies conduit beginning from beyond the northerly project limits of Ramp NSA running southerly, crossing under the Hank Aaron State Trail to the south side, where it turns and runs westerly to a We Energies pole at Station 32NSA+34, 1' RT. From there it turns into an overhead line running southwesterly on We Energies poles, crossing Schlinger Avenue at Station 530SCH+14, to a pole at Station 27NSA+07, 89' LT where it continues southwesterly to a pole at Station 25NSA+24, 52' LT. From there it turns into an underground line running southerly, crossing Ramp NSA at Station 23NSA+00 to beyond the southerly project limits of the Ramp NSA area. Windstream will relocate this line in a new We Energies duct running along the east right of way throughout the project limits of Ramp NSA during construction.

Windstream has an abandoned communication facility in a We Energies conduit beginning at approximately Station 32NSA+86, 100' RT and running southerly, crossing Schlinger Avenue at Station 530SCH+43, to approximately Station 25NSA+24, 54 LT.

Contact John Louis (608-819-5009 office/ 414-305-0332 cell) of Windstream 7 days in advance to coordinate locations and any excavation near their facilities.

WisDOT – Lighting has existing lighting facilities along IH 94 and along the freeway ramps throughout the project area. Abandon, remove, leave in place, and reconstruct these facilities as shown in the plans.

Contact Matt Pfeifer (414-266-1154) of WisDOT - Lighting 7 days in advance to coordinate locations and any excavation near their facilities.

WisDOT – Signals has no existing signal facilities within the project limits. Construct new WisDOT - Signals signal facilities at the intersections of IH 94 eastbound and

westbound on/off ramps with S. 84th Street and intersections of IH 94 eastbound and westbound on/off ramps with S. 76th Street as shown in the plans.

Contact WisDOT Traffic Signal Operations (414-750-2605) 7 days in advance to coordinate construction.

WisDOT STOC has existing communication facilities located throughout the project limits. Abandon, remove, leave in place, and reconstruct these facilities as shown in the plans.

Contact Jeff Madson (414-225-3723) of WisDOT - STOC 7 days in advance to coordinate locations and any excavation near their facilities.

10. Other Contracts.

A Description

Coordinate your work in accordance to standard spec 105.5.

Modifications to the traffic control plan may be required by the engineer to be safe and consistent with adjacent work by others.

It is expected that routine maintenance by the city and county personnel may be required at certain times concurrently with the work being done under this contract.

The following contracts are anticipated to be under construction within the time period of this contract, unless otherwise indicated:

Contract ID 1060-33-70, Zoo IC – Mayfair Road, from IH 94 to Watertown Plank Road. The WisDOT contact is Joshua LeVeque at (414) 750-1468; joshua.leveque@dot.wi.gov.

Contract ID 1060-33-72, Zoo IC – Watertown Plank Road Interchange, from Wisconsin Avenue to Underwood Parkway. The WisDOT contact is Jeff Bohen at (414) 750-2928; jeff.bohen@dot.wi.gov

Contract ID 1060-33-73, Swan Boulevard construction from W. Watertown Plank Road to USH 45. The WisDOT contact is Jeff Bohen at (414) 750-2928; jeff.bohen@dot.wi.gov.

Contract ID 1060-33-75, Zoo IC – IH 94, UPRR and Sth Hwy 100 over Ih-94 and HAST. The WisDOT contact is Josh LeVeque at (414) 750-1468; joshua.leveque@dot.wi.gov

Contract ID 1060-33-93, Zoo IC – 2013 TMP Projects; various locations in Milwaukee County. The WsDOT contact is Christopher Hager at (414) 750-1487; christopher.hager@dot.wi.gov.

Contract ID 1060-33-96, Zoo IC – Advanced Signing Projects; various locations. The WsDOT contact is Christopher Hager at (414) 750-1487; christopher.hager@dot.wi.gov.

Contract ID 1060-33-99, Zoo IC - Integrated Corridors; various intersections in Milwaukee and Waukesha Counties. The WsDOT contact is Christopher Hager at (414) 750-1487; christopher.hager@dot.wi.gov.

Contract ID 2160-14-00, S. 76th St – W Greenfield Ave to W Pierce St; City of West Allis. The City of West Allis contact is Pete Daniels at (414) 302-8374; pdaniels@westallis.gov.

11. Hauling Restrictions.

Do no haul materials of any kind on any local roads without approval of the local Maintaining Authority and the department. Provide any proposals to haul on local roads with a written agreement between the contractor and the respective Maintaining Authority. Submit a letter to the department from the Maintaining Authority in agreement to the hauling prior to hauling. Contact the respective Maintaining Authority prior to bidding for approval of haul routes.

At all times, conduct operations in a manner that causes minimum disruption to traffic on existing roadways. Coordinate with the local authority.

This provision does not reduce or eliminate the contractor responsibility from restoring local roads under the item maintenance and repair of haul roads.

12. Erosion Control.

Replace standard spec 107.20(3) with the following:

Prepare and submit an Erosion Control Implementation Plan (ECIP) for the project, including borrow sites and material disposal sites, in accordance to Chapter TRANS 401 requirements. The ECIP shall supplement information shown on the plans and shall not reproduce it. The erosion control implementation plan shall identify how the contractor intends to implement the project's erosion control plan. The erosion control plan shall include details for the methods of debris containment devices required, particularly during the removal of the old bridges and construction of the new structures.

Supplement standard spec 107.20 with the following:

Provide the Erosion Control Implementation Plan (ECIP) 14 days prior to the pre-construction conference. Provide one copy of the ECIP to WisDOT and one copy of the ECIP to the WDNR Liaison Mr. Michael Thompson @ michaelc.thompson@wisconsin.gov. Pursue operations in a timely and diligent manner, continuing all construction operations methodically from the initial removals and topsoil stripping operations through the subsequent grading, paving, and re-topsoiling to minimize the period of exposure to possible erosion. Do not implement the ECIP until it has been approved by the department.

Topsoil graded areas, as designated by the engineer, immediately after grading has been completed within those areas. Seed, fertilize and mulch/erosion mat, or sod all topsoiled areas within 5 days after placement of topsoil. If the graded areas will be left exposed for more than 14 calendar days, seed those areas with temporary seed within the first 7 days.

Furnish and apply water to sodded areas. After staking and cleanup, moisten the sod thoroughly by sprinkling with water. Keep all sodded areas thoroughly moist by watering or sprinkling if rainfall is not sufficient to achieve sod rooting to the earth bed. Water for 30 days after placement, or as the engineer directs. Apply water in a manner to preclude washing or erosion.

Do not pump water from the construction site to a storm water conveyance without the water first passing through a sediment trap.

Construct temporary sediment traps at locations that do not interfere with construction operations.

Stockpile excess material or spoils on upland areas away from wetlands, floodplains and waterways. Stockpiled soil shall be protected against erosion. If stockpiled material will be left exposed for more than 14 calendar days, seed those areas with temporary seed within the first 7 days.

13. 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 9:00 PM until the following 7:00 AM, unless prior written approval is obtained from the engineer.

Residential areas	Do not exceed 5 dB(A) over preconstruction ambient noise levels
All other areas outside WisDOT right-of-way	Do not exceed 5 dB(A) over preconstruction ambient noise levels

Prior to waiving the noise compliance by the engineer, provide 48 hour advance notice to Mr. Peter Daniels, City Engineer, at (414) 302-8374 regarding the evening noise generating construction operations.
107-001 (20060512)

14. Available Documents.

The department will make all its information available to bidding contractors. The list of documents that are available for contractors' information includes but is not limited to:

- Design Study Report
- Exceptions to Standards Report
- Interstate Access Justification Report
- Preliminary Plans
- Environmental Impact Statement
- As-Built Drawings
- Preconstruction survey

These documents are available from Jeff Bohen at 141 NW Barstow Street, Waukesha, WI 53187, telephone (414) 750-2928.

Reproduction costs will be applied to any copies requested.

15. **Geotechnical Investigation Information.**

Replace standard spec 102.5(3) 2 with the following:

Available information relative to subsurface exploration, borings, soundings, water levels, elevations or profiles are available for review at the department's Regions office. Contact Bill Mohr, 141 NW Barstow Street, Waukesha, WI 53187, (262) 548-5666.

Report Title	Report Date
Final Geotechnical Exploration and Bridge Foundation Evaluation Bridge B-40-799 (Ramp GE over Schlinger Ave.)	March 1, 2013
Geotechnical Exploration and Bridge Foundation Evaluation Report Bridge B-40-785 (76 th Street over I-94)	March 1, 2013
Geotechnical Exploration and Culvert Design Report Structure B-40-892 (Honey Creek Reconfiguration)	March 1, 2013
Geotechnical Exploration and Retaining Wall Evaluation Report Retaining Walls R-40-525 (West side Ramp GD, South Side Schlinger Avenue, East Side Ramp GE)	April 16, 2012
Geotechnical Exploration and Retaining Wall Evaluation Report Retaining Walls R-40-554 and R-40-555 (I-94 between 72 nd and 78 th Streets)	March 1, 2013
Temporary Underpass Left In Place Soil Borings and Geotechnical Data Report	February 1, 2013
76th Street Noise Barrier Geotechnical Data Report	March 1, 2013

Geotechnical baseline conditions for the tunneled pipe portion of Structure C-40-101 are presented in a separate report included in the contract documents title, "Geotechnical Baseline Report, Zoo Interchange Reconstruction, Structure C-40-101 (Honey Creek Reconfiguration)."

Subsurface and geotechnical data for the tunneled pipe portion Structure C-40-101 are presented in a separate report included in the contract documents titled “Geotechnical Data Report, Zoo Interchange Reconstruction, Structure C-40-101 (Honey Creek Reconfiguration).”

Additional geotechnical information is available from studies and analyses that have been performed by TRC for the Wisconsin Department of Transportation (WisDOT) for other aspects of this project. Review the available information to determine if it is of use. The use or not of the geotechnical information does not relieve performing the work in accordance to the plans and specifications.

16. Contract Award and Execution.

Supplement standard spec 103 as follows:

103.10 Mobilization Workshops

103.10.1 Workshop Schedule

After contract award, attend the following workshops. Each workshop is described below and will include but not be limited to the following topics.

Workshop Schedule

1. Project Kickoff and Initial Work Plan
2. Cost Reduction Incentives
3. Utility Coordination
4. Submittals
5. CPM Scheduling
6. Box Culvert
7. Earthwork and Drainage
8. Work Force Opportunities
9. Notice to Proceed

The workshop dates will be scheduled after contract award.

If necessary, the engineer may modify the workshop schedule to ensure attendance by the necessary department and contractor personnel; however, all workshops will be completed prior to issuing the Notice to Proceed.

103.10.2 Workshops

103.10.2.1 Project Kickoff and Initial Work Plan

103.10.2.1.1 General

The Project Kickoff and Initial Work Plan Workshop will provide a forum to discuss and answer questions relative to the proposal, bid schedule, and other questions in the Project Questionnaire described in section 103.10.2.1.2. The Initial Work Plan Workshop will include:

1. Contractor responses to the attached Project Questionnaire.
2. Department presentation of the use of CPM scheduling on the project and presentation of the department's Master Schedule to the contractor.
3. Contractor presentation of its conceptual work plan for the project.
4. Department and contractor discussion of the level of detail and features in the Initial Work Plan and the Baseline CPM Progress Schedule.

103.10.2.1.2 Project Questionnaire

Provide the following information in the order shown below. This information will constitute the "Project Questionnaire."

General Information

If a Joint Venture, provide information for each member of the Joint Venture.

1. Provide the following information about the company:
 - Firm Name
 - Address
 - Telephone and facsimile numbers; e-mail address
 - Contracting Specialties
 - Years performing work in contracting specialties
 - Geographic areas served
 - Total Management Employees and years of service
 - Project Managers
 - General Superintendents
 - Craft Superintendents
 - Engineers
 - Estimators
 - CPM Schedulers

Construction Engineering

- Provide/attach a copy of your Construction Project Manager's resume indicating the manager's experience in similar major construction projects. The resume shall include similar projects with references. (Note: references are only for verification of work scope performed).
- Provide (if applicable) your third-party construction engineering firms.
- Provide plan for Construction surveying.

Subcontractors

- Attach the list of all subcontractors that are intended for this Project and the items of work they shall perform.

Permanent Material Suppliers

- Attach the list of all permanent material suppliers that are intended for the project.

Quality Control (where applicable)

- Provide the name of your Construction Quality Control firm and qualifications indicating the firms' experience in similar major construction projects. The resume shall include similar projects with references. (Note: references are only for verification of work scope performed).
- Provide/attach a copy of your Construction Quality Control Manager's resume indicating the manager's experience in similar major construction projects. The resume shall include similar projects with references. (Note: references are only for verification of work scope performed).
- List the major elements and/or Table of Contents of your Construction Quality Management Program.
- Provide the name of your Independent Quality Control Testing firm (Construction Quality Control Lab) and qualifications indicating the firm's experience in similar major construction projects. The resume shall include similar projects with references. (Note: references are only for verification of work scope performed).

Organization Chart

- Provide a functional and personnel Organization Chart showing the authority and responsibilities of each individual identified.

Work Rules

- Provide the plan for hours per day, days per week, and number of shifts for key elements of work; i.e. sewer tunnels, retaining wall construction, roadway excavation, bridge structures, and roadway structural section activities.

Maintenance of Traffic

- Provide the name of your Traffic Control Manager and qualifications indicating the firm's experience in similar major construction projects. The resume shall include similar projects with references. (Note: references are only for verification of work scope performed).
- Attach a copy of your Preliminary Schedule indicating your approach to achieving the substantial completion schedule.
- Include an outline of your approach to the maintenance of traffic and how you shall stage the construction to meet the substantial completion schedule including planned locations for local street and freeway access into and out of the work zones for each stage of construction.

Construction

- Provide the approach (type of equipment, number of crews, and where required ground support systems) for the following activities:
 - Retaining wall construction by type of work
 - Bridge demolition
 - Roadway structural section
 - Roadway excavation
 - Office and yard facilities

103.10.2.2 Cost Reduction Incentives

The Cost Reduction workshop will identify value enhancing opportunities and consider modifications to the plans and specifications that will reduce either the total cost, time of construction or traffic congestion, without impairing, in any manner, the essential functions or characteristics of the project, including, but not limited to, service life, economy of operation, ease of maintenance, benefits to the traveling public, desired appearance, or design and safety standards.

Submit recommendations resulting from the workshop for approval by the engineer as cost reduction incentive proposals in conformance with the provisions in section 104.10 “Cost Reduction Incentive,” of the standard specifications.

The department and the contractor may be able to complete the CRI Concept process, as specified in 104.10.2, during the CRI workshop.

Submit CRIs after the CRI workshop that were not introduced at the CRI workshop.

103.10.2.3 Utility Coordination

The Utility Coordination Workshop will define the scope and schedule of utility relocation work and the respective roles and responsibilities of the project team.

1. At a minimum, the following key personnel will attend the Utility Coordination Meeting.
 - 1.1 Department’s Utility Coordinator.
 - 1.2 Contractor’s Utility Coordinator.
 - 1.3 Designer Team’s Utility Coordinator.
 - 1.4 Key Utility Company Representative(s)
2. At a minimum, the Utility Coordination Meeting will include a review of the following:
 - 2.1 Summary of all required utility relocations on the project.
 - 2.2 Special provisions addressing utility work.
 - 2.3 Sharing of contact information.
 - 2.4 Scheduling of work for utility relocation including critical milestones and staging for the work.

103.10.2.4 Submittals

The Submittal Workshop will identify the key required submittals for the project, categorize submittals into functional areas, and develop a schedule for submittals and submittal reviews. The Workshop participants will at a minimum:

1. Review the project special provisions.
2. Categorize submittals into functional areas including but not limited to:
 - 2.1 MSE Retaining Walls
 - 2.2 Temporary Shoring
 - 2.3 Falsework and Formwork
 - 2.4 Girder Shop Drawings
 - 2.5 Steel Transportation, Delivery and Erection
 - 2.6 Structure Demolition Plans
 - 2.7 Pile Hammers and High Capacity Piling
 - 2.8 Concrete/ Asphalt
 - 2.9 Materials
 - 2.10 ITS / Lighting
 - 2.11 Traffic Signals
 - 2.12 Sanitary Sewer and Water
 - 2.13 Permits
3. Develop a schedule for submittals.

103.10.2.5 CPM Schedule

See specification Baseline CPM Progress Schedule.

103.10.2.6 Box Culvert

The Box Culvert workshop will focus on the installation plan, scheduling, and coordination of the work, mobilization and preparation, dewatering; maintaining existing drainage, erosion control, and subsequent work operations associated with the construction.

103.10.2.7 Earthwork and Drainage

The Earthwork and Drainage workshop will focus on removal, hauling, and placement jobsite waste material while maintaining existing drainage. Drainage will also focus on tie-in locations of the Honey Creek box culvert.

103.10.2.8 Work Force Opportunities

The Work Force Opportunities workshop will provide a venue for contractors to have meaningful dialogue with TrANS providers regarding the hiring of TrANS graduates. For the prime contractor and the nine largest subcontractors according to let value of work, provide staff with hiring authority to participate in a job-matching session during this workshop. The workshop will take place on the same day and in the same location as the pre-construction meeting. The workshop participants will at a minimum:

1. Review contractor hiring processes for general labor positions.
2. Review and listen to presentation provided by TrANS providers regarding the training program including details regarding how contractors can hire TrANS graduates.
3. Review TrANS graduate availability for working on project.
4. Meet one-on-one for two minutes with each TrANS graduate in attendance at the meeting.

103.10.2.9 Notice to Proceed

After all workshops are completed, the Notice to Proceed will be issued.

17. Public Information Meetings.

Participate in department-sponsored public information meetings as the engineer requests. Ensure that representatives of subcontractors also participate in those meetings if the engineer requests.

18. Contractor Notification.

Replace standard spec 104.2.2.2(2) with the following:

If the contractor discovers the differing condition, provide a written notice, as specified in standard spec 104.3.3, of the specific differing condition before further disturbing the site and before further performing the affected work.

104.3.2 (Vacant)

104.3.3 Contractor Initial Written Notice

Replace standard spec 104.3.2 and 104.3.3 with the following:

If required by standard spec 104.2, or if the contractor believes that the department's action, the department's lack of action, or some other situation results in or necessitates a contract revision, promptly provide a written notice to the engineer. At a minimum, provide the following:

- A written description of the nature of the issue.
- The time and date of discovering the problem or issue.
- If appropriate, the location of the issue.

Provide the additional information specified in standard spec 104.3.5 as early as possible to assist the engineer in the timely resolution of an identified issue. The engineer will not require, in subsequent submissions, duplication of information already provided.

19. Contractor Document Submittals.

A Description

This special provision describes minimum requirements for submitting project documents to the department. This special provision does not apply to shop drawing submittals.

B Contractor Submittals

Provide two paper originals and one electronic copy of all documents requiring department review, acceptance, or approval. Attach a completed engineer-provided transmittal sheet to each paper original and email submittal. The department will reject submittals with incomplete transmittal sheets and require re-submittal.

The department will return one reviewed, accepted, or approved paper original to the contractor. Additional return originals can be requested. Submit an additional original for each additional return original requested.

Submit electronic copies in Adobe Acrobat (.pdf) format via email to an account the engineer determines. If possible, translate original documents from their native format (e.g. Word, Excel, AutoCAD, etc.) using an Adobe Acrobat translation routine. Scan other documents to Adobe Acrobat format with a minimum resolution of 600 dpi.

All costs for contractor document submittals are incidental to the contract.

20. Information to Bidders, Use of Recovered Material.

The department encourages the use of waste materials and recovered industrial byproducts as material substitutions (standard spec 106.2.1), provided they meet standard specification gradation requirements, conform to NR 538 requirements, and/or follow standard engineering practice for their intended use.

21. Information to Bidders, U.S. Army Corps of Engineers Section 404 Permit.

The department has obtained a U.S. Army Corps of Engineers Section 404 permit. Comply with the requirements of the permit in addition to requirements of the special provisions. A copy of the permit is available from the regional office by contacting Karla Leithoff at (262) 548-6709.
107-054 (20080901)

22. Payment Tracking.

A Reporting Payments During Construction

Comply with reporting requirements specified in the department's civil rights and labor compliance management system manual.

Report payments to all first tier relationships including subcontractors, suppliers, and trucking firms within ten calendar days of receipt of a progress payment by the department or a contractor for work performed, materials furnished, or materials stockpiled by subcontractors, suppliers, and trucking firms. Report the payment as specified in A(1) for all work satisfactorily performed and for all materials furnished or stockpiled.

Require all first tier relationships including subcontractors, suppliers, and trucking firms in receipt of a progress payment by contractor to acknowledge receipt of payment as specified in A(1) and (2).

All agreements made by a contractor shall include the provisions in A(1) and (3), and shall be binding on all first tier relationships including subcontractors, suppliers, and trucking firms on the project.

B (Vacant)

C (Vacant)

D (Vacant)

E Payment

Costs for conforming to this special provision are incidental to the contract.

23. Labor Compliance Reporting – Payroll Requirements.

Submit weekly certified payrolls verifying prevailing wage rates for all work performed under the contract as directed in the civil rights and labor compliance management system manual. Submit weekly certified payrolls within seven calendar days of the week covered by the weekly certified payroll.

24. Nighttime Work Lighting-Stationary.

A Description

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

B (Vacant)

C Construction

C.1 General

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

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

1. Layout, including location of portable lighting – lateral placement, height, and spacing. Clearly show on the layout the location of all lights necessary for every aspect of work to be done at night.
2. Specifications, brochures, and technical data of all lighting equipment to be used.
3. The details on how the luminaires will be attached.
4. Electrical power source information.
5. Details on the louvers, shields, or methods to be employed to reduce glare.
6. Lighting calculations. Provide illumination with average to minimum uniformity ratio of 5:1 or less throughout the work area.
7. Detail information on any other auxiliary equipment.

C.2 Portable Lighting

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

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

C.3 Light Level and Uniformity

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

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

C.4 Glare Control

Design, install, and operate all lighting supplied under these specifications to minimize or avoid glare that interferes with all traffic on the roadway or that causes annoyance or discomfort for properties adjoining the roadway. Locate, aim, and adjust the luminaires to

provide the adequate level of illumination and the specified uniformity in the work area without the creation of objectionable glare.

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

1. Aim tower-mounted luminaires, either parallel or perpendicular to the roadway, so as to minimize light aimed toward approaching traffic.
2. Aim all luminaires such that the center of beam axis is no greater than 60 degrees above vertical (straight down).

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

C.5 Continuous Operation

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

D (Vacant)

E Payment

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

643-010 (20100709)

25. Dust Control Implementation Plan.

A Description

Develop, update, and implement a detailed Dust Control Implementation Plan (DCIP) for all land-disturbing construction activities and associated impacts both within the project site boundaries and outside the project site boundaries. Incorporate contract bid items that this article specifies into the DCIP.

B (Vacant)

C Construction

C.1 General

Take responsibility for dust control on the project as specified in standard spec 107.18. Minimize dust emissions resulting from land disturbing activities. Do not generate excessive air borne particulate matter (PM) or nuisance dust conditions. Take direct responsibility for controlling dust at all times throughout the duration of the contract, 24 hours per day, 7 days per week, including non-working hours, weekends, and holidays.

Submit a DCIP to the engineer for review at least 14 calendar days before the preconstruction conference. Coordinate with the department, if requested, to resolve DCIP related issues before the preconstruction conference. The department will either approve the DCIP or request revisions. Do not initiate any land-disturbing activities without the department's approval of the DCIP.

C.2 Dust Control Implementation Plan Contents

Develop a DCIP tailored to the specific needs of the project. Consider potential impacts to businesses and residences adjacent to the job site. Describe in detail all land disturbing, dust generating activities. Identify strategies to prevent, mitigate, and collect excess dust. Establish clear lines of communication with the engineer to ensure that all dust control issues can be dealt with promptly.

The DCIP shall include, but not be limited to, all of the following:

1. A single contact person with overall responsibility for the DCIP development as well as surveillance and remediation of job related dust. Include the following:
 - Name, firm, address, and working-hours phone number.
 - Non-working-hours phone number.
 - Email address.
2. Individual contact persons and their respective areas of responsibility. Include the following:
 - Name, firm, address, and working-hours phone number.
 - Non-working-hours phone number.
 - Email address.
3. A site map locating project features, the job site boundaries, all ingress and egress points, air intakes and other dust-sensitive areas, and all public and private paved surfaces within and immediately adjacent to the job site. Show where specific land disturbing, dust generating activities will occur and, to the extent possible, where employing various dust control or prevention strategies.
4. A matrix showing, for each anticipated land disturbing, dust generating activity, the following:
 - Preventive measures that shall be employed.
 - The applicable contact person.
 - The contractor's timetable and/or surveillance measures used to determine when remediation is required.
 - The specific dust control and remediation measures that shall be employed. List the specific contract bid items that shall be used for payment. Also indicate costs that are incidental to the contract.
 - Both maintenance and cleanup schedules and procedures.
 - How excess and waste materials shall be disposed of.
5. A description of how off-site impacts shall be monitored and dealt with.

C.3 Updating the Dust Control Implementation Plan

Update the DCIP throughout the term of the contract as the engineer directs. Obtain the engineer's approval for all DCIP alterations. Also obtain the engineer's approval for DCIP routine adjustments for weather, job conditions, or emergencies that will have an impact on payment under the bid items listed in the approved DCIP.

C.4 Dust Control Deficiencies

Correct engineer identified dust control deficiencies within the time the engineer specifies. The engineer will allow from 30 minutes to 24 hours from the time the engineer notifies the contractor in writing of the deficiency. Deficiencies include, but are not limited to, actions or lack of actions resulting in excessive dust, failing to comply with the contractor's dust control implementation plan or associated special provisions, and failing to properly maintain equipment.

D Measurement

The department will measure the various bid items associated with dust control as specified in the applicable measurement subsections of either the standard specifications or other contract special provisions. The department will not measure work performed under a DCIP alteration unless the engineer specifically approves that alteration.

Measurement under the DCIP shall include, but is not limited to, the contract bid items listed below:

623.0200	Dust Control Surface Treatment
624.0100	Water
628.7560	Tracking Pads
SPV.0105.0002	Pavement Cleanup

The department will measure work completed under other existing contract bid items if approved as a part of the DCIP. The department will consider new bid items to the contract if proposed under the DCIP. The department will not measure work required under the DCIP that is not included in contract bid items.

E Payment

All costs associated with the development and updating of the DCIP are incidental to the contract. The department will pay separately for the work required to implement the actions approved in the DCIP under the contract bid items approved as a part of the DCIP. All other costs associated with work approved under the DCIP are incidental to the contract.

26. Project Site Air Quality.

Because fine particulate matter levels for Milwaukee, Racine and Kenosha Counties are typically close to PM_{2.5} limits and the project is in a non-attainment area for the federal 8-hour ozone standard, contributions from construction activities can have a major impact well beyond the project limits. Take practical measures to mitigate the impact of operating construction equipment on the air quality in and around the project site.

Voluntarily establishing the staging zones for trucks waiting to load and unload is encouraged by the department. Locate staging zones where idling of diesel powered equipment will have minimal impact on abutting properties and the general public. The department will make signs available to help identify these zones. Have truckers queue up in these zones whenever it is practical. The department further encourages drivers to shut down diesel trucks as soon as it appears likely that they will be queued up for more than ten minutes. Notify employees and sub-contractors about fueling and engine idling.

Portable Concrete Crusher Plants

Portable concrete crusher plants may need a NR 440 Concrete Crusher Plant Air Permit for air emissions. Please contact Mike Griffin, Wisconsin Department of Natural Resources, Air Compliance Engineer at (414) 263-8554 to request additional information and permit application materials. Complete permit applications may take three months to process.

27. Owner Controlled Insurance Program.

Standard spec 107.26, “Standard Insurance Requirements” is deleted in its entirety and the following standard spec 107.26 is substituted thereof:

107.26 Standard Insurance Requirements

107.26(1)(a) Owner Controlled Insurance Program

- 1. Overview.** The State of Wisconsin, Department of Transportation (“the WisDOT”) has arranged with Aon Risk Solutions, (the “OCIP administrator”) for this Project to be insured under its Owner Controlled Insurance Program (“OCIP”). The OCIP is more fully described in the Zoo Interchange manual for the Owner Controlled Insurance Program (the “Insurance Manual”) and the Safety and Health Plan Manual that are incorporated in this Special Provision and the Contract by this reference. Parties performing labor or services at the Project Site (as defined by the OCIP Policies) are eligible to enroll in the OCIP unless the party is an excluded party (as defined below). The OCIP will provide to enrolled parties(as defined below) workers’ compensation and employer’s liability insurance, commercial general liability insurance, Builders Risk and Excess Liability insurance as summarily described below in connection with the performance of the Work (“OCIP coverage’s”).
- 2. Enrolled Parties and Their Insurance Obligations.** OCIP coverage applies only to Enrolled Parties. Enrolled Parties include the WisDOT and its employees, non-excluded Contractors and Subcontractors of all tiers who enroll in the OCIP, all employees of Enrolled Contractor’s and Subcontractor’s who perform Work at the Project Site, and such other persons or entities that the WisDOT, in its sole discretion, may designate (each such party who is insured under the OCIP is collectively referred to as an “Enrolled Party”).

Enrolled Parties shall obtain and maintain, and shall require each of its Subcontractors to obtain and maintain, the insurance coverage specified in 107.26(1)(a) 8 below.

3. Excluded Parties and Their Insurance Obligations. OCIP coverage's do not apply to the following "Excluded Parties":

- a. Hazardous materials remediation, removal and/or transport companies;
- b. Vendors *, suppliers, fabricators, material dealers, truckers**, haulers, drivers and others who merely transport, pickup, deliver, or carry materials, personnel, parts or equipment or any other items or persons to or from the Project;

* WisDOT is requiring all vendors who perform maintenance on an enrolled contractor's equipment to be enrolled in the OCIP. Please see "WisDOT OCIP Enrollment Guidance Relating to Service Vendors" to determine whether they will be enrolled per project id number or on a Miscellaneous blanket basis.

** Truckers that come on site must remain in the cab of the vehicle.

Refer to the "Enrollment Matrix" which clearly outlines the requirements contingent upon the category that the entity falls under, such as: Contractor; Subcontractor; Consultant; Visitor; etc.

- c. Sanitary disposal facility providers, if the only function is to drop off the units and pick them up later, they are material suppliers and are excluded. If the company also services/cleans the units on site, that is no longer being a material supplier. (Refer to "Enrollment Matrix", Vendors Providing Maintenance On Site).
- d. Contractors and Subcontractors of any tier that do not perform any actual labor on the Project site;
- e. Any party or entity not specifically identified in this special provision or excluded by the WisDOT as permitted by law, even if otherwise eligible.
- f. If you are not employed by an Enrolled Party, but performing services of an Excluded Party, you are not covered by the OCIP.

Excluded Parties and parties not enrolled in the OCIP shall obtain and maintain, and shall require each of its excluded Subcontractors to obtain and maintain, the insurance coverage specified in Section 107.26(1)(a) 8 below and in the Insurance Manual. Excluded Parties shall comply with all of the safety requirements pursuant to 107.26(1)(a) 16.

4. OCIP Insurance Policies Establish OCIP coverage's. The OCIP coverage's and exclusions summarized in this special provision and the other contract documents are set forth in full in their respective insurance policy forms. The summary descriptions of the OCIP coverage's in this special provision or the Insurance Manual are not intended to be complete or to alter or amend any provision of the actual OCIP coverage's. In the event any provision of this special provision, the Insurance

Manual, or the contract documents, conflicts with the OCIP insurance policies, the provisions of the actual OCIP insurance policies shall govern.

5. **Summary of OCIP Coverage's.** OCIP coverage's will apply only to those operations of each Enrolled Party performed at the Project Site (as defined in the OCIP insurance Policies) in connection with the Work and only to Enrolled Parties that are eligible for the OCIP.

The OCIP coverage's are primary insurance for all Enrolled Parties for occurrences during the policy period at the Project Site (as defined in the OCIP Policies). The OCIP will provide at least the following insurance to Enrolled Parties:

Summary of OCIP Coverages

This is a brief description of OCIP Insurance Coverage. Enrolled Parties should refer to the actual policies for details concerning coverage, exclusions and limitations.

- a. Workers' Compensation Insurance - Statutory Limit including Jones Act and USL&H coverage, as applicable.
- b. Employer's Liability Insurance
 - \$1,000,000 Bodily Injury by Accident, each accident
 - \$1,000,000 Bodily Injury by Disease, each employee
 - \$1,000,000 Bodily Injury by Disease, policy limits
- c. Commercial General Liability (ISO Occurrence Form – Limits Shared By All Insureds)
 - \$2,000,000 Each Occurrence Limit (Annual Limit)
 - \$2,000,000 Personal/Advertising Injury Aggregate
 - \$4,000,000 General Aggregate Limit for all Enrolled Parties (Annual Limit)
 - \$4,000,000 Products & Completed Operations Aggregate for all Enrolled Parties (Single Limit Applies to Entire Products & Completed Operations Extension)
 - 10 yr. Products & Completed Operations Extension
- d. The OCIP Commercial General Liability policy will not provide coverage for any claim that could be covered under a property policy or Builder's Risk policy.
- e. Excess Liability insurance (over Employer's Liability & General Liability – Limits Shared by All Insureds)
 - \$100,000,000 Each Occurrence Limit
 - \$100,000,000 Aggregate (Annual Limit)
 - \$100,000,000 Products & Completed Operations Aggregate Limit (Single Limit Applies to Entire Products & Completed Operations Extension).
- f. Builder's Risk Insurance Coverage:

This is a brief description of Builder's Risk Insurance Coverage. Contractor should refer to the actual policies for details concerning coverage, exclusions and limitations.

The Builder's Risk insurance covers insures property, including materials, supplies, machinery, fixtures and equipment which will become a permanent part of the Work (excluding road work at grade level) in the course of construction.

The Builder's Risk coverage insures WisDOT and Enrolled Parties.

Builders Risk:

	<u>Limit</u>
Each Occurrence Limit	\$100,000,000

Builder's Risk Obligation:

Contractor or Subcontractor shall pay to the WisDOT's designee within five (5) days written notice a maximum of up to **twenty-five thousand dollars (\$25,000.00)** for each loss payable under the Builder's Risk Policy attributable to Contractor's Work, acts or omissions, or the Work, acts or omissions of any of Contractor's Subcontractors, or any other entity or party for whom Contractor may be responsible ("builder's risk obligation").

6. The WisDOT's Insurance Obligations.

- a. The WisDOT will pay the costs of premiums for the OCIP coverage's and WisDOT will receive or pay, as the case may be, all adjustments to such costs, whether by way of dividends, retroactive adjustments, return premiums, other moneys due, audits or otherwise.
- b. The WisDOT assumes no obligation to provide insurance other than that specified in this special provision and the OCIP insurance policies.
- c. Except as provided by applicable law, the WisDOT's furnishing of OCIP coverage's will in no way relieve or limit, or be construed to relieve or limit, Contractor or any of its Subcontractors of any responsibility, liability, or obligation imposed by the contract documents, the OCIP insurance policies, or by law, including without limitation any indemnification obligations which Contractor or any of its Subcontractors has to the WisDOT there under. The WisDOT reserves the right at its option, to furnish other insurance coverage of various types and limits provided that such coverage is not less than that specified in the contract documents.

7. Contractor's OCIP Obligations. Contractor shall:

- a. Assign to WisDOT the right to receive all such adjustments, and shall require that each of its Subcontractors of every tier assigns to WisDOT the right to receive all such adjustments.
- b. Incorporate the terms of this special provision in all subcontract agreements.
- c. Enroll and maintain enrollment in the OCIP, and shall ensure that each non-Excluded subcontractor, enrolls and maintains enrollment in the OCIP. Enrollment shall take place within five (5) days of a receipt of a Notice to Proceed, and prior to commencement of work.
- d. Comply with all of the administrative, safety, insurance, and other requirements outlined in this special

provision, the Insurance Manual, the OCIP insurance policies, the Safety and Health Plan Manual, or elsewhere in the contract documents.

- d. Provide each of its Subcontractors with a copy of the Insurance Manual and ensure Subcontractor compliance with the provisions of the OCIP insurance policies, the Insurance Manual, this special provision, and the contract documents. The failure of (a) the WisDOT to include the Insurance Manual in the bid documents or (b) Contractor to provide each of its eligible Subcontractors with a copy of same shall not relieve Contractor or any of its Subcontractors from any of the obligations contained therein.
- e. Acknowledge, and require all of its Subcontractors to acknowledge in writing, that the WisDOT and the OCIP administrator are not agents, partners or guarantors of the insurance companies providing coverage under the OCIP (each such insurer, an "OCIP insurer") and that the WisDOT is not responsible for any claims or disputes between or among Contractor, its Subcontractors, and any OCIP insurer(s). Any type of insurance coverage or limits of liability in addition to the OCIP coverage's that Contractor or any Subcontractor requires for its or their own protection, or that is required by applicable laws or regulations, shall be Contractor's or its Subcontractor's sole responsibility and expense and shall not be billed to the WisDOT.
- f. Cooperate fully with the OCIP administrator and the OCIP insurers, as applicable, in its or their administration of the OCIP.
- g. Provide, within five (5) business days of the WisDOT's or the OCIP administrator's request, all documents or information as requested of Contractor or its Subcontractors. Such information may include but not be limited to, payroll records, certified copies of insurance coverage's, declaration pages of coverage's, certificates of insurance, underwriting data, prior loss history information, insurance audits, safety records or history, OSHA citations, or such other data or information as the WisDOT, the OCIP administrator, or OCIP insurers may request in the administration of the OCIP, or as required by the Insurance Manual.
- h. Pay to the WisDOT's designee within five (5) days of written notification, a sum of up to **\$10,000** of each claim, including court costs, attorneys fees and costs of defense for property damage to the extent losses are insured under the OCIP Commercial General Liability policy for those losses that are attributable to Contractor's Work, acts or omissions, or the Work, acts or omissions of any of its Subcontractors, or any other entity or party for whom Contractor may be responsible ("contractor General Liability obligation"). The contractor General Liability obligation will not be insured by the OCIP Coverage's.

- 8. Additional Insurance Required From Enrolled Parties and Excluded Parties.** Contractor shall obtain and maintain, and shall require each of its Subcontractors of every tier to obtain and maintain, the insurance coverage specified in this Section in a form and from insurance companies reasonably acceptable to the WisDOT. The insurance limits may be provided through a combination of primary and excess

policies, including the umbrella form of policy. The insurance required by this Section shall conform to the WisDOT's requirements outlined in the Insurance Manual and be written by companies authorized to do business in the state of Wisconsin with an **AM Best rating of A- or better**. Contractor shall provide certificates of insurance coverage to the WisDOT as required below and by the Insurance Manual.

As to Enrolled Parties, the Workers' Compensation, Employer's Liability, and Commercial General Liability insurance required by this section shall only be for operations away from the Project Site (as defined by OCIP Policies) . The cost of providing the required insurance coverage and limits is incidental to the contract. The department will make no additional or special payment for providing insurance.

TYPE OF INSURANCE MINIMUM LIMITS REQUIRED

1. Commercial General Liability insurance shall be endorsed to include Blanket Contractual Liability coverage.
 - a. \$2,000,000 Combined Single Limits per occurrence with an annual aggregate limit of not less than \$4,000,000.
 - b. The OCIP Coverage's shall exclude blasting or explosion operations. If blasting or explosion operations are used in connection with the Work, Commercial General Liability insurance shall not contain an exclusion for blasting or explosion and shall be provided in limits established by the WisDOT at the time such blasting or explosion methods are elected. Such coverage shall apply to operations whether the operations occur on the Project site or away from the Project site.
 - c. Wisconsin Department of Transportation, their respective officers, agents and employees, and any additional entities as the WisDOT may request as additional insureds must be named as an Additional Insured which shall include: i) liability arising out of the Work performed by the named insured; ii) liability arising out of the supervision of the Work performed by or operations of the named insured; and iii) liability of the acts or omissions of the Additional Insureds relating to Work performed by the named insured for the Project, except for sole negligence of the Additional Insureds iv) will state that coverage is afforded on a primary and non-contributory basis.
 - d. Ongoing Construction Operation(s) in effect at all times while work is being performed by Contractor;
 - e. Subcontractors and Independent Contractors (if any);
 - f. Products and Completed Operations, including coverage applicable to additional insureds (as required by this agreement) with Completed Operations coverage to remain in force, whether by endorsement or renewal of coverage, including the Contractor, any party required to be indemnified by this Contract and any other party required by this Contract to be named as

an additional insured, for at least two (2) years from the date of final completion of the Project and WisDOT's acceptance of the work; and

- g. Explosion, collapse, and underground hazards.
- h. Contractual Liability (insured contract) coverage sufficient to meet the requirements of this Contract (including defense costs and attorney's fees assumed under contract);
- i. Personal and Advertising Injury Liability coverage (with the standard contractual and employee exclusions deleted);
- j. Notice and Knowledge of Occurrence conditions limited to the knowledge of relevant corporate officers or risk managers with an Unintentional Errors and Omissions provision (providing that the insurer may not deny coverage unless it can show that it has been prejudiced by a failure of the insured to comply with a condition of the policy); and
- k. CG 22 79 07 98 (or equivalent) is the only acceptable Professional Liability Exclusion.
- l. Operations performed within 50' of railroad

2. Workers' Compensation and Employer's Liability insurance.

- a. Workers' Compensation Limits: Statutory Limits
- b. Employer's Liability limits:
 - \$1,000,000 Bodily Injury by Accident, each accident
 - \$1,000,000 Bodily Injury by Disease, each employee
 - \$1,000,000 Bodily Injury by Disease, policy limits

Terms and conditions shall include:

- USL&H – where applicable.
- Jones Act – where applicable.
- All states endorsement - where applicable.

3. Commercial Automobile Liability insurance as specified by Insurance Services Office (ISO), form CA 00 01, symbol 1 (any auto) with the following limits and endorsements:

- a. No Trucking or Hauling: \$1,000,000 Each Accident
- b. Trucking or Hauling (Non Hazardous Materials): \$2,000,000 Each Accident
- c. Trucking or Hauling Hazardous Materials: \$5,000,000 Each Accident with an MCS 90 Endorsement and ISO Endorsement CA 99 48.

4. For any work over water, whether deemed navigable or otherwise, Contractors Pollution Liability insurance with \$2,000,000 per occurrence and \$2,000,000 aggregate policy limits.

5. Aviation and/or Watercraft Liability insurance, as appropriate, including hull and protection and indemnity for watercraft, or other insurance, in form and with limits of liability and from an insuring entity reasonably satisfactory to the WisDOT.

Contractor's failure to procure or maintain the insurance required by this Section and to assure all its Subcontractors of every tier maintain the required insurance during the entire term of the contract shall constitute a material breach of this contract under which the WisDOT may immediately suspend or terminate this contract or, at its discretion, procure or renew such insurance to protect the WisDOT's interests and pay any and all premiums in connection therewith, and withhold or recover all monies so paid from the Contractor.

Contractor shall provide the WisDOT with certificates of insurance as evidence that required coverage's for insurance detailed in this section are in force. The bidder shall provide certificates of insurance in their pre-qualification statement as specified in 102.1.

Contractor shall notify the WisDOT at least 60 calendar days before a cancellation or material change in coverage and only obtain coverage from insurance companies licensed to do business in the state that have an AM Best rating of A- or better. The cost of providing the required insurance coverage and limits is incidental to the contract. The WisDOT will make no additional or special payment for providing insurance.

The above insurance requirements shall apply with equal force whether the Contractor or a Subcontractor, or anyone directly or indirectly employed by either, performs the work under the Project.

9. Additional Insureds:

All insurance required by this agreement (excluding only workers compensation insurance) shall name WisDOT, all parties required to be indemnified by this Contract and all other parties as reasonably requested by the WisDOT, as additional insureds. All policies (including primary, excess and/or umbrella) must provide that coverage shall be primary and non-contributory to any insurance maintained by the Contractor or the additional insured, all of which shall be stated on the Certificate of Insurance provided by the Contractor. The Additional Insured Endorsement shall be on Form CG 20 10 11/85, or CG 20 33 10/01 plus CG 20 37 10/01, or equivalent, and shall include ongoing and completed operations coverage, which shall not contain any restrictions.

IN THE EVENT THAT THE LAW OF THE STATE IN WHICH THE PROJECT IS LOCATED (OR APPLICABLE LAW) LIMITS THE ADDITIONAL INSURED COVERAGE THAT WISDOT MAY REQUIRE FROM THE CONTRACTOR, THEN THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN ADDITIONAL INSURED COVERAGE TO THE FULLEST EXTENT OF COVERAGE AND LIMITS ALLOWED BY APPLICABLE LAW AND THIS CONTRACT SHALL BE READ TO CONFORM TO SUCH LAW.

10. Contractor Representations and Warranties to the WisDOT. Contractor represents and warrants to the WisDOT or behalf of itself and its Subcontractors:

- a. That all information it submits to the WisDOT or the OCIP administrator shall be accurate and complete.
- b. That Contractor, on behalf of itself and its Subcontractors, has had the opportunity to read and analyze copies of the OCIP binders and specimen policies that are on file in the WisDOT's office. Any reference or summary in the contract, this special provision, the Insurance Manual, or elsewhere in any other contract document as to amount, nature, type or extent of OCIP coverage's and/or potential applicability to any potential claim or loss is for reference only. Contractor and its Subcontractors have not relied upon said reference but solely upon their own independent review and analysis of the OCIP coverage's in formulating any understanding and/or belief as to amount, nature, type or extent of any OCIP coverage's and/or its potential applicability to any potential claim or loss.
- c. That the costs of OCIP coverage's were not included in Contractor's bid or proposal for the Work, the contract price, and will not be included in any change order, change modification, or any request for payment for the Work or extra work. The "costs of OCIP coverage's" is defined as the dollar amount of premiums, costs and fees the Contractor and its Subcontractors would have paid its insurance carrier to insure the operations and exposures which are being insured under the OCIP.
- d. That Contractor acknowledges that the WisDOT will not pay or compensate Contractor or any Subcontractor, in any manner, for costs of OCIP coverage's or for "insurance costs" except as specifically required to be maintained by Contractor by the terms of this special provision.

11. Severability of Interests (Cross Liability):

All insurance required by this agreement (excluding only workers compensation insurance) shall include a provision or be endorsed to provide that, inasmuch as the policy is written to cover more than one insured, all terms, conditions, insuring agreements and endorsements, with the exception of limits of liability, shall operate in the same manner as if there were a separate policy covering each insured. No cross liability exclusions are permitted and there may not be any restrictions in any policies that limit coverage for a claim brought by an additional insured against a named insured. Also, there shall not be any provision in any insurance policy which excludes or conditions coverage on the existence of a contract or other agreement requiring insurance.

12. Breach of Insurance Requirements:

The Contractor's failure to obtain and maintain insurance coverages as required by this agreement shall constitute a material breach of the Contract. In such event

WisDOT may at its option: (i) terminate the Contractor for default; or (ii) purchase such coverage and backcharge the premium and associated costs to the Contractor; or (iii) at their respective option, WisDOT and/or an additional insured can require the Contractor and/or its Subcontractors to pay for attorney's fees, expenses, damages and liability as a result of any claim or lawsuit to the extent coverage would have been provided to them under the Contractor's insurance but for the Contractor's breach WisDOT has the right to backcharge the Contractor for such sums. Furthermore, to the extent of their respective interest, the Insurers of those entities that were to be included as additional insureds are deemed to be third-party beneficiaries of the insurance procurement obligation.

13. Subcontractor:

Before permitting any Subcontractor to perform work under a subcontract, the Contractor shall require by written contract that the Subcontractor maintain insurance in like form and amounts to that required herein. The Contractor shall be responsible to ensure that each Subcontractor maintains insurance in like form and amounts and shall provide evidence of same if requested. Contractor shall provide copies of its Subcontractor's certificates of insurance coverage to WisDOT or the OCIP Administrator upon request.

14. Notice of Cancellation:

All insurance coverages required by this agreement shall contain a provision that the coverage afforded thereunder cannot be cancelled, non-renewed, allowed to lapse, or have any restricted modifications added unless at least thirty (30) days prior written notice has been given to WisDOT. The Contractor is responsible to provide replacement coverage conforming with the requirements of this agreement in the event of any cancellation, non-renewal or modification of any insurance coverages required by this agreement.

15. Limits of Insurance:

The Contractor's insurance coverage and any additional insured coverage provided to WisDOT and any additional insured shall be for the full amount of any loss up to the policy(s) limits of liability and shall not be limited to the minimum insurance requirements of this Contract. The Contractor is responsible for notifying its insurance carriers in the event of a loss or potential loss involving coverage for the additional insureds. However, this does not prohibit any additional insureds from reporting a claim directly to the Contractor's insurance carriers.

16. Deductibles/Denial of Claims:

The Contractor shall be responsible, at no additional cost to WisDOT, for the payment of any deductibles or self-insured retention in connection with the insurance coverages required by this agreement, both for itself and all additional insureds. Any self-insured retention or deductible must be declared in writing at the

time the Contractor submits its bid and must be specifically approved by WisDOT prior to execution of the Contract. The Contractor shall be responsible for any loss arising out of coverage denial by its insurance carrier. The Contractor may not procure policies that limit who may pay the SIR or deductible; rather, any SIR shall be payable by either the Contractor or the Subcontractor and the Contractor may not have a policy that prevents WisDOT from accessing or triggering coverage unless the SIR is paid by the Contractor. Contractor shall also ensure that similar conditions are incorporated into all subcontracts. In the event that WisDOT is required to pay any deductible and/or SIR to access any insurance policy, Subcontractor shall promptly reimburse the Contractor for such payment.

17. No Waiver of Insurance Requirements:

IT IS EXPRESSLY AGREED BETWEEN WISDOT AND THE CONTRACTOR THAT THE FAILURE OF WISDOT TO REQUIRE OR VERIFY COMPLETE AND TIMELY PERFORMANCE OF THE CONTRACTOR'S OBLIGATIONS UNDER THIS CONTRACT SHALL NOT BE A WAIVER BY WISDOT OF ANY RIGHT OF WISDOT TO REQUIRE THE CONTRACTOR TO COMPLY WITH THESE INSURANCE REQUIREMENTS AND/OR TO SEEK DAMAGES BECAUSE OF THE CONTRACTOR'S FAILURE TO COMPLY WITH THE INSURANCE REQUIREMENTS IN THIS CONTRACT.

- 18. Audits.** Contractor agrees that the WisDOT, the OCIP administrator, and/or any OCIP insurer may audit Contractor's or any of its Subcontractor's Project payroll records, books and records, insurance coverage's, insurance cost information, or any other information that Contractor provides to the WisDOT, the OCIP administrator, or the OCIP insurers to confirm their accuracy and to assure that costs of OCIP coverage's are not included in any payment for the work.
- 19. The WisDOT's Election to Modify or Discontinue OCIP.** The WisDOT may, for any reason, modify the OCIP coverage's, discontinue the OCIP, or request that Contractor or any of its Subcontractors withdraw from the OCIP upon thirty (30) days written notice. Upon such notice Contractor and/or one or more of its Subcontractors, as specified by the WisDOT in such notice, shall obtain and thereafter maintain at the WisDOT's expense, Contractor Maintained Coverages (or a portion thereof as specified by the WisDOT) of the OCIP coverage's. The form, content, limits of liability, cost, and the insurer issuing such replacement insurance shall be subject to the WisDOT's approval.
- 20. Withhold of Payments.** The WisDOT may withhold from any payment owing to Contractor the costs of OCIP coverage's if included in a request for payment. In the event the WisDOT audit of Contractor's records and information as permitted in the Contract, this special provision, or other contract documents reveals a discrepancy in the insurance, payroll, safety, or any other information required by the contract documents to be provided by Contractor to the WisDOT, or to the OCIP administrator, or reveals the inclusion of costs of OCIP coverage's in any payment for the work, the WisDOT will have the right to full deduction from the Contract

Price of all such costs of OCIP coverage's and all audit costs. Audit costs will include but not be limited to the fees of the OCIP administrator, and the fees of attorneys and accountants conducting the audit and review. If the Contractor or its Subcontractors fail to timely comply with the provisions of this special provision or the requirements of the Insurance Manual, the WisDOT may withhold any payments due Contractor and its Subcontractors until such time as they have performed the requirements of this special provision. Such withholding by the WisDOT will not be deemed to be a default hereunder.

21. Waiver of Claim and Waiver of Subrogation:

Where permitted by law, Contractor hereby waives all rights of recovery under subrogation because of deductible clauses, inadequacy of limits of any insurance policy, limitations or exclusions of coverage, or any other reason against the WisDOT, the State of Wisconsin and any of its Agencies or Officer's, Agents or employees including without limitation, the OCIP administrator, its or their officers, agents, shareholders or employees of each, if any, and any other Contractor or Subcontractor performing work or rendering services on behalf of the WisDOT in connection with the planning, development and construction of the Project, and Contractor shall require that all Contractor maintained insurance coverage related to the work include clauses providing that each insurer shall waive all of its rights of recovery by subrogation for claims described above.

22. Waiver of Subrogation. Where permitted by law, Contractor shall also require that all Contractor maintained insurance coverage related to the work include clauses providing that each insurer shall waive all of its rights of recovery by subrogation against the WisDOT, the State of Wisconsin and any of its Agencies or Officer's, Agents or employees including without limitation, the OCIP administrator, its or their officers, agents, shareholders or employees of each, if any . Contractor shall require similar written express waivers and insurance clauses from each of its Subcontractors. A waiver of subrogation shall be effective as to any individual or entity even if such individual or entity (a) would otherwise have a duty of indemnification, contractual or otherwise, (b) did not pay the insurance premium directly or indirectly, and (c) whether or not such individual or entity has an insurable interest in the property damaged.

24. Conflicts. In the event of a conflict, the provisions of this special provision shall govern, then the provisions of the contract and its other related contract documents, then the provisions of the Insurance Manual.

25. Safety. Contractor shall be solely responsible for safety on the Project and safety relating to the Work. Contractor shall establish a safety program that, at a minimum, complies with all local, state and federal safety standards, and any safety standards established by the WisDOT for the Project, including the Project Safety and Health Plan Manual.

28. Clearing and Grubbing, Emerald Ash Borer.

This applies to projects in the emerald ash borer (EAB) quarantined zones to include Fond du Lac, Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Washington and Waukesha counties.

Supplement standard spec 201.3 with the following:

The emerald ash borer (EAB) has resulted in a quarantine of ash trees (*Fraxinus sp.*) by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) and the Wisconsin Department of Natural Resources (DNR).

Ash trees species attacked by emerald ash borer include the following:

- (a) Green ash (*F. pennsylvanica*) is found throughout the state, but is most common in southern Wisconsin. It may form pure stands or grow in association with black ash, red maple, swamp white oak, and elm. It grows as an associate in upland hardwood stands, but is most common in and around stream banks, floodplains, and swamps.
- (b) Black ash (*F. nigra*) is distributed over the entire state but is most frequently found in northern Wisconsin. It is most common in swamps, but is also found in other wet forest types.
- (c) Blue ash (*F. quadrangulata*) is a threatened species that is currently found only at a few sites in Waukesha County. The species is at the edge of its range in Wisconsin, but is common in states farther south. The species is not of commercial importance. Blue ash twigs are 4-sided.
- (d) White ash (*F. americana*) tends to occur primarily in upland forests, often with *Acer saccharum*.

The quarantine of ash trees includes all horticultural cultivars of the species listed above.

Note that blue ash twigs are 4-sided. All other Wisconsin ash trees have round stems. Also, Mountain ash (*Sorbus americana* and *S. decora*) is not a true ash and is not susceptible to EAB infestation.

The contractor shall be responsible for hiring a certified arborist to identify all ash trees that will be cleared and grubbed for the project. In addition, prior to scheduled clearing and grubbing activities, the arborist shall mark all ash trees with florescent lime flagging tied around the trunk perimeter.

Follow and obey the following Wisconsin Department of Agriculture, Trade, and Consumer Protection order:

ATCP 21.17 Emerald ash borer; import controls and quarantine.

Importing or Moving Regulated Items from Infested Areas; Prohibition.

Except as provided in subparagraph (3), no person may do any of the following:

- (a) Import a regulated item under sub. (2) into this state if that item originates from an emerald ash borer regulated area identified in 7CFR 301.53-3.
- (b) Move any regulated item under sub. (2) out of an emerald ash borer regulated area that is identified in 7CFR 301.53-3 and located in this state.

Note: the United States Department of Agriculture-Animal and Plant Health Inspection Service (USDA-APHIS) periodically updates the list of regulated areas in 7CFR 301.53-3. Subsection (1) applies to new regulated areas as those areas are identified in the CFR.

Regulated Items. The following are regulated items for purposes of subparagraph (1):

The emerald ash borer, *Agrilus planipennis* Fairmaire in any living stage.

Ash trees.

Ash limbs, branches, and roots.

Ash logs, slabs or untreated lumber with bark attached.

Cut firewood of all non-coniferous species.

Ash chips and ash bark fragments (both composted and uncomposted) larger than one inch in diameter.

Any other item or substance that may be designated as a regulated item if a DATCP pest control official determines that it presents a risk of spreading emerald ash borer and notifies the person in possession of the item or substance that it is subject to the restrictions of the regulations.

Regulatory Considerations

The quarantine means that ash wood products may not be transported out of the quarantined area.

Clearing and grubbing includes all ash trees that are to be removed from within the project footprint. If ash trees are identified within clearing and grubbing limits of the project, the following measures are required for the disposal:

Chipped Ash Trees

May be left on site if used as landscape mulch within the project limits. If used as mulch on site, chips may not be applied at a depth greater than standard mulch applications as this will impede germination of seeded areas.

May be buried on site within the right-of-way in accordance to standard spec 201.3 (14).

May be buried on adjacent properties to projects within the quarantined zone with prior approval of the engineer in accordance to standard spec 201.3 (15).

May be trucked to a licensed landfill within the quarantined zone with the engineer's approval in accordance to standard spec 201.3 (15).

Burning chips is optional if in compliance with standard spec 201.3.

Chips must be disposed of immediately if not used for project mulching and may not be stockpiled and left on site for potential transport by others. Chips may be stockpiled temporarily if they will be used for project mulching and are not readily accessible to the public.

Chipper equipment must be cleaned following post-chipping activities to ensure no spread of wood chip debris into non-quarantined counties.

Ash logs, Branches, and Roots

May be buried without chipping within the existing right-of-way or on adjacent properties in accordance to standard spec 201.3 (14)(15).

May be trucked to a licensed landfill within the quarantined zone with the engineer's approval in accordance to standard spec 201.3 (15).

Burning is optional if in compliance with standard spec 201.3.

Ash logs, branches, and roots must be disposed of immediately and may not stockpiled.

All additional costs will be incidental to clearing and grubbing items.

Do not bury or use mulch in an area that will be disturbed again during later phases of the project.

Anyone moving firewood or ash products from the state or these counties is subject to state and federal fines up to \$1,000.00. All fines are the responsibility of the contractor. Obtain updated quarantine information at the DNR Firewood Information Line at (800) 303-WOOD.

Furnishing and Planting Plant Materials

Supplement standard spec 632.2.2 with the following:

Ash trees may be obtained from inside or outside the quarantine area and planted within the quarantined area. Ash trees from within the quarantine area may not be transported and planted into the non-quarantined area.

Updates for Compliance

Each year, as a service, the Wisconsin department of agriculture, trade and consumer protection distributes an updated federal CFR listing to nursery license holders and other affected persons in this state. More frequent updates, if any, are available on the Department of Agriculture, Trade, and Consumer Protection (DATCP) website at www.datcp.state.wi.us. Subsection (1) applies to new regulated areas as those areas are identified in the CFR, regardless of whether affected persons receive update notices from the DATCP. Persons may request update notices by calling (608) 224-4573, by visiting the DATCP website, or by writing to the following address:

Wisconsin Department of Agriculture, Trade and Consumer Protection
Division of Agricultural Resource Management
P.O. Box 8911
Madison WI 53708-8911

Regulated Items

More frequent updates, if any, are available on the DATCP website at www.datcp.state.wi.us. Subsection (1) applies to new regulated areas as those areas are identified in the CFR, regardless of whether affected persons receive update notices from DATCP. Persons may request update notices by calling (608) 224-4573, by visiting the DATCP website, or by writing to the above address.

29. Notice to Contractor – OCIP Exclusions.

The Owner Controlled Insurance Program (OCIP) insurance coverage excludes environmental/abatement work, including but not limited to hazardous materials/chemicals, lead and other materials considered hazardous – see Article – Owner Controlled Insurance Program for additional information. Environmental/abatement work must be performed by a qualified contractor who will not be enrolled in the OCIP. The qualified subcontractor must carry Construction Pollution Liability insurance with limits of at least \$1,000,000 per Occurrence and \$2,000,000 Aggregate.

Only payroll from non-environmental work shall be reported under the OCIP. All payroll generated from environmental/abatement work should not be reported.

Questions regarding this or any other aspects of OCIP should be directed to Kevin Gehrmann at (608) 267-7722, or Kevin.Gehrmann@dot.wi.gov.

30. Notice to Contractor – Traffic Signal Equipment Lead Time.

Lead time for traffic signal equipment specified for this project has been ranging from 12-weeks to 18-weeks. Order equipment as soon as possible to assure the equipment is procured in a timely fashion and, therefore, installed, inspected, and ready for turn-on at the required date.

31. Baseline CPM Progress Schedule, Item SPV.0060.0024; CPM Progress Schedule Updates and Accepted Revisions, Item SPV.0060.0025.

Replace standard spec 108.4 with the following:

108.4 Critical Path Method Progress Schedule

108.4.1 Definitions

The department defines terms used in standard spec 108.4 as follows:

Activity

An administrative or construction task performed during the course of the project with a defined duration, and scheduled (or actual) start and finish dates.

Critical Path

The longest continuous chain of activities through the CPM schedule that establishes the minimum overall project duration.

Construction Activity

Construction activities are discrete work activities performed by the contractor, subcontractors, utilities, or third parties within the project limits.

CPM Progress Schedule

A Critical Path Method (CPM) Progress Schedule is a network of logically related activities. The CPM schedule calculates when activities can be performed and establishes the critical or longest continuous path or paths of activities through the project.

Float

Float, as used herein, is the total float of an activity; i.e., it is the amount of time between the date when an activity can start (the early start), and the date when an activity must start (the late start). In cases where the total float of an activity has a different value when calculated based on the finish dates, the lower (more critical) value will govern.

Forecast Completion Date

The completion date predicted by the latest accepted CPM Update, which may be earlier or later than the contract completion date, depending on progress.

Fragnet

A group of logically-related activities, typically inserted into an existing CPM schedule to model a portion of the project, such as the work associated with a change order.

Initial Work Plan

The initial work plan is a time-scaled CPM schedule showing detailed activities for the first 90 calendar days of work and summary level activities for the remainder of the project.

Intermediate Milestone Date

A contractually required date for the completion of a portion of the work, so that a subsequent portion of the work or stage of traffic phasing may proceed.

Master Program Schedule

The department's schedule for the overall I-94 N-S Freeway Program, including intermediate milestone dates and contract completion dates, and containing codes for use as a template for the development of the contractor's schedule.

Master Project Schedule

The department's schedule for the contract work, developed during design, and provided to the contractor for informational purposes only.

Work Breakdown Structure (WBS)

A framework for organizing the activities that make up a project by breaking the project into successively greater detail by level. A WBS organizes the project work. It does not address the sequencing and scheduling of project activities.

108.4.2 Department's Master Schedules**108.4.2.1 Master Project Schedule**

If requested by a bidder or by the contractor, the department will supply its Master Project Schedule for the contract work, developed during design. The Master Project Schedule is not a direction on how to perform the work. The Master Project Schedule reflects one possible approach to the work, consistent with the phasing requirements.

108.4.2.2 Master Program Schedule

Within five business days after award, the department will provide its current Master Program Schedule, containing intermediate milestone constraints, standard activity codes, and a standard WBS for the contractor to use to develop its schedule.

108.4.2.3 Use of Department's Master Schedules

The department's Master Schedules provide information to assist the contractor in preparing its schedule. The Master Schedules are not contract documents. The logic contained in the Master Schedules is not intended to alter or supplement contract requirements for the phasing of the work, but to reflect those requirements.

108.4.3 Contractor's Scheduling Responsibilities

Prepare and submit a CPM progress schedule that accurately reflects the plan for the performance of the work, based on the physical requirements of the Work, and Traffic Phasing requirements. The CPM schedule is the contractor's committed plan to complete all work within the completion deadlines. Full responsibility is assumed for the prosecution

of the work as shown. The CPM schedule is not part of the contract. Schedule the Work in the manner required to achieve the completion date and intermediate milestone dates specified in the Prosecution and Progress Special Provision.

Use the department-provided Master Program Schedule as a template to develop the Initial Work Plan and the Baseline CPM Progress Schedule. Use the Master Program Schedule's ID coding structure to categorize activities by Contract, Stage, Location, and Responsibility to ensure compatibility with the Master Program Schedule and with schedules prepared by other contractors. Add additional activity codes as necessary, but do not delete the coding structure provided.

To ensure compatibility with the Master Program Schedule, use the latest version of Primavera Project Planner (P6), by Primavera Systems, Inc., Bala Cynwyd, PA to prepare the Initial Work Plan, Baseline CPM Progress Schedule, and Monthly CPM Updates.

Designate a Project Scheduler who will be responsible for scheduling the Work and submit for approval a professional resume describing a minimum of three years of scheduling experience on urban, interstate-highway reconstruction work of similar size and complexity, including recent experience with P6.

108.4.4 Submittals

108.4.4.1 Initial Work Plan

Within ten business days after the Initial Work Plan Workshop, as scheduled in section 103.10, submit an Initial Work Plan consisting of the following:

1. Develop the Initial Work Plan using the Master Program Schedule as a template.
2. Provide a detailed plan of activities to be performed within the first 90 calendar days of the contract. Provide construction activities with durations not greater than 28 calendar days (20 business days), unless the engineer accepts requested exceptions.
3. Provide activities as necessary to depict administrative work, including submittals, reviews, and procurements that will occur within the first 90 calendar days of the contract. Activities other than construction activities may have durations greater than 28 calendar days (20 business days). Allow 21 calendar days (15 business days) for department review of submittals.
4. Provide summary activities for the balance of the project. Summary activities may have durations greater than 28 calendar days (20 business days).
5. Submit three copies of the Initial Work Plan in a compressed (XER) format on three separate CDs.
6. The engineer will accept the contractor's Initial Work Plan or provide comments within five business days after receipt of the Initial Work Plan. Address comments and resubmit the Initial Work Plan as necessary. Do not begin work until the engineer

accepts the Initial Work Plan. The department will use the initial work plan to monitor the progress of the work until the Baseline CPM Progress Schedule is accepted.

7. Submit an updated version of the Initial Work Plan on a monthly basis until the engineer accepts the Baseline CPM Progress Schedule. With each update, include actual start dates, completion percentages, and remaining durations for activities started but not completed. Include actual finish dates for completed activities.

108.4.4.2 Baseline CPM Progress Schedule

Within 15 business days after the CPM Scheduling Workshop, as scheduled in section 103.10, submit a Baseline CPM Progress Schedule and written narrative consisting of the following:

Supplement standard spec 108.4.4.2(1) with the following:

4. Submit a temporary drainage plan showing the interface between various stages of a project as well as the interface with adjacent projects.
1. Develop the Baseline CPM using the Master Program Schedule as a template. The Baseline CPM is the contractor's committed plan to complete the Work within the time frames required to achieve the contract completion date and Intermediate milestone dates. The department will use the schedule to monitor the progress of the work. Include the following:
 - 1.1 Provide a detailed plan of activities to be performed during the entire contract duration, including all administrative and construction activities required to complete the work as described in the contract documents. Provide construction activities with durations not greater than 28 calendar days (20 business days), unless the engineer accepts requested exceptions.
 - 1.2 Provide activities as necessary to depict administrative work, including submittals, reviews, procurements, inspections, and all else necessary to complete the work as described in the contract documents. Activities other than construction activities may have durations greater than 28 calendar days (20 business days). Allow 21 calendar days (15 business days) for department review of submittals.
 - 1.3 Provide activities as necessary to depict third party work related to the contract.
 - 1.4 Make allowance for specified work restrictions, non-working days, time constraints, calendars, and weather; and reflect involvement and reviews by the department, and coordination with adjacent contractors, utility owners, and other third parties.

- 1.5 With the exception of the Project Start Milestone and Project Completion Milestone, all activities must have predecessors and successors. The start of an activity shall have a Start-to-Start or Finish-to-Start relationship with preceding activities. The completion of an activity shall have a Finish-to-Start or Finish-to-Finish relationship with succeeding activities. Do not use Start-to-Finish relationships. Do not use Finish-to-Start relationships with a lag unless the engineer accepts requested exceptions.
 - 1.6 Schedule all intermediate milestones in the proper sequence and input as either a “Start-no-Earlier-Than” or “Finish-no-Later-Than” date. Provide predecessors and successors for each intermediate milestone as necessary to model each Stage of the Work. Unless the engineer accepts a requested exception, the schedule should encompass all the time in the contract period between the starting date and the specified completion date.
 - 1.7 Using the bid quantities and unit prices, develop an anticipated cash-flow curve for the project, based on the Baseline CPM.
2. Provide three hard copies of a hand-drawn or electronically drafted logic diagram depicting the CPM network. Organize the logic diagram by grouping related activities, based on the activity codes in the CPM.
3. Provide a written narrative with the baseline CPM explaining the planned sequence of work, as-planned critical path, critical activities for achieving intermediate milestone dates, traffic phasing, and planned labor and equipment resources. Use the narrative to further explain:
 - 3.1 The basis for activity durations in terms of production rates for each major type of work (number of shifts per day and number of hours per shift), and equipment usage and limitations.
 - 3.2 Use of constraints.
 - 3.3 Use of calendars.
 - 3.4 Estimated number of adverse weather days on a monthly-basis.
 - 3.5 Scheduling of permit and environmental constraints, and coordination of the schedule with other contractors, utilities, and public entities.
4. Submit three copies of the Baseline CPM in a compressed (XER) format on three separate CDs.

Within ten business days of receiving the Baseline CPM, the engineer will provide comments and schedule a meeting for the contractor to present its Baseline CPM and answer questions raised in the engineer’s review.

At the meeting scheduled by the engineer, provide a presentation of the Baseline CPM. In the presentation, include a discussion of the staging and sequencing of the work, understanding of traffic phasing, and application of labor and equipment resources to the Work. Address comments raised in the engineer's review.

Within five business days after the meeting, the engineer will accept the contractor's Baseline CPM schedule or provide comments. Address the engineer's comments and resubmit a revised Baseline CPM within ten business days after the engineer's request. If the engineer requests justification for activity durations, provide information that may include estimated labor, equipment, unit quantities, and production rates used to determine the activity duration.

The engineer will accept the Baseline CPM based solely on whether the schedule is complete as specified in this section. The engineer's acceptance of the schedule does not modify the contract.

The department will not consider requests for contract time extensions as specified in 108.10 or additional compensation for delay specified in 109.4.7 until the department accepts the Baseline CPM schedule.

108.4.4.3 Monthly CPM Updates

Submit CPM Updates on a monthly basis after acceptance of the Baseline CPM. With each CPM Update, include the following:

1. Actual start dates, completion percentages, and remaining durations for activities started but not completed, and actual finish dates for completed activities, through the final acceptance of the project.
2. Additional activities as necessary to depict additions to the contract by changes and logic revisions as necessary to reflect changes in the contractor's plan for prosecuting the work.
3. Include a narrative report that includes a brief description of monthly progress, changes to the critical path from the previous update, sources of delay, potential problems, work planned for the next 30 calendar days, and changes to the CPM schedule. Changes to the logic of the CPM schedule include the addition or deletion of activities and changes to activity descriptions, original durations, relationships, constraints, calendars, or previously recorded actual dates. Justify changes to the CPM schedule in the narrative by describing associated changes in the planned methods or manner of performing the work or changes in the work itself.
4. Submit three copies of each CPM Update in a compressed (XER) format electronically, as agreed to with the department.

5. If additions or changes were made to the CPM schedule since the previous update, submit an updated hard copy of the revised logic diagram.
6. Within five business days of receiving each CPM Update, the engineer will provide comments and schedule a meeting as necessary to address comments raised in the engineer's review. Address the engineer's comments and resubmit a revised CPM Update within five business days after the engineer's request.

108.4.4.4 Three-Week Look-Ahead Schedules

Submit Three-Week Look-Ahead Schedules on a weekly basis after NTP. The schedule can be hand drawn or generated by computer. With each Three-Week Look-Ahead include:

Activities underway and as-built dates for the past week.

Provide actual as-built dates for completed activities through final acceptance of the project.

3. Planned work for the upcoming two-week period.
4. The activities of the Three-Week Look-Ahead schedule shall include the activities underway and critical RFIs and submittals, based on the CPM schedule. The Three-Week Look-Ahead may also include details on other activities not individually represented in the CPM schedule.
5. On a weekly basis, the department and the contractor shall agree on the as-built dates depicted in the Three-Week Look-Ahead schedule or document any disagreements. Use the as-built dates from the Three-Week Look-Ahead schedules for the month when updating the CPM schedule.

108.4.4.5 Weekly Production Data (WisDOT construction PM to provide input)

Provide estimated and actual weekly production rates for items of work on a weekly basis as follows:

1. Provide data on the following items by area or station:
 - 1.1 Retaining Walls
 - a. Leveling Pads - LF
 - b. Set Panels - SF
 - c. Parapets - LF
 - d. Wall Face - Bay
 - e. Tie Backs – Each
 - f. Anchor Slabs – LF
 - g. Drilling - Each
 - h. Coping – LF
 - i. Footing - LF

- 1.2 Bridge Construction
 - a. Footings—Each
 - b. Columns—Each
 - c. Abutments—Each
 - d. Pier Caps—Each
 - e. Girder Spans – Each
 - f. Decked Spans – Each
 - g. Poured Spans – Each
- 1.3 Roadway Excavation—CY per week
- 1.4 Roadway Structural Section
 - a. Grading/Subgrade Preparation—SY
 - b. Base Material Placement—Ton
 - c. Base Material Subgrade Preparation—SY
 - d. Asphalt Pavement—Ton
 - e. Concrete Pavement – SY
- 1.5 Tunnels
 - a. Drilled Shafts – Each
 - b. Beam Seat/Cap - LF
 - c. Girders - Each
 - d. Deck – Percent
- 1.6 Noise Walls
 - a. Drill/Set Ground Mounted Posts - Each
 - b. Install Ground Mounted Panels - Each
 - c. Anchor/Set Structure Mounted Posts - Each
 - d. Install Structure Mounted Panels - Each

- 2. For each item, indicate the actual daily production for the past week and the anticipated weekly production for the next week.
- 3. Submit the data in an electronic spreadsheet format at the same time the Three-Week Look-Ahead is submitted. On a weekly basis, the department and the contractor shall agree on the production data or document any disagreements.

108.4.5 Progress Review Meetings

Weekly Progress Review Meetings: After completing the weekly submittal of the Three-Week Look-Ahead and production data, attend a weekly meeting to review the submittals with the department. At the meeting, address comments as necessary, and document agreement or disagreement with the department.

Monthly Update Review Meetings: After submitting the monthly update and receiving the engineer's comments, attend a job-site meeting, as scheduled by the engineer, to review the progress of the schedule. At that meeting, address comments as necessary, and

document agreement or disagreement with the department. The monthly meeting will be coordinated to take place on the same day and immediately before or after a weekly meeting, whenever possible.

108.4.6 CPM Progress Schedule Revisions

Revision by the contractor if necessary due to changes in the Work or project conditions and authorized by the engineer, a CPM Progress Schedule Revision may be submitted, although the next CPM Update is not yet due. Prepare the CPM Revision in the same format as required for CPM Updates, including justification for changes to the schedule. The process for comment and acceptance of a CPM Revision will be the same as for CPM Updates. If the CPM Revision is accepted, prepare the next monthly update based on the revised CPM. If the CPM Revision is rejected, prepare the next monthly update based on the previous month's update.

Engineer's Right to Request Revisions: The engineer will monitor the progress of the work and may request revisions to the CPM schedule. Revise the schedule as requested by the engineer, and submit a CPM Progress Schedule Revision within ten business days of the request. The process for comment and acceptance of a CPM Revision will be the same as for CPM Updates. The engineer may request that the contractor revise the CPM schedule for one or more of the following reasons:

1. The forecast completion date is scheduled to occur more than 14 calendar days after the contract completion date.
2. An intermediate milestone is scheduled to occur more than 14 calendar days after the date required by the contract.
3. The engineer determines that the progress of the work differs significantly from the current schedule.
4. A contract change order requires the addition, deletion, or revision of activities that causes a change in the contractor's work sequence or the method and manner of performing the work.

108.4.7 Documentation Required for Time Extension Requests

To request a time extension to an intermediate milestone date or the contract completion date associated with changes to the work, provide a narrative detailing the work added or deleted and the other activities affected, based on the latest accepted CPM Update. For added work, submit a proposed fragnet of activities to be added or revised in the CPM schedule, indicating how the fragnet is to be tied to the CPM schedule.

To request a time extension to an intermediate milestone date or the contract completion date associated with delays to the work, provide a narrative detailing the affected activities and the cause of the delay, based on the latest accepted CPM Update. Requests for time extensions due to delays should meet the following criteria:

1. For requests to extend the contract completion date, include a description of how the delay affected the project's critical path, based on the latest accepted CPM Update.
2. For requests to extend an intermediate milestone date, include a description of how the delay affected the controlling (longest) path to the milestone, based on the latest accepted CPM Update.
3. The department and the contractor agree that the float is not for the exclusive use or financial benefit of either party. Either party has the full use of the float on a first come basis until it is depleted.

108.4.8 Payment for CPM Progress Schedule

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0024	Baseline CPM Progress Schedule	Each
SPV.0060.0025	CPM Progress Schedule Updates and Accepted Revisions	Each

The department will only make progress payments for the value of materials, as specified in standard spec 109.6.3.2.1, until the Baseline CPM schedule has been submitted. The department will retain ten percent of each estimate until the department accepts the Baseline CPM schedule.

Payment is full compensation for furnishing all work required under these bid items. The department will pay the contract unit price for the Baseline CPM schedule after the department accepts the schedule. Thereafter, the department will pay the contract unit price for each monthly CPM Update acceptably completed. The department will pay the contract unit price for CPM Revisions, if the department accepts the revision. The department will not pay for proposed revisions that are not accepted.

32. Pay Plan Quantity.

A Bid Items Designated as Pay Plan Quantity

Replace standard spec 109.1.1.2 with the following:

If the schedule of items designates a bid item with a ****P**** in the title, the department will not measure that bid item. The department will use the plan quantity, the approximate quantity shown on the schedule of items, for payment unless a contract revision affects a designated bid item.

If the engineer revises the contract under standard spec 104.2, the department will adjust the quantity of designated items that are affected by the revised work. The engineer will adjust the affected quantity, with a contract modification as defined in standard spec 101.3, regardless of the magnitude of the revised work, which may result in either an

increase or a decrease from the quantity shown on the schedule of items. The department will measure revised work as specified in standard spec 109.1.1.1. If the engineer revises the contract to eliminate a designated item, the engineer will not pay for the designated item, except as specified in standard spec 109.5.

The approximate quantity shown on the schedule of items for a designated item is for information only and only an estimate. The engineer makes no guarantee that the quantity, which can be determined by computations based on contract information, will equal the approximate quantity shown on the schedule of items. The engineer will not make a quantity adjustment for discrepancies.

33. Pavement Breaking Equipment.

Use only hydraulic pavement breaking equipment for breaking pavement within 300 ft. of any building. Do not use guillotine, drop hammer, falling weight, gravity impact breakers or equivalent equipment.

34. 3D Model Data.

The department will provide for Project 1060-33-78 for informational purposes only (see following disclaimer) detailed 3D proposed and existing model data or portions of data which may include: roadways, temporary roadways, topography, grading, temporary grading, drainage, temporary drainage, structures, temporary structures, utilities, abandoned utilities, FTMS, signals, temporary signals, signs, temporary signs, lighting, temporary lighting, pavement markings, landscaping, wetlands, waterways, railways, geotech soil borings, parcels, fencing, and survey monumentation. The department will provide the above data or portions of the 3D model data electronically consisting of electronic 2D/3D files containing features, points, reference lines, breaklines, area extents lines, profiles, LandXML v1.2 files and/or TIN Civil 3D surfaces in Autocad 2012 dwg files with horizontal datum - NAD-83 (GRS-1980) (2007), vertical datum - NAVD-1988 (2007), and coordinate projection - Wisconsin County Coordinate System in U.S. survey ft. The department will provide the model data prior to project LET date within 5 business days of a contractor request submitted as follows: by email to jeff.bohen@dot.wi.gov.

The department is providing, by agreement with contractor and subcontractors, materials stored electronically. The parties recognize that data, plans, specifications, reports, documents, or other information recorded on or transmitted as electronic media (including but not necessarily limited to “CAD, CIM, BIM, GIS or other electronic documents”) are subject to undetectable alteration, either intentional or unintentional, due to, among other causes, transmission, conversion, media degradation, software error, or human alteration. Accordingly, all such documents are provided to the parties for informational purposes only and not as an end product or as a record document. Any reliance thereon is deemed to be unreasonable and unenforceable. The signed and/or stamped hard copy of the engineer’s Instruments of Service plans, specifications and estimates or other contract documents are the only true contract documents of record.

35. City of Milwaukee Communications Conduit.

These plans include communications conduits for the City of Milwaukee. Provide as-built drawings to the City of Milwaukee including locations and depths for the conduit system, noting any field adjustments. Provide as built drawings for both concrete-encased conduit and directional bore conduit.

For any questions on as-builts, contact Ms. Karen Roney at (414) 286-3243.

36. Leadership Partnering Meetings.

The department will implement mandatory leadership partnering meetings on this contract.

Key members of the contractor project team, major subcontractors project team shall meet with department leadership as directed by engineer. Attendance at this meeting shall include project level supervisory personnel, contractor/state level management personnel, and FHWA. Project design engineers, key project personnel of the contractor's principal subcontractors and suppliers, local government representatives, environmental regulators, emergency service personnel, utility companies, impacted business and/or landowners, and other stakeholders may also be invited to attend, as needed.

This meeting will facilitate communication between parties and review issues and issues resolution procedures, help resolve disputes timely, satisfactorily, and as near as possible to the originating level of the dispute.

All mobilization workshop costs are incidental to the contract work.

37. Milwaukee County Transit System.

The Milwaukee County Transit System (MCTS) maintains multiple bus routes throughout the project corridor along the project. Notify MCTS at least ten days prior to beginning work. The MCTS contact is Mr. Dave Ziarek, (414) 343-1764.

Invite MCTS to all coordination meetings between the contractor, the department, local officials and business people to discuss the project schedule of operations including vehicular and pedestrian access during construction operations.

MCTS will remove their existing bus stop signs and shelters. Notify MCTS at least ten days in advance. MCTS will install new bus stop signs and shelters prior to the opening of traffic on the new roadway pavement. Notify MCTS at least ten days prior to opening new pavement to vehicular traffic.

Coordinate with MCTS to determine temporary bus stop locations. Provide a safe boarding zone that is clear of debris and ADA compliant at each temporary bus stop. MCTS will install temporary bus stop signs if notified at least ten days in advance.

38. Honey Creek Culvert MMSD Coordination.

The Milwaukee Metropolitan Sewerage District (MMSD) contact for the Honey Creek Culvert is Larry Anderson, (414) 225-2241 office / (414) 617-1429 cell.

The existing MMSD Honey Creek culvert structure that will be removed under this contract and the concrete lined channel portion of Honey Creek that will be removed near the culvert outlet were both originally constructed by MMSD. Record drawings for the constructed portions of the existing Honey Creek culvert structure and concrete lined channel at the outlet can be obtained from:

Debra Jensen
Planning Services Supervisor
260 W Seeboth St.
Milwaukee, WI 53204
djensen@mmsd.com
(414) 225-2143

The contractor's construction staging and maintenance of flow may require access to an upstream access chamber in the existing MMSD Honey Creek culvert structure. The access chamber is located in State Fair Park just on the north side of the Hank Aaron State Trail (HAST) and provides access to all four steel plate arches via two manholes. To acquire access to the access chamber, the contractor must coordinate construction activities with the MMSD contact. The MMSD contact will coordinate staff to be on site during contractor access to the access chamber. The contractor must notify the MMSD contact a minimum of three days prior to chamber access. The contractor will be required to follow all OSHA requirements for confined space entry when accessing the access chamber.

MMSD will need to be on-site for inspection of the downstream connection to the existing concrete lined channel and the upstream connection to the existing MMSD steel plate arches. The contractor shall provide notification to the MMSD contact a minimum of three days prior to construction activities at the connection locations.

39. Subletting the Contract.

Replace standard spec 108.1.1 (3) with the following:

If proposing to have a party other than a subcontractor perform work, notify the engineer and submit details of this arrangement in writing. The engineer will determine if that arrangement constitutes subcontracting. Submit copies of all other agreements between any parties regarding the performance of work under the contract with the Request to Sublet.

40. Force Account.

Supplement standard spec 109.4.5.1 (3)1 with the following:

Include accumulation of wages to date for each employee performing force account work and identify allowable Federal Unemployment Tax (FUTA) and State Unemployment Tax (SUTA) multipliers.

41. Removing Old Culverts and Bridges.

Supplement standard spec 203.3.1 with the following:

(5) Structure Removal Site Safety Plan

Prepare a Structure Removal Site Safety Plan covering all structure removal work included in the contract. Maintain posted copies of the Structure Removal Site Safety Plan at the site in the project field office. Provide two copies of the Structure Removal Site Safety Plan to the engineer at least four weeks prior to beginning removal work.

(6) Structure Removal Plans

Prepare a structure removal plan for each structure removal included in the contract indicating the methods and sequence of demolition. The contractor is strongly encouraged to examine existing structure plans and visit the site prior to preparing a structure removal plan. The contractor shall be responsible for the methods and sequence of demolition, including effects on the overall stability of each structure being removed. At a minimum, the plan shall include:

1. The name of the professional engineer, registered in the state of Wisconsin who will be on site and monitor the removal of existing structures as required in this specification.
2. The name of the contractor's on-site-employee designated in responsible charge of all removal operations.
3. The removal method and sequence of removal for each individual structure, including the staging of bridge removals.
4. Analysis of the stability of the structure based on the methods and sequence of demolition proposed, to ensure that the structure is demolished in a safe and controlled manner. The analysis computations shall be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.
5. Design and details of temporary supports, shoring or temporary bracing, if required to stabilize portions of partially remaining structures during the removal sequence or support partially remaining structures after staged removals. The removal plan shall include design computations and detail drawings for all temporary supports, shoring and bracing that indicate the exact placement of the temporary supports, shoring or bracing; verification of

design loads; attachment details; and methods for the safe transfer of loads from existing structural elements to be removed to the temporary supports, shoring, or bracing. Temporary support, shoring, or bracing design computations and drawings details are to be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.

6. Design and details of temporary support foundations. Foundation design shall include evaluation of expected foundation settlement and the effect that this will have on the structure being supported. Temporary support foundation design computations and drawing details are to be prepared, signed and sealed by a professional engineer registered in the State of Wisconsin.
7. Equipment type and locations of equipment on the structure(s) or adjacent roadways during the removal operations
8. Locations and type of work to be performed directly adjacent to traffic.
9. Details and locations of protective covers and other measures to ensure that people, property and improvements will not be endangered or damaged as a result of the removal operations. This shall include methods for protecting any pavement surfaces including shoulders, concrete barriers, and other highway features.
10. Methods of removal, proposed haul route(s) and disposal, the proposed haul route, method of hauling, and proposed destination.
11. A schedule of anticipated roadway and lane closures to accommodate removal operations. Include the timing of individual lane or temporary roadway closures and the nature of removal operations that will be performed during the lane or roadway closures.
12. Acknowledgement that the contractor and removal design engineer responsible for preparing the removal plan have visited the site and reviewed the existing structure plans in preparing the removal plan.

(7) Structure Pre-Removal Meetings

After submission of the Structure Removal Site Safety Plan and Structure Removal Plan(s), schedule and conduct structure pre-removal meetings at a time agreed to by the engineer. Hold structure pre-removal meetings at least three working days prior to beginning structure removal activities. If the engineer agrees in advance, multiple structure removals can be combined and discussed at one structure pre-removal meeting. Otherwise schedule and conduct a separate structure pre-removal meeting for each structure to be removed.

Supplement standard spec 203.3.2.1 with the following:

- (4) Perform structure removals in accordance to the submitted Structure Removal Site Safety Plan and Structure Removal Plans.

Supplement standard spec 203.5.1(2) with the following:

Payment includes preparation and submittal of a Structure Removal Site Safety Plan; preparation and submittal of Structure Removal Plans and performing all structure removal work in accordance to the submitted plans.

42. Removing Concrete Barrier.

Supplement standard spec 204.3.2.2 with the following:

Under the Removing Concrete Barrier bid item, remove barrier to the depth and location the plans show. Removal includes full-width and full-height vertical saw cutting. Removal includes sawing per standard spec 690.

Supplement standard spec 204.5.1(2) with the following:

Payment for Removing Concrete Barrier is full compensation for full-width and full-height saw cutting of existing barrier and sludge removal.

43. Removing or Abandoning Miscellaneous Structures.

Delete standard spec 204.5.1(3) in its entirety and replace with the following:

When backfilling with Backfill Granular as specified in this special provision articles or as directed by the engineer, the item Backfill Granular is considered incidental to the appropriate bid item.

At locations where Backfill Granular is not specified, contractor may choose to use either Backfill or Backfill Granular and no separate payments will be made for using Backfill Granular.

44. Excavation For Structures Retaining Walls.

Modify the standard specifications as follows:

206.2 Materials

Add the following to the end as paragraph three and four:

- (3) If the plan details call for Controlled Low Strength Material (CLSM), provide CLSM for backfill consisting of a designed cementitious mixture of natural or processed materials. Allowable materials include natural sand, natural gravel, produced sand, foundry sand, produced gravel, fly ash, Portland cement, and other broken or fragmented mineral materials. The designed mixture shall have a

consistent texture and flow characteristics, be self-leveling and not exhibit shrinkage after hardening. Design the mixture to reach a state of hardening such that it can support foot traffic in no more than 24 hours. Provide a mixture that also meets the following requirements:

Test	Method	Value
Flow	ASTM D-6103	9-inches minimum
Compressive Strength	ASTM D-6024	20 - 40 psi @ 14 days 40 - 80 psi @ 28 days 80 -120 psi @ 90 days

Chemical admixtures to control air content and setting time are allowable. Ten days prior to placement, furnish the engineer with a design mix detailing all components and their proportions in the mix. Also, provide documentation from the supplier of the industrial byproducts that the foundry sand and fly ash used in the mixture meet the requirements for Industrial Byproducts Categories 1, 2, 3, or 4 in NR 538 of the Wisconsin Administrative Code for use as a confined geotechnical fill.

- (4) If the plan details call for flowable backfill, provide backfill material consisting of aggregates that conform to standard spec 501 for Grade A Concrete and do not add any cementitious material; cement or fly ash, to the flowable fill mix. Weigh aggregates at a batch plant suitable for batching concrete masonry. Mix and deliver to the project site using a truck mixer. Add enough water to enable the mixture to flow readily.

206.3.13.1 General

Add the following to the end as paragraph thirteen and fourteen:

- (13) For soldier pile retaining walls, when called for in the plans, backfill around soldier piles above the soldier pile foundations with CLSM as shown on the plans. If the official Weather Bureau forecast for the construction site predicts temperatures at or below freezing within the next 24 hours after placement of controlled low strength backfill, protect the placed materials from freezing during that time period. If the temperature is not forecast to rise above 40° F for 72 hours after placement, the engineer may require protection from freezing for up to 72 hours. No controlled low strength backfill shall be allowed to enter any stream, lake, or sewer system. The contractor shall be responsible for any clean up or remediation costs resulting from such occurrences.
- (14) For soldier pile retaining walls, when called for on the plans, fill all voids behind timber lagging and excavated soil with flowable backfill. Prior to placement of flowable backfill, provide for positive drainage of the area to be backfilled. Discharge from the truck in a manner to prevent segregation. Completely fill excavation in a single operation. Consolidation or compaction effort is not required.

206.5.2 Excavation For Structures

Add the following to the end as paragraphs eight and nine:

- (8) Payment for Structure Excavation Retaining Walls includes providing and placing CLSM as backfill when CLSM as backfill is called for on the plans.
- (9) Payment for Structure Excavation Retaining Walls includes providing and placing flowable backfill when flowable backfill is called for on the plans.

45. QMP Subgrade.

A Description

This special provision describes requirements for subgrade materials within the roadway as defined in standard spec 101.3. Conform to standard spec 207 as modified in this special provision for all work within the roadway and railway foundation at the following locations:

IH 94 widening, all ramps, local roads, parking lots, backfilling of jacking and receiving pits

Provide and maintain a quality control program. A quality control program is defined as all activities, including process control inspection, sampling and testing, documentation, and necessary adjustments in the process that are related to the construction of subgrade which meets all the requirements of this provision.

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

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

B Materials

B.1 Quality Control Plan

Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not perform grading work before the engineer reviews and accepts the plan. Construct the project as the plan provides.

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

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication process that will be used, and action time frames.

3. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.
4. Location of the QC laboratory, retained sample storage, and control charts and other documentation.
5. A summary of the locations and calculated quantities to be tested under this provision.
6. An explanation regarding the basis of acceptance for material that cannot be tested by nuclear methods due to a high percentage of oversized particles.

B.2 Personnel

Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a grading technician certified under HTCP at level I present at the site during all subgrade preparation, fill placement, compaction, and nuclear testing activities. Have a nuclear density technician certified under HTCP at level I perform field density and field moisture content testing.

B.3 Laboratory

Perform quality control testing in a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:

Materials Laboratory

3502 Kinsman Boulevard

Madison, Wisconsin 53704-2583

Telephone: (608) 246-7938

<http://www.dot.state.wi.us/business/engrserv/lab-qualification.htm>

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B.4 Equipment

Furnish the necessary equipment and supplies for performing quality control testing. Ensure that all testing equipment conforms to the equipment specifications applicable to the required testing methods. The engineer may inspect the measuring and testing devices to confirm both calibration and condition. Calibrate all testing equipment according to the CMM and maintain a calibration record at the laboratory.

Furnish nuclear gauges from the department's approved product list at <http://www.atwoodsyste.ms.com/materials>. Ensure that the gauge manufacturer or an approved calibration service calibrates the gauge within 12 months before using it on the project. Retain a copy of the calibration certificate with the gauge. Nuclear density gauge calibration verification is required daily when earthwork construction operations require testing under this special provision article. This calibration verification shall be performed using the Departments "Validator" apparatus which is located at the Zoo Interchange Construction Field Office: 2424 S. 102nd St., West Allis, Wisconsin 53227. The contractor must establish a standard gauge reading for the "Validator" using the ten test average method. The source emitter depth for calibration verification, in the direct transmission mode, will be determined by the engineer. This procedure will establish the "Validator" apparatus, as the contractor's project reference site.

Conform to ASTM D 2950 and CMM 8.15 for density testing and gauge monitoring methods. Perform nuclear gauge measurements using gamma radiation in the backscatter or direct transmission position. Perform each test for 4 minutes of nuclear gauge count time.

B.5 Soil Source Study

Conduct and submit a soil source study before beginning of grading operations. Ensure that this study identifies each distinct soil type on the project within the top 15 feet of cut areas and all borrow material. Provide the in-bank natural moisture content for each soil. Develop moisture-density curves for each identified soil type by utilizing AASHTO T 99 with a minimum of 5 individual points, and a zero air voids curve at a specific gravity of 2.65. If the specific gravity is not considered to be equal to 2.65, use the specific gravity considered appropriate for the material. Specific gravity tests may need to be performed to confirm the value used for generation of the zero air voids curve. Determine the maximum density and corresponding optimum moisture level for each soil type. Develop a site-specific family of Proctor curves for this contract from the completed soil source study and submit to the engineer for review and acceptance.

Perform characterization tests on each of the soil types selected for the soil source study. The tests for roadway (and railway) include AASHTO T 89 (ASTM D4318), AASHTO T 90 (ASTM D4318), AASHTO T 27 (ASTM C136), and AASHTO T 11 (ASTM C117). Classify each soil type selected according to the AASHTO soil classification system based on the characterization tests. Do not begin grading operations until the engineer accepts the soil source study.

Use the soil types identified in the soil source study with corresponding maximum densities and optimum moisture values to determine the compaction compliance on the project. Continue the soil source study in those areas of cuts greater than 15 feet that were not accessible during the initial study. Include data on additional soil types if project conditions change. Ensure that tests of additional soil types are complete and the engineer accepts the results before incorporating the material into the roadway foundation.

Split each Proctor sample and identify so as to provide comparison with the department's test results. Unless the engineer directs otherwise, retain the QC split samples for 14 calendar days and promptly deliver the department's split samples to the department at:

Regional Materials Laboratory
935 S. 60th Street
West Allis, Wisconsin 53214
Telephone: (414) 266-1158

Retain and identify 2 representative samples of each Proctor. Submit one sample to the engineer. Retain one sample on site for use when performing textural identification.

B.6 Quality Control Documentation

B.6.1 Control Charts

Maintain separate control charts for the field density and field moisture content of each grading area. Designate grading areas within the project as follows:

1. Embankment portions of the project, except within 200 feet of bridge abutments.
2. Embankment within 200 feet of bridge abutments.
3. Subgrade cut portions of the project.
4. Embankment in pipe culvert, sewer and waterline trenches.
5. Structure and granular backfill placed at bridge abutments.
6. Embankments of the project where embankments are 20 feet or higher regardless of location to be known as special compaction area.

Ensure that all tests are recorded and become part of the project records. Plot required test results on the control charts. Include random and engineer-requested testing but only include the contractor's randomly selected QC test results in the 4-point running average. The contractor may plot other contractor-performed process control or informational tests on the control charts, but do not include them in 4-point running averages.

Post control charts in an engineer-approved location and update daily. Ensure that the control charts include the project number, the test number, each test element, the applicable control limits, the contractor's individual test results, the running average of the last 4 data points, and the engineer's quality verification test data points. Use the control charts as part of a process control system for identifying potential problems and assignable causes. Format control charts according to the CMM.

Submit control charts to the engineer in a neat and orderly manner within 10 business days after completing subgrade construction.

B.6.2 Records

Document all observations, inspection records, adjustments to fill placement procedures, soil changes, and test results daily. Note the results of the observations and inspection records as they occur in a permanent field record. Density test locations shall be identified by a specific test number and include horizontal and vertical control for reference as noted in Section B.7.1.

Provide copies of the field density and field moisture running average calculation sheets, the one-point Proctor tests, records of procedure adjustments, and soil changes to the engineer daily.

Submit original testing records to the engineer in a neat and orderly manner within 10 business days after completing subgrade construction.

B.7 Contractor Testing

B.7.1 General

Have a grading technician certified under HTCP at level I present during all subgrade preparation, fill placement, compaction, and testing. Have a nuclear density technician certified under HTCP at level I perform the testing for field density and field moisture content. During subgrade construction, use sampling and testing methods identified in the CMM to perform the required tests at randomly selected locations at the indicated minimum frequency for each grading area.

Determine the cubic yards for testing based on a total load count system the engineer and contractor agree to.

For each test, provide the cubic yards represented and the test location to within 2 feet horizontally and 0.5 feet vertically. Use project stationing to determine horizontal location and grade stakes to determine vertical location.

Test areas of suspect compaction or areas which appear to be nonconforming as determined by the engineer.

B.7.2 Field Density and Field Moisture

Perform the field density and field moisture tests using the nuclear density meter method according to AASHTO T 310. Ensure that each field density test material is related to one of the specific soil types identified in the soil source study in determining the percent compaction. Use textural identification as the primary method of establishing this relationship. Utilize the representative samples retained from the soil source study when performing the textural identification. Use a coarse particle correction according to AASHTO T 224.

If field density and field moisture tests cannot be performed by the nuclear density method due to a high percentage of oversized particles as determined according to AASHTO T 99 for highway embankments, observe the placement of the embankment and document the basis of acceptance. Document daily quantities of untested embankment and locations where untested embankment is placed, and keep a cumulative quantity of untested embankment material for the duration of the project. Include the daily documentation and a summary of the cumulative quantity of untested embankment material with the project records.

B.7.3 One-Point Proctor

Obtain a representative sample of the fill material and test according to AASHTO T 272. Compare the sample to the curves developed in the soils source study to determine the maximum dry density and optimum moisture. Use the appendix for AASHTO T 272 as a guide in this determination.

B.7.4 Testing Frequency

B.7.4.1 Subgrade Embankment portions of the project, except within 200 Feet of bridge abutments

Perform the required tests at the following frequencies:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One per 2,000 cubic yards of fill per lift or one test per grading area per day whichever yields the most tests.
One-Point Proctor (AASHTO T 272)	One per 9,000 cubic yards or when a change in fill material occurs.

B.7.4.2 Subgrade Embankment Within 200 Feet of Bridge Abutments

Perform the required tests at the following frequencies:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One per 1,000 cubic yards of fill per lift or one test per grading area per day whichever yields the most tests.
One-Point Proctor (AASHTO T 272)	One per 9,000 cubic yards or when a change in fill material occurs.

B.7.4.3 Subgrade Cut

Perform the required tests at the following frequencies:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One test per 1,000 linear feet of cut or one test per cut area whichever yields the most tests. The testing will be completed at the finished subgrade elevation.

B.7.4.4 Subgrade Embankment in Pipe Culvert, Sewer and Waterline Trenches

Perform the required tests at the following minimum frequencies per trench run between structures. Test trenches individually at the frequency listed below. For example, lateral lines and trunk lines are to be considered individual trenches:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One test per 100 CY of backfill placed per lift or one test per day whichever yields the most tests.
One-Point Proctor (AASHTO T 272)	One per 3,000 cubic yards or when a change in fill material occurs.

B.7.4.5 Structure and Granular Backfill at Bridge Abutments

Perform the required tests at the following minimum frequencies:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One test per 2 feet of vertical backfill height per abutment.
One-Point Proctor (AASHTO T 272)	One per 3,000 cubic yards or when a change in fill material occurs.

B.7.4.6 Embankments of the project where embankments are 20 feet or higher regardless of location to be known as special compaction area

Perform the required tests at the following minimum frequencies but exclude MSE wall backfill:

Test	Minimum Frequency
Field Density and Moisture (AASHTO T 310)	One per 2,000 cubic yards of fill per lift or one test per grading area per day whichever yields the most tests.
One-Point Proctor (AASHTO T 272)	One per 6,000 cubic yards or when a change in fill material occurs.

B.7.5 Compaction Zones

B.7.5.1 Subgrade Embankment portions of the project, except within 200 Feet of bridge abutments

Embankment material placed within 6 feet of the finished subgrade elevation is classified as upper zone material. Material placed more than 6 feet below the finished subgrade elevation is classified as lower zone material.

B.7.5.2 Subgrade Embankment Within 200 Feet of Bridge Abutments

All embankment material placed within 200 feet of bridge abutments is subject to the quality controls for upper zone material.

B.7.5.3 Subgrade Cut

Subgrade material in cut areas is subject to the quality controls for upper zone material.

B.7.5.4 Subgrade Embankment in Culvert Pipe Trenches

Material placed within culvert pipe trenches is subject to the quality controls for the zone that the material is located in.

B.7.5.5 Structure and Granular Backfill at Bridge Abutments

All backfill material placed adjacent to bridge abutments is subject to the quality controls for upper zone material.

B.7.5.6 Embankments of the project where embankments are 20 feet or higher regardless of location to be known as special compaction area

All embankment material placed where embankments are 20 feet or higher regardless of location is subject to the quality controls for upper zone material. Exclude MSE wall backfill.

For this contract, the station ranges where embankments are 20 feet or higher and require higher levels of compaction (special compaction) are as follows:

- Station 24NSA+40 TO Station 27NSA+37
- Station 32BSA+95 TO Station 34NSA+00
- Station 23+50 TO Station 24+00 (C-40-101)
- Station 25+40 TO Station 26+90 (B-40-892)
- Station 28+80 TO Station 25+00 (B-40-892)

Also see plan notes identifying special compaction

B.7.6 Control Limits

B.7.6.1 Field Density

The lower control limit for field density measurements in the upper zone is a minimum of 95.0% of the maximum dry density as determined by AASHTO T 99 or T 272 for the 4-point running average and a minimum of 92.0% of the maximum dry density for any individual test.

The lower control limit for field density measurements in the lower zone is a minimum of 93.0% of the maximum dry density as determined by AASHTO T 99 or T 272 for the 4-point running average and a minimum of 90.0% of the maximum dry density for any individual test. The lower zone lower control limit for field density measurements is a minimum of 93.0% of the maximum dry density as determined by AASHTO T 99 or T 272 for the 4-point running average and a minimum of 92.0% of the maximum dry density for any individual test.

B.7.6.1.1 Field Density

Embankments of the project where embankments are 20 feet or higher regardless of location to be known as special compaction area excluding MSE wall backfill

The lower control limit for field density measurements in the special compaction area is a minimum of 98.0% of the maximum dry density as determined by AASHTO T 99 or T 272 for the 4-point running average and a minimum of 95.0% of the maximum dry density for any individual test.

B.7.6.2 Field Moisture Content

The upper control limit for the field moisture content in the upper and lower zones is 105.0% of the optimum moisture as determined by AASHTO T 99 or T 272 for the 4-point running average.

The lower control limit for the field moisture content in the upper and lower zones is 65.0% of the determined optimum moisture for the 4-point running average. There is no lower control limit for the field moisture of material having less than 5% passing the No. 200 sieve.

B.7.6.2.1 Field Moisture Content

Embankments of the project where embankments are 20 feet or higher regardless of location to be known as special compaction area excluding MSE wall backfill

The upper control limit for the field moisture content in the special compaction area is 105.0% of the optimum moisture as determined by AASHTO T 99 or T 272 for the 4-point running average. The lower control limit for the field moisture content in the special compaction area is 65% of the determined optimum moisture for the 4-point running average.

B.7.7 Corrective Action

Notify the engineer if an individual field density test falls below the individual test control limit. The subgrade in this area is unacceptable. Perform corrective actions, acceptable to the engineer, to improve the density of the subgrade material. After corrective action, perform a randomly located retest within the represented quantity to ensure that the material is acceptable. Each embankment lift shall be tested for compaction compliance before the next lift is placed.

Notify the engineer if the field density or field moisture running average point falls below the running average control limit for field density or outside the control limits for field moisture. The subgrade in this area is unacceptable. Perform corrective actions, acceptable to the engineer, to improve the quality of the material represented by the running average point. Retest each corrected area at a new random location within its represented quantity and determine a new 4-point running average. If the new running average is not acceptable, perform further corrective actions and retest at new random locations.

If the contractor's control data is proven incorrect resulting in a field density or field moisture point falling below the control limit for field density or outside the control limits for field moisture, the subgrade is unacceptable. Employ the methods described above for unacceptable material.

B.8 Department Testing

B.8.1 General

The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all verification and independent assurance personnel for the project.

The department will provide field density and field moisture test results to the contractor on the day of testing. Test results from Proctor split samples will be provided to the contractor within 7 business days after the sample has been received by the department.

B.8.2 Verification Testing

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

The department will test field density and field moisture randomly at locations independent of the contractor's QC work. The department will use split samples for verification of Proctor testing. In all cases, the department will conduct the verification tests in a separate laboratory and with separate equipment from the contractor's QC tests.

The department will perform verification testing as follows:

1. The department will conduct verification tests on Proctor split samples taken by the contractor. These samples may be from the Soil Source Study or the one-point Proctor or sample locations chosen by the engineer from anywhere in the process. The minimum verification testing frequency is one per 90,000 cubic yards, with at least one for each soil type identified in the Soil Source Study.
2. The department will test the first split sample obtained by the contractor for the one-point Proctor. The engineer may select any contractor-retained sample for verification testing.
3. The department will conduct at least one verification test for field density and field moisture per 30,000 cubic yards.

Plot verification tests on the contractor's quality control charts as specified in B.6.1. Do not include verification tests in the 4-point running average.

If verification tests are within specified control limits, no further action is required. If verification tests are not within specified control limits, the engineer and contractor will jointly investigate any testing discrepancies. The investigation may include additional testing as well as review and observation of both the department's and contractor's sampling and testing procedures and equipment. Both parties will document all investigative work.

Correct all deficiencies. If the contractor does not respond to an engineer request to correct a deficiency or resolve a testing discrepancy, the engineer may suspend grading work until action is taken. Resolve disputes as specified in B.9.

B.8.3 Independent Assurance Testing

Independent assurance is unbiased testing the department performs to evaluate the department's verification and the contractor's QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform the

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

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

Plot the independent assurance tests on the contractor's quality control charts as specified in B.6.1. Do not include independent assurance tests in the 4-point running average.

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

B.9 Dispute Resolution

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

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

B.10 Acceptance

The department will accept the material tested under this provision based on the contractor QC tests unless it is shown through verification testing or the dispute resolution process that the contractor's test results are in error.

C (Vacant)

D (Vacant)

E Payment

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

46. QMP Base Aggregate.

A Description

A.1 General

- (1) This special provision describes contractor quality control (QC) sampling and testing for base aggregates, documenting those test results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.
- (2) Conform to standard spec 301, standard spec 305, and standard spec 310 as modified here in this special provision. Apply this special provision to material placed under all of the Base Aggregate Dense and Base Aggregate Open Graded bid items, except do not apply this special provision to material classified as reclaimed asphaltic pavement placed under the Base Aggregate Dense bid items.
- (3) Do not apply this special provision to material placed under the Aggregate Detours, Salvaged Asphaltic Pavement Base, Breaker Run, Select Crushed, Pit Run, Subbase, or Riprap bid items.
- (4) Provide and maintain a quality control program, defined as all activities related to and documentation of the following:
 1. Production and placement control and inspection.
 2. Material sampling and testing.
- (5) Chapter 8 of the department's construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures. The contractor may obtain the CMM from the department's web site at:

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

A.2 Contractor Testing for Small Quantities

- (1) The department defines a small quantity, for each individual Base Aggregate bid item, as a plan quantity of 9000 tons or less of material as shown in the schedule of items under that bid item.
- (2) The requirements under this special provision apply equally to a small quantity for an individual bid item except as follows:

1. The contractor need not submit a full quality control plan but shall provide an organizational chart to the engineer including names, telephone numbers, and current certifications of all persons involved in the quality control program for material under affected bid items.
2. Divide the aggregate into uniformly sized sublots for testing as follows:

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

- ^[1] If using production tests for acceptance, submit test results to the engineer for review prior to incorporating the material into the work. Production test results are valid for a period of 3 years.
- ^[2] For 3-inch material, obtain samples at load-out.
- ^[3] If the actual quantity overruns 9000 tons, create overrun sublots to test at a rate of one additional placement test for each 3000 tons, or fraction of 3000 tons, of overrun.
3. No control charts are required. Submit aggregate load-out and placement test results to the engineer within one business day of obtaining the sample. Assure that all properties are within the limits specified for each test.
 4. Department verification testing is optional for quantities of 6000 tons or less.
- (3) Material represented by a subplot with any property outside the specification limits is nonconforming. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B Materials

B.1 Quality Control Plan

- (1) Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not place base before the engineer reviews and comments on the plan. Construct the project as that plan provides.
- (2) Do not change the quality control plan without the engineer's review. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in each of the contractor's laboratories as changes are adopted. Ensure that the plan provides the following elements:
 1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
 2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.
 3. A list of source and processing locations, section and quarter descriptions, for all aggregate materials requiring QC testing.

4. Test results for wear, sodium sulfate soundness, freeze/thaw soundness, and plasticity index of all aggregates requiring QC testing. Obtain this information from the region materials unit or from the engineer.
5. Descriptions of stockpiling and hauling methods.
6. Locations of the QC laboratory, retained sample storage, and where control charts and other documentation is posted.
7. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.

B.2 Personnel

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

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

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

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

B.3 Laboratory

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

Materials Management Section
3502 Kinsman Blvd.
Madison, WI 53704
Telephone: (608) 246-5388

<http://www.dot.state.wi.us/business/engrserv/lab-qualification.htm>

B.4 Quality Control Documentation

B.4.1 General

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

B.4.2 Records

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

B.4.3 Control Charts

- (1) Plot gradation and fracture on the appropriate control chart as soon as test results are available. Format control charts according to CMM 8.30. Include the project number on base placement control charts. Maintain separate control charts for each base aggregate size, source or classification, and type.
- (2) Provide control charts to the engineer within 6 hours after obtaining a sample. For 3-inch base, extend this 6-hour limit to 24 hours. Post or distribute charts using a method mutually agreeable to the engineer and contractor. Update control charts daily to include the following:
 1. Contractor individual QC tests.
 2. Department QV tests.
 3. Department IA tests.
 4. Four-point running average of the QC tests.
- (3) Except as specified under B.8.2.1 for nonconforming QV tests, include only QC tests in the running average. The contractor may plot process control or informational tests on control charts, but do not include these tests, conforming QV tests, or IA tests in the running average.

B.5 Contractor Testing

- (1) Test gradation, fracture, liquid limit and plasticity index during placement for each base aggregate size, source or classification, and type.
- (2) Test gradation once per 3000 tons of material placed. Determine random sample locations and provide those sample locations to the engineer. Obtain samples after the material has been bladed, mixed, and shaped but before compacting; except collect 3-inch samples from the stockpile at load-out. Do not sample from material used to maintain local traffic or from areas of temporary base that will not have an overlying pavement. On days when placing only material used to maintain local traffic or only temporary base that will not have an overlying pavement, no placement testing is required.
- (3) Split each contractor QC sample and identify it according to CMM 8.30. Retain the split for 7 calendar days in a dry, protected location. If requested for department comparison testing, deliver the split to the engineer within one business day.
- (4) The engineer may require additional sampling and testing to evaluate suspect material or the technician's sampling and testing procedures.

- (5) Test fracture for each gradation test until the fracture running average is above the lower warning limit. Subsequently, the contractor may reduce the frequency to one test per 10 gradation tests if the fracture running average remains above the warning limit.
- (6) Test the liquid limit and plasticity index for the first gradation test. Subsequently, test the liquid limit and plasticity index a minimum of once per 10 gradation tests.

B.6 Test Methods

B.6.1 Gradation

- (1) Test gradation using a washed analysis conforming to the following as modified in CMM 8.60:
 Gradation..... AASHTO T 27
 Material finer than the No. 200 sieve..... AASHTO T 11
- (2) For 3-inch base, if 3 consecutive running average points for the percent passing the No. 200 sieve are 8.5 percent or less, the contractor may use an unwashed analysis. Wash at least one sample out of 10. If a single running average for the percent passing the No. 200 sieve exceeds 8.5 percent, resume washed analyses until 3 consecutive running average points are again 8.5 percent passing or less.
- (3) Maintain a separate control chart for each sieve size specified in standard spec 305 or standard spec 310 for each base aggregate size, source or classification, and type. Set control and warning limits based on the standard specification gradation limits as follows:
 1. Control limits are at the upper and lower specification limits.
 2. There are no upper warning limits for sieves allowing 100 percent passing and no lower control limits for sieves allowing 0 percent passing.
 3. Dense graded warning limits, except for the No. 200 sieve, are 2 percent within the upper and lower control limits. Warning limits for the No. 200 sieve are set 0.5 percent within the upper and lower control limits.
 4. Open graded warning limits for the 1-inch, 3/8-inch, and No. 4 sieves are 2 percent within the upper and lower control limits. Upper warning limits for the No. 10, No. 40, and No. 200 sieves are 1 percent inside the upper control limit.

B.6.2 Fracture

- (1) Test fracture conforming to CMM 8.60. The engineer will waive fractured particle testing on quarried stone.
- (2) Maintain a separate fracture control chart for each base aggregate size, source or classification, and type. Set the lower control limit at the contract specification limit, either specified in another special provision or in table 301-2 of standard spec 301.2.4.5. Set the lower warning limit 2 percent above the lower control limit. There are no upper limits.

B.6.3 Liquid Limit and Plasticity

- (1) Test the liquid limit and plasticity according to AASHTO T 89 and T 90.
- (2) Ensure the material conforms to the limits specified in standard spec table 301-2.

B.7 Corrective Action

B.7.1 General

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

B.7.2 Placement Corrective Action

- (1) Do not blend additional material on the roadbed to correct gradation problems.
- (2) Notify the engineer whenever the running average exceeds a warning limit. When 2 consecutive running averages exceed a warning limit, the engineer and contractor will discuss appropriate corrective action. Perform the engineer's recommended corrective action and increase the testing frequency as follows:
 1. For gradation, increase the QC testing frequency to at least one randomly sampled test per 1000 tons placed.
 2. For fracture, increase the QC testing frequency to at least one test per gradation test.
- (3) If corrective action improves the property in question such that the running average after 4 additional tests is within the warning limits, the contractor may return to the testing frequency specified in B.5.3. If corrective action does not improve the property in question such that the running average after 4 additional individual tests is still in the warning band, repeat the steps outlined above starting with engineer notification.
- (4) If the running average exceeds a control limit, material starting from the first running average exceeding the control limit and ending at the first subsequent running average inside the control limit is nonconforming and subject to pay reduction.
- (5) For individual test results significantly outside the control limits, notify the engineer, stop placing base, and suspend other activities that may affect the area in question. The engineer and contractor will jointly review data, data reduction, and data analysis; evaluate sampling and testing procedures; and perform additional testing as required to determine the extent of potentially unacceptable material. The engineer may direct the contractor to remove and replace that material. Individual test results are significantly outside the control limits if meeting one or more of the following criteria:

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

B.8 Department Testing

B.8.1 General

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

B.8.2 Verification Testing

B.8.2.1 General

- (1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in B.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.
- (2) The department will conduct QV tests of each base aggregate size, source or classification, and type during placement conforming to the following:
 1. One non-random test on the first day of placement.
 2. At least one random test per 30,000 tons, or fraction of 30,000 tons, placed.
- (3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will collect QV samples after the material has been bladed, mixed, and shaped but before compacting; except, for 3-inch aggregates, the department will collect samples from the stockpile at load-out. The department will split each sample, test half for QV, and retain half.
- (4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.
- (5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to the specification, the department will take no further action. If QV test results are nonconforming, add the QV to the QC test results as if it were an additional QC test.

B.8.3 Independent Assurance

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

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

1. Split sample testing.
 2. Proficiency sample testing.
 3. Witnessing sampling and testing.
 4. Test equipment calibration checks.
 5. Reviewing required worksheets and control charts.
 6. Requesting that testing personnel perform additional sampling and testing.
- (2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in B.9.

B.9 Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.
- (2) Production test results, and results from other process control testing, may be considered when resolving a dispute.
- (3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C (Vacant)

D (Vacant)

E Payment

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

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

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47. Maintaining Drainage.

Maintain drainage at and through worksite during construction in accordance to standard spec 107.22, standard spec 204, and standard spec 520.

Use existing storm sewer, culvert pipes or existing drainage channels to maintain existing surface and pipe drainage. Pumps may be required to drain the surface and/or pipe/structure discharges during construction. Costs for furnishing, operating, and maintaining the pumps is considered incidental to storm sewer construction.

Dewatering

If dewatering or pumping is required, treat the water to remove suspended solids before allowing it to enter any waterway or wetland. Filter pumped water through a media such as washed stone or allow settling in a sedimentation basin with sufficient capacity and size to provide an efficient means to filter the water from the dewatering operation before it is discharged back into the waterway or wetland. As part of the Erosion Control Implementation Plan (ECIP) submittal, supply all pertinent information and calculations used to determine the best management practice for dewatering at each location it is required.

Refer to the dewatering guidelines of WisDNR Storm Water Management Technical Standards, Code #1061, "Dewatering". This document can be found at the WisDNR website: <http://dnr.wi.gov/runoff/stormwater/techstds.htm>

48. Concrete Maturity Testing.

A Description

This special provision requires using concrete maturity testing to determine strength for project control of concrete pavement, falsework removal, and structural concrete under the designated subsections of the standard specifications as follows:

Duration of the curing period	415.3.12
Duration of the cold weather protection period	415.3.13
Opening to service	415.3.15
Removing falsework	502.3.4.2
Duration of the required curing period	502.3.8
Duration of the cold weather protection period	502.3.9
Opening to service	502.3.10.1

The requirement for determining strength by the concrete maturity testing method supersedes all provisions for strength determination by other methods or provisions based on equivalent days within those designated subsections. The concrete maturity testing requirement also applies to all other provisions referencing strength determination under these designated subsections.

B Materials

Provide a maturity testing system that uses data-encrypted sensor devices permanently embedded in the field-placed concrete. Data-encrypted sensors have a chip that records both temperature and time information that can be downloaded to a reading device not permanently attached to those sensors.

Provide the department with a maturity reading device for each maturity testing system utilized on the project. Devices provided for the department use will become department property under the contract.

C Construction

Develop a strength/maturity relationship for each concrete mix design used under the contract. Base that relationship on strength results of cylinders from pavement, appurtenant construction, ancillary concrete, or structural masonry units incorporated into the work and using those same mixes. Submit the maturity test results to the engineer for approval before proceeding with the next pour using that mix. Develop a new strength/maturity relationship every time the mix changes, when average daily temperature changes by 30° F (17° C) or more, or if engineer verification cylinder strength varies more than 10 percent from the required opening strength when tested at the calibrated opening maturity.

Conform to the department's procedure for developing the strength/maturity relationship, field calibration of the resulting curve, and for all maturity testing. Use a mix-specific datum temperature per Annex A1 of ASTM C1074. Develop data points for the strength/maturity relationship up to 120 percent of the highest required opening strength for each mix design.

For mainline concrete pavement placements, place two probes at the beginning of the day's placement and two probes at the end of the day's placement. Place at least one sensor for each 100 cubic yards (76 m³) of concrete placed under non-pavement bid items. Place additional probes as the engineer directs at no additional cost to the Department. The resulting concrete maturity test data, after engineer verification, will apply to concrete on the same project conforming to the following:

1. The same mix design as the test location.
2. Cured under conditions similar to or more favorable than that of the test location.
3. Placed on or before the time the test location was placed.

Each work week provide a set of three verification cylinders to the engineer for each strength/maturity field calibration curve currently in use on the project. The engineer will designate the sampling location for the verification cylinders. Provide two cylinders for compressive strength testing and one with a data-encrypted sensor embedded in its center for maturity evaluation. Cast and cure these cylinders on-site as the engineer directs and conforming to the requirements of ASTM 31 for field curing. Deliver them to the engineer promptly after attaining 50 percent of their opening maturity so the engineer can perform verification testing as closely as possible to the opening maturity level.

D (Vacant)

E Payment

No additional payment will be made by the department for maturity testing

49. HMA Joint Repair.

Supplement standard spec 460.5.2.1 with the following:

Maintain joint repair work done under the HMA Pavement Type E-30 item for the duration of the contract. This includes remilling and replacement of additional HMA pavement if required as determined by the engineer.

50. Contact Grouting.

A Description

Contact grouting is to fill any remaining voids outside of the jacked pipe and outside of shaft excavation support system. This section covers the work necessary for contact grouting including furnishing, mixing and placing grout; furnishing all labor, materials, equipment, and incidentals; and all other related work necessary for grouting, complete.

B Materials

Contact grout shall consist of a mixture of water, sand and Portland cement, with mineral fillers or admixtures as necessary to achieve a non-shrink, non-bleed, flowable grout. The grout shall have a minimum 24-hour compressive strength of 75 and a minimum 28-day compressive strength of 250 psi. The wet density of contact grout shall be between 70 pcf to 140 pcf.

Portland cement, water and fly ash shall conform to the requirements of standard spec 501.2. Use Type I Portland cement.

Sand shall conform to the requirements for concrete aggregates specified in standard spec 501.2.5, except that it shall have a fines modulus between 1.5 and 2.0 and be graded as specified in the following table.

Sieve Size	Percent Passing Minimum
No. 8	100
No. 16	95 – 100
No. 30	60 – 85
No. 50	20 – 50
No. 100	10 – 30
No. 200	0 – 5

Fluidifier shall be a compound with characteristics that will hold the solid constituents of the grout in colloidal suspension, be compatible with the cement and water used in the grout mix, and contain a shrinkage compensator. Fluidifier shall not contaminate the groundwater. Fluidifier shall be furnished in moisture resistant paper sacks shipped in sealed containers and shall be handled and stored so as to avoid absorption of moisture, damage or waste. Material which has become caked due to moisture absorption will be rejected.

Suitable stop valves shall be provided at the collar of the grout hole for use in maintaining pressure as required until the grout has set

C Construction

C.1 Submittals

C.1.1 General

Prepare and submit Contact Grout Mix and Contact Grout Work Plan at least 21 calendar days prior to beginning grouting activities. The engineer will accept the submittal as submitted or return the submittal with requested revisions. Do not start any grouting work until the engineer provides acceptance of Contact Grout Mix and Contact Grout Work Plan. Acceptance of the submittals does not relieve the contractor of responsibility for successful completion of the tunnels.

C.1.3 Submittals for Approval

Contact Grout Mix:

- a. Submit mix designs for each contact grout mix proposed for use. Resubmit as appropriate if the mixes are modified during the course of the work. Each mix design shall show the ingredients of the mix and shall include:
 - i. Type, brand, source, and amounts of cement, admixtures, and other additives.
 - ii. Source and amount of water.
 - iii. Representative samples of materials for materials test and mix proportion testing.
 - iv. Combined grading of each mix design.
 - v. Specific gravity of all materials.
 - vi. Results of required tests.
- b. Submit material specifications and instructions for use of any proposed concrete admixtures.

- c. Submit certificates of compliance for each load of Portland cement and fly ash (if used) which is in accordance to ASTM C618 and certificates of compliance for all admixtures. Supporting test data shall be furnished when requested by the engineer. All testing and sampling procedures shall be in accordance to ASTM C311.
- d. Mill test reports for Portland cement.
- e. Submit water quality test results.

Contact Grouting Work Plan: The work plan for placing contact grout shall cover each type of contact grouting required and shall include:

- a. Contact grouting methods, procedures and sequences for each tunnel segment.
- b. Grout hole locations and depth of injection ports.
- c. Plans for grout port opening in advance of injection at a port and release of water disturbed soil or slurry.
- d. Method of transporting grouting equipment, grout and materials into and within the tunnel.
- e. Quantitative prediction of grout volumes required at each location, with consideration of volume of annular space due to difference between diameter excavated and outside diameter of initial support system or jacked pipe, ground loss volumes, soil stand-up time and diametrical closure.
- f. Means for measuring grout takes (volume) per foot or segment of initial support system or pipe.
- g. Means for measuring grout pressures and planned grout pressure limits for refusal criteria.
- h. Timing of grout injection after completion of a drive for pipe jacking.
- i. Contact Grouting Equipment: Manufacturer's specifications and operation instructions for grout conveyance equipment. Pump specifications. Grout hose, valve and port sizes and specifications. Grout pressure gages and pressure gauge calibration data.

C.1.3 Information Submittals

Contact Grouting Daily Records: Submit the following daily reports and records for jacked pipe contact grouting.

- a. Daily logs of grouting operations at all contact grouting locations (station and position) of grout ports, including pressures, volumes, and grout mix pumped, times of injecting, locations where grout samples for test cylinders are taken, and grout slump results.
- b. An analysis of overcut annulus volume at the time of grouting with consideration of soil stand-up time, diametrical closure and effects of injected bentonite slurry volumes. Provide a comparison of anticipated annulus volume with grout volume placed by contact grouting for each pipe.
- c. Compressive strength tests reports from a certified testing laboratory.

C.1.4 Acceptance

The department will evaluate the Submittals for Approval with the requirements of these special provisions. Within 14 calendar days after receipt of the Submittals of Approval,

the engineer will notify the contractor of the acceptance of the submittal, or if additional information and/or changes are required. Any unacceptable part of the Submittals of Approval will require resubmission. The contractor must resubmit the Submittals of Approval for evaluation and review with the necessary changes or additional information provided. The engineer will provide a written notice of acceptance or rejection of contractor's resubmitted Submittal for Approval within 14 calendar days after its receipt.

After the engineer's acceptance of Submittal of Approval, no changes to the Submittal of Approval can be made without written consent of engineer's.

All Information Submittals should be submitted to WisDOT. WisDOT can reject the submittals which do not adequate detail, as required herein. The contractor shall resubmit the rejected submittals within 7 days upon the receipt of WisDOT's rejection notice.

C.2 General Grouting Requirement

Notify the engineer at least 24 hours in advance of the start of grouting operations.

If out of visible contact, continuous telephonic communication shall be maintained between the grout plant and the injection point.

Continuously agitate grout in the mixer and holding tanks. Remove Portland cement grout from the mixer, holding tank and supply line that is not injected into the hole within 2 hours after mixing and waste it.

Maintain grout at temperatures above 50 degrees F until injected. The temperatures of mixing water shall range from 50 degrees F to 100 degrees F when added to the grout mixer. Store grout materials at temperatures above freezing. Grouted ground shall be no colder than 40 degrees F when grout is injected and for a period of 5 days thereafter.

Protect grout holes from becoming clogged or obstructed prior to grouting by means of a cap or other suitable device on the collar of the hole. Clean out in a satisfactory manner or replace any hole that becomes blocked or otherwise unsuitable for its intended purpose at the expense of the contractor.

Flag and protect all grout hole locations. Clearly label grout locations for easy identification.

C.3 Contact Grout Injection

Perform contact grouting to reduce groundwater inflow, to fill voids, to minimize ground movement into the excavation, and to provide firm and uniform contact between the support system and the ground.

Equipment and lines shall be kept clean by constant circulation of grout and periodic flushing with water. Leakage from connections shall not be permitted. Plugs on ends of nearby grout holes or pipes shall be removed to permit escape of air and water and the filling of spaces with grout.

Once started, grouting of a hole shall not be interrupted. Grouting of a hole shall not be considered complete until that hole refuses to take grout as defined under article Refusal. After grouting of a hole or any stage of a hole has reached refusal, the pressure on the hole shall be maintained by means of a stopcock or other suitable device until the grout has set.

Grout progressively from pipe to pipe in the sequence submitted by the contractor or approved by the engineer. If necessary to relieve premature stoppage, periodic applications of water under pressure shall be considered. Grout that cannot be placed prior to initial set shall be discarded. Check operating gauges daily to determine that they are in working order. Do not grout without appropriate gauges in place and in working order.

Inject grout in continuous progression of the grout holes along the length of the tunnel or perimeter of the shaft. Where grout holes extend around the tunnel periphery, connections to higher grout holes shall not be made until the grout has completely filled the void space below as indicated by escape of grout of normal consistency from the higher holes. Exercise particular care to completely fill the voids on each side of any obstruction which interferes with the passage of grout. Vent holes for the release of air and water during grouting of crown or invert cavities shall be provided as necessary.

Where grouting in soil, the grouting pressure at the injection point shall not exceed 0.6 psi per foot of depth of soil overburden, unless otherwise proposed by the contractor, with the engineer's concurrence. In all cases, the grouting pressures shall be limited as necessary to avoid damage to the final lining.

The grouting of any hole shall not be considered complete until all voids have been filled to the maximum extent practicable. After the grouting of any hole is finished, the pressure shall be maintained by means of the stop valve until the grout has set to the extent that it will be retained in the hole.

C.4 Contact Grouting for Shaft

Perform contact grouting outside of initial support system where overcutting results in a 1/2-inch or wider void space between the ground and the excavation support system.

Locate grout holes as necessary to accomplish the work and to thoroughly fill the voids outside of the initial support system. Drill grout holes for contact grouting of initial supports through the initial supports and into the annular space between the initial support and surrounding ground.

Perform contact grouting at least once per day after the excavation support system has been advanced on that day.

Perform contact grouting to reduce groundwater inflow, to fill voids, to minimize ground movement into the excavation, and to provide firm and uniform contact between the support system and the ground. The contractor's ground support design engineer shall determine a refusal criteria and the maximum grout pressure that is consistent with the design of the ground support system. The engineer may periodically request that check holes be drilled to determine if unacceptable voids exist outside of the ground support system. Additional contact grouting shall be completed at no additional cost to the department where checking indicates the presence of unacceptable voids.

C.5 Contact Grouting after Pipe Jacking

The contractor shall commence contact grouting promptly (within 24 hours) following completion of each Tunnel drive. Once started for a tunnel drive, perform continuous contact grouting until contact grouting for the entire drive has been completed.

Grout holes for contact grouting of jacked pipe shall be pre-installed pipe nipples. New grout holes shall not be drilled through pipe walls unless specifically approved by WisDOT.

Inject grout in continuous progression of the grout holes along the length of the tunnel. At any time during the grouting operations, sufficient contact grout holes ahead of the hole to be grouted shall be opened, plugs removed, holes cleaned and valves attached for controlled discharge (venting) of lubrication slurry, disturbed soil and groundwater within the overcut annulus. Keep grout port valves in a fully open position within a maximum safe grout communication distance, as determined by the contractor and accepted by the engineer in the grouting submittal. This distance may vary along the tunnel with variations in adjacent soil and groundwater conditions. Close or regulate discharge at ports opened for venting, as necessary to prevent lost ground from squeezing, a blow-in or excessive groundwater seepage. Continue venting from each opened port until grout of normal consistency (not mixed with slurry, soil or water) is discharged from the vent holes. After an acceptable grout discharge is observed at a port, close the valve until a hook-up is made at the port for injection of grout.

Attempt to hook-up and pump grout at every port unless approval is granted by the engineer to skip selected holes. In general, contact grouting at a port will be considered completed when less than one cubic foot of grout of the accepted mix and consistency can be pumped in 5 minutes under the specified maximum pressure. After the grouting is finished, the valve shall be closed until grout has set. After a valve is closed following injection, the grout header and hoses shall be moved to the next port in progression.

Volume of contact grout injected shall be measured, recorded and compared with the anticipated volume per foot of pipe grouted with compensation for grout wasted in lines and vented through ports.

At the completion of grouting, remove valves after grout has set and replace valves with screw type grout plugs.

C.6 Cleanup

Minimize spilling and prevent the setting of any grout that may escape upon finished pipe or structure surfaces. Remove any spilled grout and restore the pipe or structure surface to its original condition. Properly dispose of all waste materials. Remove all grouting equipment and accessories from the tunnel.

D (Vacant)

E Payment

Contact grout used to fill any remaining voids outside of the jacked pipe or fill any remaining voids outside of shaft excavation support system shall be included under pay item of Tunneling Reinforced Concrete Pipe Class V 120-Inch.

51. Concrete Masonry Structures.

A Description

A.1 General

Work under this item applies to cast in place concrete for structures. Conform to standard spec 501, 502, 504, 701, 710 and 715 and as modified in this special provision. Apply this special provision to all cast in place concrete placed under the following bid items:

502.0100	Concrete Masonry Bridges
502.0200	Concrete Masonry Bridges HES
502.1100	Concrete Masonry Seal
504.0100	Concrete Masonry Culverts
504.0200	Concrete Masonry Culverts HES
504.0500	Concrete Masonry Retaining Walls
504.0600	Concrete Masonry Retaining Walls HES
504.0900	Concrete Masonry Endwalls
SPV.0035.4010	Concrete Masonry Soldier Pile Footings

A.2 Concrete Masonry Bridges

Work under the item Concrete Masonry Bridges applies to cast in place concrete for bridge substructures, which includes abutments and piers. Cast in place concrete for bridge superstructures, which includes bridge decks, raised medians, sidewalks, and parapets, is covered under the special provision item HPC Masonry Superstructures.

B (Vacant)

C Construction

Replace standard spec 501.3.8.2 with the following:

The contractor is responsible for the quality of the concrete placed in hot weather. Submit a written temperature control plan at or before the pre-pour meeting. In that plan, outline the actions taken to control concrete temperature if the concrete temperature at the point of placement exceeds 80° F (27° C). Do not place concrete without the engineer's written

acceptance of that temperature control plan. Perform the work as outlined in the temperature control plan.

If the concrete temperature at the point of placement exceeds 90° F (32° C), do not place concrete under the following bid items:

- Concrete Masonry Bridges
- Concrete Masonry Bridges HES
- Concrete Masonry Retaining Walls
- Concrete Masonry Retaining Walls HES
- Concrete Masonry Culverts
- Concrete Masonry Culverts HES
- Concrete Masonry Endwalls
- Concrete Masonry Soldier Pile Footings

Notify the engineer whenever conditions exist that might cause the temperature at the point of placement to exceed 80° F (27° C). If project information is not available, obtain information from similar mixes placed for other nearby work.

Any additive or action taken to control the temperature of the Concrete Masonry to within the limits of this special provision, including but not limited to the addition of ice to the concrete mix, is considered incidental to the work and will not be measured or paid for separately.

Add the following standard spec 501.3.11:

501.3.11 Slip Forming

Do not place concrete by the slip-form method for any item covered by this special provision.

D (Vacant)

E (Vacant)

52. Contact Grouting.

A Description

Contact grouting is to fill any remaining voids outside of the jacked pipe and outside of shaft excavation support system. This section covers the work necessary for contact grouting including furnishing, mixing and placing grout; furnishing all labor, materials, equipment, and incidentals; and all other related work necessary for grouting, complete.

B Materials

Contact grout shall consist of a mixture of water, sand and Portland cement, with mineral fillers or admixtures as necessary to achieve a non-shrink, non-bleed, flowable grout. The grout shall have a minimum 24-hour compressive strength of 75 and a minimum 28-day compressive strength of 250 psi.

Portland cement, water and fly ash shall conform to the requirements of Section 501.2. Use Type I Portland cement.

Sand shall conform to the requirements for concrete aggregates specified in Section 501.2.5, except that it shall have a fines modulus between 1.5 and 2.0 and be graded as specified in the following table.

Sieve Size	Percent Passing Minimum
No. 8	100
No. 16	95 – 100
No. 30	60 – 85
No. 50	20 – 50
No. 100	10 – 30
No. 200	0 – 5

Fluidifier shall be a compound with characteristics that will hold the solid constituents of the grout in colloidal suspension, be compatible with the cement and water used in the grout mix, and contain a shrinkage compensator. Fluidifier shall not contaminate the groundwater. Fluidifier shall be furnished in moisture resistant paper sacks shipped in sealed containers and shall be handled and stored so as to avoid absorption of moisture, damage or waste. Material which has become caked due to moisture absorption will be rejected.

Suitable stop valves shall be provided at the collar of the grout hole for use in maintaining pressure as required until the grout has set

C Construction

C.1 Submittals

C.1.1 General

Prepare and submit Contact Grout Mix and Contact Grout Work Plan at least 21 calendar days prior to beginning grouting activities. The engineer will accept the submittal as submitted or return the submittal with requested revisions. Do not start any grouting work until the engineer provides acceptance of Contact Grout Mix and Contact Grout Work Plan. Acceptance of the submittals does not relieve the contractor of responsibility for successful completion of the tunnels.

C.1.3 Submittals for Approval

Contact Grout Mix:

- a. Submit mix designs for each contact grout mix proposed for use. Resubmit as appropriate if the mixes are modified during the course of the work. Each mix design shall show the ingredients of the mix and shall include:
 - i. Type, brand, source, and amounts of cement, admixtures, and other additives.
 - ii. Source and amount of water.

- iii. Representative samples of materials for materials test and mix proportion testing.
 - iv. Combined grading of each mix design.
 - v. Specific gravity of all materials.
 - vi. Results of required tests.
- b. Submit material specifications and instructions for use of any proposed concrete admixtures.
- c. Submit certificates of compliance for each load of Portland cement and fly ash (if used) which is in accordance to ASTM C618 and certificates of compliance for all admixtures. Supporting test data shall be furnished when requested by the engineer. All testing and sampling procedures shall be in accordance to ASTM C311.
- d. Mill test reports for Portland cement.
- e. Submit water quality test results.

Contact Grouting Work Plan: The work plan for placing contact grout shall cover each type of contact grouting required and shall include:

- a. Contact grouting methods, procedures and sequences for each tunnel segment.
- b. Grout hole locations and depth of injection ports.
- c. Plans for grout port opening in advance of injection at a port and release of water disturbed soil or slurry.
- d. Method of transporting grouting equipment, grout and materials into and within the tunnel.
- e. Quantitative prediction of grout volumes required at each location, with consideration of volume of annular space due to difference between diameter excavated and outside diameter of initial support system or jacked pipe, ground loss volumes, soil stand-up time and diametrical closure.
- f. Means for measuring grout takes (volume) per foot or segment of initial support system or pipe.
- g. Means for measuring grout pressures and planned grout pressure limits for refusal criteria.
- h. Timing of grout injection after completion of a drive for pipe jacking.
- i. Contact Grouting Equipment: Manufacturer's specifications and operation instructions for grout conveyance equipment. Pump specifications. Grout hose, valve and port sizes and specifications. Grout pressure gages and pressure gauge calibration data.

C.1.3 Information Submittals

Contact Grouting Daily Records: Submit the following daily reports and records for jacked pipe contact grouting.

- a. Daily logs of grouting operations at all contact grouting locations (station and position) of grout ports, including pressures, volumes, and grout mix pumped, times of injecting, locations where grout samples for test cylinders are taken, and grout slump results.

- b. An analysis of overcut annulus volume at the time of grouting with consideration of soil stand-up time, diametrical closure and effects of injected bentonite slurry volumes. Provide a comparison of anticipated annulus volume with grout volume placed by contact grouting for each pipe.
- c. Compressive strength tests reports from a certified testing laboratory.

C.1.4 Acceptance

The department will evaluate the Submittals for Approval with the requirements of these special provisions. Within 14 calendar days after receipt of the Submittals of Approval, the engineer will notify the contractor of the acceptance of the submittal, or if additional information and/or changes are required. Any unacceptable part of the Submittals of Approval will require resubmission. The contractor must resubmit the Submittals of Approval for evaluation and review with the necessary changes or additional information provided. The engineer will provide a written notice of acceptance or rejection of contractor's resubmitted Submittal for Approval within 14 calendar days after its receipt.

After the engineer's acceptance of Submittal of Approval, no changes to the Submittal of Approval can be made without written consent of engineer's.

All Information Submittals should be submitted to WisDOT. WisDOT can reject the submittals which do not adequate detail, as required herein. The contractor shall resubmit the rejected submittals within 7 days upon the receipt of WisDOT's rejection notice.

C.2 General Grouting Requirement

Notify the engineer at least 24 hours in advance of the start of grouting operations.

If out of visible contact, continuous telephonic communication shall be maintained between the grout plant and the injection point.

Continuously agitate grout in the mixer and holding tanks. Remove Portland cement grout from the mixer, holding tank and supply line that is not injected into the hole within 2 hours after mixing and waste it.

Maintain grout at temperatures above 50 degrees F until injected. The temperatures of mixing water shall range from 50 degrees F to 100 degrees F when added to the grout mixer. Store grout materials at temperatures above freezing. Grouted ground shall be no colder than 40 degrees F when grout is injected and for a period of 5 days thereafter.

Protect grout holes from becoming clogged or obstructed prior to grouting by means of a cap or other suitable device on the collar of the hole. Clean out in a satisfactory manner or replace any hole that becomes blocked or otherwise unsuitable for its intended purpose at the expense of the contractor.

Flag and protect all grout hole locations. Clearly label grout locations for easy identification.

C.3 Contact Grout Injection

Perform contact grouting to reduce groundwater inflow, to fill voids, to minimize ground movement into the excavation, and to provide firm and uniform contact between the support system and the ground.

Equipment and lines shall be kept clean by constant circulation of grout and periodic flushing with water. Leakage from connections shall not be permitted. Plugs on ends of nearby grout holes or pipes shall be removed to permit escape of air and water and the filling of spaces with grout.

Once started, grouting of a hole shall not be interrupted. Grouting of a hole shall not be considered complete until that hole refuses to take grout as defined under article Refusal. After grouting of a hole or any stage of a hole has reached refusal, the pressure on the hole shall be maintained by means of a stopcock or other suitable device until the grout has set.

Grout progressively from pipe to pipe in the sequence submitted by the contractor or approved by the engineer. If necessary to relieve premature stoppage, periodic applications of water under pressure shall be considered. Grout that cannot be placed prior to initial set shall be discarded. Check operating gauges daily to determine that they are in working order. Do not grout without appropriate gauges in place and in working order.

Inject grout in continuous progression of the grout holes along the length of the tunnel or perimeter of the shaft. Where grout holes extend around the tunnel periphery, connections to higher grout holes shall not be made until the grout has completely filled the void space below as indicated by escape of grout of normal consistency from the higher holes. Exercise particular care to completely fill the voids on each side of any obstruction which interferes with the passage of grout. Vent holes for the release of air and water during grouting of crown or invert cavities shall be provided as necessary.

Where grouting in soil, the grouting pressure at the injection point shall not exceed 0.6 psi per foot of depth of soil overburden, unless otherwise proposed by the contractor, with the engineer's concurrence. In all cases, the grouting pressures shall be limited as necessary to avoid damage to the final lining.

The grouting of any hole shall not be considered complete until all voids have been filled to the maximum extent practicable. After the grouting of any hole is finished, the pressure shall be maintained by means of the stop valve until the grout has set to the extent that it will be retained in the hole.

C.4 Contact Grouting for Shaft

Perform contact grouting outside of initial support system where overcutting results in a 1/2-inch or wider void space between the ground and the excavation support system.

Locate grout holes as necessary to accomplish the work and to thoroughly fill the voids outside of the initial support system. Drill grout holes for contact grouting of initial supports through the initial supports and into the annular space between the initial support and surrounding ground.

Perform contact grouting at least once per day after the excavation support system has been advanced on that day.

Perform contact grouting to reduce groundwater inflow, to fill voids, to minimize ground movement into the excavation, and to provide firm and uniform contact between the support system and the ground. The contractor's ground support design engineer shall determine a refusal criteria and the maximum grout pressure that is consistent with the design of the ground support system. The engineer may periodically request that check holes be drilled to determine if unacceptable voids exist outside of the ground support system. Additional contact grouting shall be completed at no additional cost to the department where checking indicates the presence of unacceptable voids.

C.5 Contact Grouting after Pipe Jacking

The contractor shall commence contact grouting promptly (within 24 hours) following completion of each Tunnel drive. Once started for a tunnel drive, perform continuous contact grouting until contact grouting for the entire drive has been completed.

Grout holes for contact grouting of jacked pipe shall be pre-installed pipe nipples. New grout holes shall not be drilled through pipe walls unless specifically approved by WisDOT.

Inject grout in continuous progression of the grout holes along the length of the tunnel. At any time during the grouting operations, sufficient contact grout holes ahead of the hole to be grouted shall be opened, plugs removed, holes cleaned and valves attached for controlled discharge (venting) of lubrication slurry, disturbed soil and groundwater within the overcut annulus. Keep grout port valves in a fully open position within a maximum safe grout communication distance, as determined by the contractor and accepted by the engineer in the grouting submittal. This distance may vary along the tunnel with variations in adjacent soil and groundwater conditions. Close or regulate discharge at ports opened for venting, as necessary to prevent lost ground from squeezing, a blow-in or excessive groundwater seepage. Continue venting from each opened port until grout of normal consistency (not mixed with slurry, soil or water) is discharged from the vent holes. After an acceptable grout discharge is observed at a port, close the valve until a hook-up is made at the port for injection of grout.

Attempt to hook-up and pump grout at every port unless approval is granted by the engineer to skip selected holes. In general, contact grouting at a port will be considered completed when less than one cubic foot of grout of the accepted mix and consistency can be pumped in 5 minutes under the specified maximum pressure. After the grouting is finished, the valve shall be closed until grout has set. After a valve is closed following injection, the grout header and hoses shall be moved to the next port in progression.

Volume of contact grout injected shall be measured, recorded and compared with the anticipated volume per foot of pipe grouted with compensation for grout wasted in lines and vented through ports.

At the completion of grouting, remove valves after grout has set and replace valves with screw type grout plugs.

C.6 Cleanup

Minimize spilling and prevent the setting of any grout that may escape upon finished pipe or structure surfaces. Remove any spilled grout and restore the pipe or structure surface to its original condition. Properly dispose of all waste materials. Remove all grouting equipment and accessories from the tunnel.

D (Vacant)

E Payment

Contact grout used to fill any remaining voids outside of the jacked pipe or fill any remaining voids outside of shaft excavation support system shall be included under pay item of Tunneling Reinforced Concrete Pipe Class V 120-Inch.

53. Railing Pipe B-40-892.

A Description

This special provision describes furnishing and installing steel pipe handrails in accordance to standard spec 513, as shown in the plans, and as hereinafter provided.

B Materials

B.1 Paint for Railing Pipe

Use one of the qualified paint sources and products given below with tie primer coat specifically intended for painting of galvanized surfaces. 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	NA
Carboline 350 Hanley Industrial St. Louis, MO 63144 (314) 644-1000	Tie	Rustbond Penetrating Sealer FC	1	36
	Top	Carboline 133 LH	4	NA
Wasser Corporation 4118 B Place NW Suite B Auburn, WA 98001	Tie	MC-Ferrox B 100	3.0 to 5.0	8
	Top	MC-Luster 100	2.0 to 4.0	NA

B.2 Color

The finished color for coating system for railing pipe shall match Federal Color 37038 – Black

C Construction

Delete standard spec 513.3.1(6) and replace with the following:

After fabrication, blast clean railing pipe assemblies per SSPC-SP 6 and galvanize according to ASTM A 123. 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 all evident steel defects exposed in accordance to AASHTO M 160 prior to blast cleaning.

After galvanizing, paint all exterior surface of railing pipe as hereinafter provided. All exterior galvanizing 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) for adhesion. Blasting should not fracture the galvanized finish or remove any dry film thickness.

After cleaning provide a tie primer 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. Exercise care so as not to damage the painted surface during railing installation.

D (Vacant)

E Payment

Delete standard spec 513.5(2) and replace with the following:

Payment for Railing Pipe is full compensation for providing, fabricating transporting, and erecting the rail; for preparation, galvanizing, cleaning and painting; for providing and placing metal shims under the bases if required; for providing and placing the anchor bolts; and furnishing all labor, tools, equipment and incidentals necessary to complete the contract work.

54. Driven Piles Using Pile Dynamic Analyzer.

Where indicated in the structure plans, replace standard spec. 550.3.6 with the following:

550.3.6 Driving Resistance

- (1) Drive piles to the depths necessary to obtain the required driving resistance per the driving resistance determination method called for in the plans.
- (2) Driving resistance will be developed by the engineer from Pile Dynamic Analyzer (PDA) testing performed on the designated piles at each substructure unit as shown on the plans. The driving criteria will be given as blows per foot with hammer stroke and minimum penetration of the pile or as directed by the engineer.

The PDA test piles at each substructure unit are designated on the plans and will be monitored using a PDA. Pile installation for these test piles will be controlled by the PDA testing and the engineer per the Pile Dynamic Analyzer (PDA) Testing and Restrike Special Provision within this contract.

For the PDA driving resistance determination method, pile restrikes will be required per the PDA Testing and Restrike Special Provision, or as directed by the engineer. Accommodate a time delay in the pile driving sequence as defined in the PDA Testing Special Provision to allow the engineer time to develop the production pile driving criteria.

- (3) If the required driving resistance is not met at the minimum tip elevation, driving shall continue until it is achieved. If the required driving resistance is achieved above the minimum tip elevation, driving shall continue until both the minimum tip elevation and required driving resistance criteria are met. If practical pile refusal is encountered prior to the minimum tip elevation, the engineer will determine if driving can be halted.

Where indicated in the structure plans, delete standard spec. 550.3.7.

55. Storm Sewer.

General

Supplement standard spec 607.3.1.1 General with the following:

- (9) Review the Plans, Specifications, and existing site conditions prior to bidding to ascertain the extent of the work requiring shoring.
- (10) Exercise additional caution when constructing sewers in close proximity to utilities, structures, and live traffic lanes.
- (11) Proposed utilities are not shown on the plans. Review “Utilities” article for abandoned, relocated, adjusted, and/or new utility facilities prior to bidding.
- (12) To facilitate drainage, maintain concrete barrier temporary precast drainage/lifting slot holes free from debris.
- (13) Provide a shoring design and installation sequence for each location when shoring is used. Have a professional engineer, registered in the State of Wisconsin and knowledgeable of the specific site conditions and requirements, verify the adequacy of the design. Submit one copy of each shoring design, signed and sealed by the same professional engineer verifying the design, to the engineer for incorporation into the permanent project record.

Supplement standard spec 608.3 with the following:

- (2) Provide rubber gasket joints for all storm sewer pipes.
- (3) Place rubber gasket over the spigot end or tongue of the entering pipe. Clean the gasket and the ends of the pipe from sand and gravel. Immediately before making the joint, lubricate the outside of the gasket and the inside of the bell or groove of the last pipe with an approved vegetable lubricant. Place the spigot or tongue of the pipe being laid with the gasket in place into the bell or groove end of the previously laid pipe. Set pipe carefully to line and grade, and push or jack home. The engineer can order the use of a jack or “come-along” if deemed necessary to ensure that the joints are completely tight.

Replace standard spec 607.3.5(1) Backfilling with the following:

- (1) Backfill all trenches and excavations of all new storm sewer and storm sewer structures not occupied by Backfill Controlled Low Strength immediately after completing the sewer work with backfill material conforming to standard spec 209. Backfill locations where existing storm sewers and or existing storm sewer structures have been called for removal or abandoning, not occupied by the new roadway structure or occupied by Backfill Controlled Low Strength, immediately after completing the sewer work with backfill material conforming to standard spec 209.

Supplement standard spec 607.3.5 Backfilling with the following:

- (8) Material placed within storm sewer trenches is subject to the quality control for the zone that the material is located in and shall conform to QMP Subgrade article listed elsewhere in this special provision document.

Replace standard spec 608.5(2) with the following:

- (2) Payment for the Storm Sewer Pipe bid items is full compensation for providing all materials, including all special Y's, mitered sections, elbows and connections required; for excavating and wasting excess material, except rock excavation; for providing rubber gasket joints; for supporting utilities in storm sewer trench; for shoring design, providing a signed and sealed copy of the design; for installation, monitoring, and removal of shoring; for forming foundation; for laying pipe; for sealing joints and making connections to new or existing features; for providing granular backfill material, including bedding material; for backfilling; for QMP; for maintaining concrete barrier temporary precast drainage/lifting slot holes to keep free from debris; for cleaning out; and absent the pertinent contract bid items, for restoring the work site.

56. Storm Sewer Backfill.

Backfill all trenches and excavations of all new storm sewer and storm sewer structures not occupied by Backfill Controlled Low Strength immediately after completing the sewer work with backfill material conforming to standard spec 209. Backfill locations where existing storm sewers and or existing storm sewer structures have been called for removal or abandoning, not occupied by the new roadway structure or occupied by Backfill Controlled Low Strength, immediately after completing the sewer work with backfill material conforming to standard spec 209. Backfill granular is considered incidental to the respective pipe or storm sewer structure bid item, and no separate payment will be made.

Material placed within storm sewer trenches is subject to the quality control for the zone that the material is located in and shall conform to QMP Subgrade article listed elsewhere in this special provision document. QMP is considered incidental to respective pipe or storm sewer structure item and no additional payment will be made.

Replace standard spec 607.5.1(1) with the following:

Payment for the Storm Sewer Pipe bid items is full compensation for providing all materials, including all special Y's, mitered sections, elbows and connections required; for excavating and wasting excess material, except rock excavation; ground support system design, providing a signed and sealed copy of the design; for providing and removing sheeting and shoring; for forming foundation; for laying pipe; for sealing joints and making connections to new or existing features; for providing granular backfill material, including bedding material; for backfilling; for QMP; for cleaning out; and absent the pertinent contract bid items, for restoring the work site.

57. Catch Basins, Manholes, and Inlets.

Supplement standard spec 611.3.3 with the following:

- (5) Use monolithic concrete shimming as shown on plans for final adjustment of drainage structures located within concrete pavement, concrete curb and gutter and concrete barrier wall.

Supplement standard spec 611.3.6.1 General with the following:

- (3) Use a Grade "A" concrete collar for final adjustment of manhole cover.
- (4) Conform to storm sewer concrete collar detail for storm sewer pipes to structure connections as shown on the plan.
- (5) Provide a butyl rubber gasket or butyl rubber rope for joints of precast reinforced concrete manhole sections. Butyl Rubber gasket joint used for manholes conforms to 8.41.6 of the Standard Specification for Sewer and Water Construction in Wisconsin, latest Edition.

Supplement standard spec 611.3.7 with the following:

- (4) Adjustments of 4-inches or more in height shall be constructed using concrete grade rings. Grade rings less than 2-inches in thickness are not allowed.

Replace standard spec 611.5.2 (1) with the following:

- (1) Payment for Catch Basins, Manholes, and Inlets bid items is full compensation for providing all materials, including all masonry, for Grade "A" concrete adjustments and monolithic concrete shimming; conduit and sewer connections, steps, and other fittings; for providing and installing butyl rubber joints; for all excavating, backfilling, disposing of surplus material, and for cleaning out and restoring the work site; except that the department will pay for covers, including frames, grates and lids separately.

58. Sign Supports Concrete Masonry.

Add the following to standard spec 636.3.2:

- (3) Drill or excavate and maintain a stable open excavation for subsequent installation of drilled footings for sign structure foundations as shown in the plans. The subsurface conditions vary across the project site and are not necessarily the same at each sign structure foundation in the project. Anticipate the possibility of encountering randomly interlaced seams of loose, permeable sand or gravel of substantial thickness situated within glacial clays and till deposits; saturated soils; ground water; isolated cobbles or boulders; and nested cobbles and boulders at any sign structure foundation when selecting equipment and methods for drilling or otherwise excavating. Partial or

full depth temporary casing may be required to maintain the stability of the excavation prior to placement of reinforcement and filling the excavation with concrete.

It is strongly advised to obtain and review the Geotechnical Exploration and Foundation Evaluation Reports for the sign structures and as well as nearby structures to the sign structure foundation being constructed. See article “Geotechnical Investigation Information” in these special provisions for information on obtaining geotechnical reports.

Add the following paragraph to standard spec 636.3.3:

- (8) For drilled foundations, no more than 3 inches of standing water is permitted in the bottom of the drilled excavation immediately prior to placing concrete masonry in the excavation.

Replace standard spec 636.5.2(1) with the following:

Payment for Sign Supports Concrete Masonry is full compensation for providing, transporting, placing and curing the concrete; for providing and removing casing if applicable; for providing required ground rods; for furnishing all required excavating; for placing post stubs or anchor bolts, and for providing and placing electrical conduit if required; for pumping of ground water seepage if applicable; for cleaning-up, repairing damage, and for disposing of excavation and surplus materials.

59. Signs Type I and II.

Furnish and install mounting brackets per approved product list for type II signs on overhead sign supports incidental to sign. For type II signs on sign bridges use aluminum vertical support beams noted above incidental to sign.

Modify standard spec 637.2.4 with the following:

Use stainless steel bolts, washers and nuts for type I and type II signs mounted on sign bridges or type I signs mounted on overhead sign supports. Use clips on every joint for Sign Plate A 4-6 when mounted on a sign bridge or overhead sign support. Inspect installation of clips and assure bolts and nuts are tightened to manufacturers recommended torque values.

Use aluminum vertical sign support beams that have a 5-inch wide flange and weigh 3.7 pounds per foot, if the L-brackets are 4 inches wide then use 4 inch wide flange beams weighing 3.06 pounds per foot. Contractor shall measure the width of the L-brackets on existing structures of determine the width needed for sign support beams

Use beams a minimum of six feet in length or equal to the height of the sign to be supported, whichever is greater. Use U-bolts that are made of stainless steel, one-half inch diameter and of the proper size to fit the truss cords of each sign bridge. Install vertical sign support beams on each sign and use new U-bolts to attach each beam to the top and bottom cord of the sign bridge truss.

For type II signs on overhead sign supports follow the approved product list for mounting brackets.

Replace standard spec 637.2.4.1(2)2 with the following:

Clips may be either stainless steel or ASTM B 108, aluminum alloy, 356.0-T6.

Append standard spec 637.3.2.1(3) with the following:

Provide the engineer with 3 copies of drawings of the signs proposed to be furnished under this contract for approval.

Append standard spec 637.3.3.2(2) with the following:

Install Type I Signs at the offset stated in the plan, which shall be the clear distance between the edge of mainline pavement right edgeline and the near edge of the sign.

Append standard spec 637.3.3.3(3) with the following:

Furnish and install new aluminum vertical sign support beams on each sign and new U-bolts to attach each beam to the top and bottom cord of the sign bridge truss for Type I or Type II Signs and Type I signs on overhead sign supports incidental to sign.

60. Field Facilities.

Replace standard spec 642 with the following:

The department has procured its own Field Facilities located at 2424 S. 102nd Street; West Allis, WI 53227.

61. Traffic Control Surveillance and Maintenance.

Replace standard spec 643.3.2(2) with the following:

Provide one person, certified by the American Traffic Safety Services Association (ATSSA) or equivalent, as a Traffic Control Specialist responsible for inspections and maintaining traffic control signs or devices; other personnel as may be needed to accomplish the inspection and maintenance; and all necessary vehicles, equipment, tools and repair materials. Supply the credentials of the Traffic Control Specialist to the engineer for approval by the department.

62. Freeway Lighting Systems.

General

Append standard spec 651, 652, 653, 654, 655, 656, 657 and 659 as follows.

Wet Location Splices

Modify standard spec 655.3.1 as follows:

Wet location splices are not anticipated on this project and not shown in the plans. In the event that the engineer allows wet location splices, make pull box splices with engineer approved epoxy kit.

Branch Circuit Tagouts

Any circuit that the contractor does not personally tag out at the disconnect shall be considered live, and will be subject to being activated by another person with no notice to the contractor. Make tagouts with manufactured tags, and endorse them with the date and the name of the contractor. Clear tagouts at the end of the workday.

Shop Locations

Materials indicated to be returned to the department shall be hauled to one of the following two locations:

- State Electrical Shop at 935 South 60th street, West Allis, as directed by Mr. Mike Prebish, (414) 266-1170.
- Milwaukee County Grounds, 10191 West Watertown Plank Road, Wauwatosa, as directed by Mr. Pat Stoetzel, (414) 750-5306.

Arrange pickups and deliveries 3 days in advance and during regular business hours (Monday – Thursday 7:00 AM to 3:45 PM).

Corrosion Protection

Corrosion protection measures described in standard spec 657.3.1 and 657.3.5 are invoked for breakaway transformer bases and aluminum light poles.

Wire Networks

Where two or more wire networks pass through a pull point, tag each circuit network (i.e. A/B/N and C/D/N) with approved all-weather tags.

At each pull point or access point, indicate the line side bundle with a lap of blue tape.

Lighting Pull Box Covers

This provision modifies the standard detail drawing for pull boxes and thereby both the standard items and SPV pay item for pull boxes. Lighting pull box covers shall read “LIGHTING”.

63. Traffic Signals, General.

All work shall be in accordance to the plans and the State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, 2013 Edition, and these special provisions.

City of Milwaukee/State Owned Traffic Signals

Project 1060-33-78

The existing traffic signal at the intersections of IH 94 eastbound ramps and STH 181 (S. 84th Street) and IH 94 westbound ramps and STH 181 (S. 84th Street) is owned and operated by the City of Milwaukee. The proposed traffic signal will be owned and operated by the department. The City of Milwaukee will maintain the existing traffic signal until the contractor furnished and installed temporary traffic signals are activated. Assume all traffic signal responsibilities after the temporary traffic signal is operational. The state will assume ownership of the permanent traffic signal upon acceptance of the work.

Work under this item shall consist of furnishing and installing all materials, except for the traffic signal cabinet, video detection system, and emergency vehicle preemption system for the department owned traffic signals at the intersections of IH 94 eastbound ramps and STH 181 (S. 84th Street) and IH 94 westbound ramps and STH 181 (S. 84th Street) in the City of Milwaukee, WI. Install the traffic signal cabinet, video detection system, and emergency vehicle preemption system furnished by the department.

64. General Requirements for Electrical Work.

Append standard spec 651.3.3 (3) with the following:

Notify the department's Electrical Field Unit at (414) 266-1170 to coordinate the inspection. The department's Region Electrical personnel will perform the inspection for the state owned and maintained traffic signals.

65. Electrical Conduit.

This special provision applies only to 76th Street.

Append standard spec 652.3.1.1 with the following:

Locations of the conduits where they are required are identified in the plans. However, installation will require integration with existing field conditions. Appropriate adjustment on conduit locations may be made if the field conditions are such that the pipes cannot be installed at the specified locations. Any relocation of greater than five feet must be approved by the engineer.

Plan changes must be approved by the City of Milwaukee Electric Services Supervisor or Traffic Engineer. The primary contacts are Mr. Al Nichols, Traffic Operations Supervisor (414) 286-3687-office, (414) 708-5148-mobile; or Mr. Joseph Blakeman, Traffic Control Engineer III (414) 286-8070.

Provide three sets of As-Built plan sets to City of Milwaukee Electric Services Supervisor or engineer upon completion of conduit installation.

66. Electrical Service Meter Breaker Pedestal, IH 94 Eastbound Ramps and STH 181, Item 656.0200.3001; IH 94 Westbound Ramps and STH 181, Item 656.0200.3002.

Append standard spec 656.2.3 with the following:

City of Milwaukee/State Owned Traffic Signals

The department will be responsible for the electric service installation request for any department maintained facility. Notify the maintaining authority if the signal is not state maintained that it is their responsibility to arrange for the electrical service installation.

Electric utility company service installation and energy cost will be billed to and paid for by the maintaining authority.

Append standard spec 656.3.4 with the following:

Install the cabinet base and meter breaker pedestal first, so the electric utility company can install the service lateral. Finish grade the service trench, replace topsoil that is lost or contaminated with other materials, fertilize, seed, and mulch all areas that are disturbed by the electric utility company.

Append standard spec 656.5(3) with the following:

Payment for grading the service trench, replacing topsoil, fertilizer, seed, and mulch will be incidental to this work unless the bid items are in the contract and then they will be paid for at the contract price.

67. Pedestrian Signal Face 16-Inch.

Append standard spec 658.2.3.2(1) with the following:

Furnish 16 inch LED ready pedestrian signal housing, drilled for top/bottom pipe mount with the ability to rotate 270 degrees on poly mounting bracket.

Append standard spec 658.3.4 with the following:

Connect all ungrounded conductors with wire nuts in the appropriate sections of the signal heads. Connect the neutral conductors to the terminal strip. Be certain to twist wires prior to installing the wire nuts. All wire nuts must be installed facing up to prevent the entrance of water.

68. Pedestrian Push Buttons.

Append standard spec 658.2.5 with the following:

Furnish vandal resistant, pressure activated, pedestrian push buttons, with die cast body type, in unfinished aluminum or yellow. Button constructed shall be constructed of stainless steel, with a Piezo driven solid state switch, momentary LED display and beeper that sounds simultaneously with button push.

Furnish low profile, unfinished cast aluminum, vandal resistant, and flush mounting pole mount.

Place a Size 1, Type H reflective (R10-3EL, R, D) sign sticker (per state sign plate), message series – B, directly above each push button. Include a directional arrow or arrows on the sign as the plans show.

69. Traffic Signal Faces.

Append standard spec 658.3.2 with the following:

Connect all ungrounded conductors with wire nuts in the appropriate sections of the signal heads. Connect the neutral conductors to the terminal strip. Be certain to twist wires prior to installing the wire nuts. All wire nuts must be installed facing up to prevent the entrance of water.

70. Temporary Traffic Signals for Intersections.

Append standard spec 661.2.1 with the following:

(1) Furnish all temporary traffic signal equipment as shown on the plan. The signal controller shall be capable of operating with the video camera detection system and Emergency Vehicle Preemption (EVP) system. All wood poles shall be plumb and level. Provide primary and secondary temporary traffic signal contact names and phone numbers who will be responsible for implementing temporary traffic signal timing changes. The department may request traffic signal timing changes to an approved incident timing plan during the project. Implement any approved incident timing plan immediately upon notification of the change and immediately upon notification of switching the timing plan back to normal operation. Record the times of operation of the incident timing and subsequent return to normal operation and provide this information to the department.

(3) The department has initiated the installation of the temporary electrical service with the electrical utility at the intersections of IH 94 eastbound Ramps and STH 181 (S. 84th Street) and IH 94 westbound Ramps and STH 181 (S. 84th Street) to expedite the process. Contact Justin Effinger at (262) 548-5676 to coordinate the temporary electrical service. The department will pay for all installation and energy costs associated with the operation

of the temporary traffic signal. Contact the electrical utility and arrange timely installation of the temporary service.

(5) Furnish a video image detector system consisting of video image detector cameras, mounting brackets and hardware, power cable, video image processor card, and auxiliary equipment to make the video detector system fully operational.

(6) Furnish pedestrian signal faces in accordance to standard spec 658.2.3.

(7) Furnish pedestrian push buttons in accordance to standard spec 658.2.5.

Append standard spec 661.3.1 with the following:

(4) Install temporary video detection cameras at the locations shown on the plans and according to the manufacturer's recommendations at a minimum 30-foot mounting height. Install power cable and signal cabinet equipment. Aim the video cameras to provide detection at the location shown on the plans and make the video detector system fully operational.

(5) In the event, at installation or turn on date, a noticeable obstruction is present in line with the video detection zone(s), advise the engineer before setting the zone.

(6) The video camera shall be mounted on a wooden pole. Relocate the video camera to a suitable location if there is impedance on the sensor operation, construction related or otherwise.

(7) The video detection system, as shown in the traffic signal construction plans, shall be complete, in place, tested, and in full operation during each stage and sub-stage of construction.

(8) Install pedestrian signal faces on the wood pole or wood post as the plans show. Maintain the height to the bottom of the pedestrian signal face as indicated in SDD Traffic Signal Standard Poly Bracket Mountings (Typical) 13 FT. or 15 FT.

(9) Install pedestrian push buttons in accordance to standard spec 658.3.5. Mount push buttons so that they are wheelchair accessible from the temporary crossing areas and in accordance to MUTCD Chapter 4.

Append standard spec 661.3.1.1 with the following:

(2) Place the pole in the ground to no less than 1/5 of the pole's length as the plans show. Sawcut existing pavement and concrete curb and gutter as needed to install the wood poles and guy wire anchors. Sawcut existing pavement in accordance to the pertinent provisions in standard spec 690.3, Construction. Remove pavement and concrete curb and gutter as shown on the plans and if needed to install the wood poles and guy wire anchors. Remove only as much pavement as needed to install the wood poles. Remove

pavement and curb and gutter in accordance to the pertinent provisions in standard spec 204.3, Construction. Hold any wood poles in place and/or move wood poles during construction due to conflicts with proposed work.

Append standard spec 661.3.1.4 with the following:

(1) Arrange for every other week inspections with the engineer to check the height of the span wire above the roadways to ensure that the bottom of the traffic signal heads remain within the minimum and maximum heights allowed above the roadway. Make all height adjustments within 1-hour of an inspection indicating that adjustments are required. Notify the engineer in writing upon completion of all necessary adjustments. Maintain a written log to properly document the date of each every other week inspection, the heights above the roadway, the roadway clearance after adjustments have been made and acceptance by the engineer. Provide all documentation related to the every other week span wire height checks as well as all records related to maintenance performed on the temporary traffic signal installations to the engineer.

(4) Maintain all temporary vehicle detection zones as the plans show or as the engineer directs. The temporary vehicle detection zones shall be set near the vicinity and within the approximate distance from the stop bar as shown on the plans. Check temporary vehicle detection zones every other week and at the opening of each stage of temporary traffic signal operation to ensure that they are working and are aimed properly. Periodic adjustment of the detection zones and/or moving of the temporary vehicle detection sensors may be required due to changes in traffic control, staging, or other construction operations.

Ensure that the temporary vehicular detection system stays in clean working order. Periodic cleaning of the equipment may be required due to dirt and dust build-up.

Append standard spec 661.3.2.6 with the following:

(6) Remove the video detection system from the temporary traffic signal poles and cabinet.

Append standard spec 661.5 with the following:

(2) Payment for the Temporary Traffic Signals for Intersections bid item is full compensation for providing, operating, maintaining, and repairing the complete temporary installation; and for removal. Payment also includes the following:

1. Furnishing and installing the replacement equipment.
2. The cost of delivery and pick-up of the cabinet assemblies.
3. Removal of service and site restoration.

Payment is full compensation for drilling holes; furnishing and installing all materials, including bricks, and coarse aggregate; for excavation, bedding, and backfilling, including any sand or other required materials; furnishing and placing topsoil, fertilizer,

seed, and mulch in disturbed areas; for properly disposing of surplus materials; for making inspections; for checking and/or adjusting the temporary detection zones on an every other week basis; for maintaining and changing the temporary detection zones to match the plans, traffic control, and construction staging; for relocating the temporary detection sensors due to construction activities, if required; for periodically cleaning all temporary vehicle detector equipment; for removing the temporary vehicle detector system; for cleaning up and properly disposing of waste; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

71. Intelligent Transportation Systems (ITS) – Control of Materials.

Standard spec 106.2 – Supply Source and Quality

Supplement standard spec 106.2 with the following:

The department will furnish a portion of equipment to be installed by the contractor. This department-furnished equipment includes the following:

State-furnished Items
Dome Camera
50-Foot Camera Pole
Pole Mounted Camera
12-Count Fiber Optic Termination Panel
72-Count Fiber Optic Cable
36-Count Fiber Optic Cable
6-Count Fiber Optic Cable
Fiber Optic Splice Enclosure
Ethernet Video Encoder
Ethernet Switch
ITS Field Cabinet

Pick-up small department-furnished equipment, such as communications devices, cameras, and controllers, from the department's Statewide Traffic Operations Center (STOC), 433 W. St. Paul Ave., Milwaukee, WI 53203 at a mutually agreed upon time during normal state office hours. Contact the department's STOC at (414) 227-2166 to coordinate pick-up of equipment.

Large department-furnished equipment, such as camera poles will be delivered by the supplier to a contractor-controlled site within Milwaukee County. Delivery will not necessarily be in a "just in time" manner. Store the equipment until field installation. Provide location details and a contact for delivery coordination upon receiving the contract's Notice to Proceed.

Transportation of the equipment between the electric shop and the field or interim location(s) shall be the responsibility of the contractor.

Standard spec 106.3 – Approval of Materials

Supplement standard spec 106.3 with the following:

Design/Shop Drawings

Prior to the purchase and/or fabrication of any of the components listed herein, and for any non-catalog item shown on the Material and Equipment List specified above, and no more than 30 days after notice to proceed, submit five copies of design drawings and shop drawings, as required, to the department for review. The items and the drawings that represent them shall meet the requirements of the standard specifications.

Design drawing submissions shall consist of signed and certified designs, design drawings, calculations, and material specifications for required items.

Shop drawings will be required for, but not limited to the following:

1. Mounting assemblies for the vehicle speed and classification sensors, including their attachment to the structure.
2. Mounting LED warning signs to the sign structure.
3. Mounting detail for dynamic message signs.
4. Any contractor-designed structure or foundation.

The department will complete its review of the material within 30 days from the date of receipt of the submission, unless otherwise specified. The department will advise the contractor, in writing, as to the acceptability of the material submitted. The department may determine that if no exceptions were taken for the item, it is approved, and no further action is required by the contractor; or the item may be partially or totally rejected, in which case modify and/or amend the submittal as required by the department and resubmit the item within 14 days. At this time, the review and approval cycle described above will begin again.

670-005 (20100709)

72. Intelligent Transportation Systems – General Requirements.**A Description****A.1 General**

This contract includes furnishing and installing elements for an Intelligent Transportation System (ITS) in or along the existing roadway as shown on the plans.

Unusual aspects of this project include:

- The project includes working on cables and equipment that are carrying data between roadside equipment and the department's Statewide Traffic Operations Center (STOC). Interruption of this service is not expected to perform this work. If an interruption is determined necessary, it must be done on a weekend, and must be done in a way that minimizes communication outages for the existing equipment. Notify the department's STOC at least 48 hours in advance of the planned interruption.
- The department will furnish some of the equipment to be installed. Make a reasonable effort to discover defects in that equipment prior to installing it.

A.2 Surge Protection

Equip every ungrounded conductor wire entering or leaving any equipment cabinet with a surge protector. For purposes of this section, multiple cabinets on a single pole or foundation are considered a single cabinet.

B Materials

B.1 General

Only furnish equipment and component parts for this work that are new and have high quality workmanship. All controls, indicators, and connectors shall be clearly and permanently labeled in a manner approved by the engineer. All equipment of each type shall be identical.

All electrical equipment shall conform to the standards and requirements of the Wisconsin Electrical Code, the National Electrical Manufacturers Association (NEMA), National Electric Safety Council (NESC), Underwriter's Laboratory Inc. (UL) or the Electronic Industries Association (EIA), when applicable. All materials and workmanship shall conform to the requirements of the National Electrical Code (NEC), Rural Electrification Administration (REA), Standards of the American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), requirements of the plans these special provisions, the standard specifications, and to any other codes, standards, or ordinances that may apply. All system wiring, conduit, grounding hardware and circuit breakers shall be in conformance with the National Electrical Code. Whenever reference is made to any of the standards mentioned, the reference shall be considered to mean the code, ordinance, or standard that is in effect at the time of the bid advertisement.

B.2 Outdoor Equipment

All conductive connectors, pins (except pins connected by soldering), and socket contacts shall be gold plated. Acrylic conformal coating shall protect each circuit board side that has conductive traces. Except for integrated circuits containing custom firmware, all components shall be soldered to the printed circuit board.

To prevent galvanic corrosion, all connections between dissimilar metals shall incorporate a means of keeping moisture out of the connection. Where the connection need not conduct electricity, interpose a non-absorbing, inert material or washer between

the dissimilar metals. Use nonconductive liners and washers to insulate fasteners from dissimilar metals. Where the connection must conduct electricity, use a conductive sealant between the dissimilar metals. Alternatively, use an insulating gasket and a bond wire connecting the two metal parts.

B.3 Custom Equipment

Equipment that is not part of the manufacturer's standard product line, or that is made or modified specifically for this project, shall conform to the following requirements:

Where practical, electronics shall be modular plug-in assemblies to facilitate maintenance. Such assemblies shall be keyed to prevent incorrect insertion of modules into sockets.

All components shall be available from multiple manufacturers as part of the manufacturers' standard product lines. All must be clearly labeled with the value, part number, tolerance, or other information sufficient to enable a technician to order an exact replacement part.

Lamps used for indicator purposes shall be light-emitting diodes.

The printed circuit boards shall be composed of "two-ounce" copper on 1/16-inch thick fiberglass epoxy or equivalent type construction. Holes that carry electrical connections from one side of the boards to the other shall be completely plated through. Multilayer printed circuit boards shall not be used. The name or reference number used for the board in the drawings and maintenance manuals supplied to the department shall be permanently affixed to each board.

All components shall be mounted so that the identifying markings are visible without moving or removing any part, if practical.

B.3 Environmental Conditions

Equipment shall continue to operate as specified under the following ranges of environmental conditions, except as noted in the specifications for individual pieces of equipment.

1. **Vibration and Shock:** Vehicle speed and classification sensors and any other equipment mounted atop poles or on structures shall not be impaired by the continuous vibration caused by winds (up to 90 mph with a 30 percent gust factor) and traffic.
2. **Duty Cycle:** Continuous
3. **Electromagnetic Radiation:** The equipment shall not be impaired by ambient electrical or magnetic fields, such as those caused by power lines, transformers, and motors. The equipment shall not radiate signals that adversely affect other equipment.

4. **Electrical Power:**

- a. **Operating power:** The equipment shall operate on 120-volts, 60-Hz, single-phase unless otherwise specified. It shall conform to its specified performance requirements when the input voltage varies from 89 to 135 volts and the frequency varies +3 Hz.
- b. **High frequency interference:** The equipment operation shall be unaffected by power supply voltage spikes of up to 150 volts in amplitude and 10 microseconds duration.
- c. **Line voltage transients:** The equipment operation shall be unaffected by voltage transients of plus or minus 20 percent of nominal line voltage for a maximum duration of 50 milliseconds. Equipment in the field shall meet the power service transient requirements of NEMA Standard TS-2 when connected to the surge protectors in the cabinets.

5. **Temperature and Humidity:**

- a. **Field equipment:** Equipment in the field shall meet the temperature and humidity requirements of NEMA Standard TS-2. Liquid crystal displays shall be undamaged by temperatures as high as 165 degrees F, and shall produce a usable display at temperatures up to 120 degrees F.
- b. **Equipment in Controlled Environments** shall operate normally at any combination of temperatures between 50 degrees F and 100 degrees F, and humidity's between 5 percent and 90 percent, non-condensing, and with a temperature gradient of 9 degrees F per hour.

B.4 Patch Cables and Wiring

All cables and wiring between devices installed in a single cabinet, or in separate cabinets sharing a single concrete base, will be considered incidental to the installation of the devices and no separate payment will be made for them. It is anticipated that this will include fiber optic patch cables between termination panels and Ethernet switches, 10 / 100 MBPS Ethernet cables, RS-232 cables between individual devices and terminal servers, and power cables between individual devices and power sources within the cabinets.

B.5 Surge Protection

Low-voltage signal pairs, including twisted pair communication cable(s) entering each cabinet shall be protected by two-stage, plug-in surge protectors and shall be installed on both ends of camera control cables. The protectors shall meet or exceed the following minimum requirements:

- The protectors shall suppress a peak surge current of up to 10k amps.
- The protectors shall have a response time less than one nanosecond.
- The protector shall clamp the voltage between the two wires at a voltage that is no more than twice the peak signal voltage, and clamp the voltage between each wire and ground at 50 volts.
- The first stage of protection shall be a three-element gas discharge tube, and the second stage shall consist of silicon clamping devices.
- The protector shall also contain a resettable fuse (PTC) to protect against excessive current.

- There shall be no more than two pairs per protector.
- It shall be possible to replace the protector without using tools.

Cables carrying power to curve signs shall be protected at the cabinet by grounded metal oxide varistors of appropriate voltages. The varistors must be at least 0.8 inch in diameter.

C Construction

C.1 Thread Protection

Provide rust, corrosion, and anti-seize protection at all thread assemblies of metallic parts by coating (non-spray) the mating surfaces with an approved compound. Failure to use an approved compound will result in no payment for the items to which coating was to have been applied.

C.2 Cable Installation

When installing new cables into conduits containing existing cables, remove the existing cables and reinstall the existing cables simultaneously with the new cables. Take every precaution necessary to protect the existing cables. In the event of avoidable damage to the existing cables, replace all damaged cables, in-kind, at no additional expense to the department. When cables are pulled into conduit, use a cable pulling lubricant approved by the cable manufacturer. Submit documentation supporting manufacturer approval of the lubricant to the engineer.

C.3 Wiring

Every conductor, except a conductor contained entirely within a single piece of equipment, must terminate either in a connector or on a terminal block. Provide and install the connectors and terminal blocks where needed, without separate payment. Use approved splice kits instead of connectors and terminal blocks for underground power cable splices.

Permanently label and key connectors to preclude improper connection. Obtain prior engineer approval for the labeling method(s) prior to use.

Terminal blocks must be affixed to panels that permanently identify the block and what wire connects to each terminal. This may be accomplished by silk screening or by installing a laminated printed card under the terminal block, with the labels on portions of the card that extend beyond the block. Installation of terminal blocks by drilling holes in the exterior wall of the cabinet is not acceptable.

Use barriers to protect personnel from accidental contact with all dangerous voltages.

Do not install conductors carrying AC power in the same wiring harness as conductors carrying control or communication signals.

Arrange wiring, including fiber optic pigtails, so that any removable assembly can be removed without disturbing wiring that is not associated with the assembly being removed.

Communication and control cables may not be spliced underground, except where indicated on the plans.

Cables in the Statewide Traffic Operations Center or in communication hubs, which are not contained within a single cabinet, shall have at least 10 feet of slack.

C.4 System Operations

If the contractor's operations unexpectedly interrupt Intelligent Transportation Systems (ITS) service, notify the engineer immediately and restore service within 24 hours. Repair all damaged facilities to the condition existing before the interruption. If service is not restored within 24 hours, the department may restore service to any operating device and deduct restoration costs from payments due the contractor.

C.5 Surge Protection

Arrange the equipment and cabinet wiring to minimize the distance between each conductor's point of entry and its protector. Locate the protector as far as possible from electronic equipment. Ensure that all wiring between the surge protectors and the point of entry is free from sharp bends.

D Measurement

No separate measurement will be made for the work described in this article.

E Payment

No separate payment will be made for the work described in this article. All work described in this article shall be included under the ITS items in the contract.

73. Conduit HDPE Directional Bore 4-Duct 4-Inch; Item 671.0244.

Modify standard spec 671 Intelligent Transportation Systems – Conduit with the following:

Replace standard spec 671.2.2 Woven Pull Tape with the following:

Pull Rope

Furnish and Install pull rope that complies with the following:

- Flat construction (7/16" to 5/8" wide)
- 100% woven aramid fiber (may include tracer wire)
- 1500 lbs. Minimum pull strength prelubricated
- sequential footage markings for location

Install pull rope for all ducts in the run.

For any questions on materials, contact Ms. Karen Roney at (414) 286-3243.

74. Intelligent Transportation Systems – Signal Assemblies.

Modify standard spec 676 with the following:

676.2.4 Signal Heads

- Furnish the housing, visor, lenses, LED modules, and other components consisting of an LED signal head assembly from the statewide approved electrical materials list.

75. Intelligent Transportation System – Communication Vault.

673.2 Materials

- Furnish a vault lid with a minimum design load of 15,000 pounds and that has permanent stamp that reads WISDOT COMMUNICATIONS or as the plans show. The vault lid will have 2 slots measuring ½ inch by 4 inches to use as a pull out. The vault lid will also be detectable through the inclusion of detectable metal incorporated into the lid.

76. QMP Concrete Pavement Special Requirements.

This is a specialized QMP Concrete Pavement specification modified for Zoo Interchange projects.

Supplement standard spec 701, 710, 715 with the following:

A Description

A.1 General

Conform to standard spec 320, 415, 416, and 501 as modified in this special provision.

Apply this special provision only to the following bid items:

- 320.0100 - 0199 Concrete Base (inch)
- 320.0300 - 0399 Concrete Base HES (inch)
- 415.0060 - 0199 Concrete Pavement (inch)
- 415.1080 - 1199 Concrete Pavement HES (inch)
- 415.0410 Concrete Pavement Approach Slab
- 415.1410 Concrete Pavement Approach Slab HES
- 415.0310 Concrete Alley
- 415.1310 Concrete Alley HES
- 415.0210 Concrete Pavement Gaps

A.2 Contractor Testing for Small Quantities

The requirements under this special provision apply equally to a small quantity for a particular mix design and placement method, except as follows:

1. A full quality control plan need not be submitted but provide an organizational chart to the engineer including names, telephone numbers and current certifications of all persons involved in the quality control program.
2. The engineer may accept aggregate gradation based upon satisfactory records of previous testing.
3. No concrete control charts are required. Submit test results to the engineer each day as they become available. Assure that all properties are within the limits specified in the standard specifications for each subplot tested.
4. The department will not adjust the pay for sublots with conforming compressive strength.

B Materials

B.1 Quality Control Plan

Supplement standard spec 701.2.2 and 715.1.1.4 with the following:

Ensure that the plan provides the following elements:

1. The locations of the QC laboratories for mix design, aggregate testing, cylinder curing, concrete testing, and compressive strength testing.
2. The frequency of contractor quality control testing, if planning to perform more frequently than section B.5 specifies.
3. The format for control charts and sampling, testing, and pay adjustment data documentation, if different from the forms provided in the CMM 8.35.

B.2 Laboratory Certification

Supplement standard spec 701.2.4 with the following:

Obtain information on the Wisconsin laboratory qualification program from:

Materials Management Section
935 S. 60th Street
West Allis, Wisconsin 53214
Telephone: (414) 266-1156

B.3 Class I Concrete Mixes

B.3.1 General

For concrete base, use a grade B, B-FA, B-S, B-IS, or B-IP concrete mix conforming to standard spec 501.

Use clean, hard, durable crushed limestone with 100% fractured surfaces and free of an excess of thin or elongated pieces, frozen lumps, vegetation, deleterious substances or adherent coatings considered injurious.

Use virgin aggregates only.

B.3.2 Contractor Concrete Mix Design

Delete standard spec 501.2.5.3.4, 501.2.5.4.4, 501.3.1.1.2, 501.3.2.1, 501.3.2.2, and 501.3.2.3. Delete the maximum limit for percent passing the No. 200 (75 µm) sieve from standard spec 501.2.5.3.1 and 501.2.5.4.2.

B.3.2.1 Pavements

Replace standard spec 715.2.3.1(2) and 715.2.3.1(3) with the following:

Provide minimum cement content of 565 pounds per cubic yard (335 kg/m³). Portland cement may be partially replaced with fly ash at a replacement ratio of not less than one pound (kg) of fly ash per one pound (kg) of cement up to a maximum fly ash content of 30% of total cementitious material. Alternatively, slag may be used as a partial replacement for cement at a replacement ratio of not less than one pound (kg) of slag per one pound (kg) of cement up to a maximum slag content of 30% of the total cementitious material. Alternatively, A combination of fly ash and slag may be used up to a maximum combined fly ash and slag content of 30 percent. Ensure that fly ash conforms to standard spec 501.2.6 and slag conforms to standard spec 501.2.7.

The amount of deleterious substances shall not exceed the following percentages:

DELETERIOUS SUBSTANCE	PERCENT BY WEIGHT
Shale.....	1.0
Coal	1.0
Clay lumps	0.3
Soft fragments.....	3.0
Any combination of above.....	3.0
Thin or elongated pieces based on a 3:1 ratio.....	15.0
Materials passing the No. 200 (75 µm) sieve	1.5
Chert ^[1]	3.0

^[1] Material classified lithologically as chert and having a bulk specific gravity (saturated surface-dry basis) of less than 2.45. Determine the percentage of chert by dividing the weight of chert in the sample retained on a 3/8-inch (9.5 mm) sieve by the weight of the total sample.

B.3.2.2 Combined Aggregate Gradation

Replace standard spec 715.2.2(1) items 2 and 3 with the following:

2. The percent passing the 1 inch (25 mm) sieve is less than or equal to 95.
3. The percent passing the No. 4 (4.75 mm) sieve is less than or equal to 47.

B.4 Quality Control Program

B.4.1 Control Charts

Maintain control charts when required by the test reporting procedures. Ensure that all tests are recorded and become part of the project records. Plot required test results on the control charts. Include random, non-random, and engineer requested testing but only include the contractor's randomly selected QC test results in the 4-point running average.

Other process control or informational tests on the control charts may be plotted, but do not include them in 4-point running averages.

Post control charts in an engineer-approved location and update daily. Ensure that the control charts include the project number, the test number, each test element, the applicable warning and control limits, the contractor's individual test results, the running average of the last 4 data points, and the engineer's verification and independent assurance test data points. Use the control charts as part of a process control system for identifying potential problems and assignable causes. Format control charts according to CMM 8.30.

Submit control charts to the engineer in a neat and orderly manner within 10 days after completing concrete production.

B.4.2 Documentation

Replace standard spec 701.2.6(3) with the following:

Submit original paper copy testing records to the engineer in a neat and orderly manner within 10 days after completing concrete production.

B.5 Contractor Testing

B.5.1 General

Supplement standard spec 701.3 with the following:

Ensure that all test results are available for the engineer's review at any time during normal working hours.

B.5.2 Aggregate Testing

B.5.2.1 General

Supplement standard spec 710.5.6.1 with the following:

Ensure that only results of randomly selected QC tests are included in the 4-point running average.

Use control limits for sieve sizes as identified in the project concrete mix report or, if the concrete mix report is not published at the time of testing, in the contractor's quality control plan. Gradation warning limits are inside the upper and lower control limit values by one percentage point for all sieves except as follows:

1. The upper warning limits for percent passing the No. 100 (150 μ m) and No. 200 (75 μ m) sieves are inside the control limit by 0.5 percent.
2. For sieves allowing 100 percent passing, there is no upper warning limit. For sieves with 0 percent passing, there is no lower warning limit.

Replace standard spec 710.5.6.2(2) with the following:

Wash each sample of fine aggregate and the first 4 samples of each of the coarse aggregates. If the percent passing the No. 200 (75 μm) sieve for the combined gradation is less than the warning limit, wash at least every 10th sample of each of the coarse aggregates. If the percent passing the No. 200 (75 μm) sieve for the combined gradation is greater than or equal to the warning limit, wash each sample of the coarse aggregate until 4 consecutive tests are less than the warning limit.

B.5.2.2 Documentation

Maintain control charts at the laboratory for each aggregate stockpile. Maintain a chart for each control sieve for each material. Record contractor test results the same day tests are conducted.

B.5.2.3 Corrective Action

When the 4-point running average value approaches a warning limit, consider corrective action. Ensure that any corrective action is documented and becomes part of the project records.

Document whenever a 4-point running average exceeds the warning limits. When a second consecutive running average value exceeds the warning limits, take corrective action. Continue corrective action until 2 consecutive average points are within the warning limits.

Notify the engineer whenever an individual test value exceeds a control limit. Material is nonconforming when an individual test exceeds the control limit. The quantity of nonconforming material includes the material of the first test exceeding the control limit, continuing to but not including, the material from the first subsequent test that is within the control limits. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.5.3 Aggregate Percent Passing the No. 200 Sieve

B.5.3.1 Sampling and Testing

Measure and record the percent passing the No. 200 (75 μm) sieve of both the fine and coarse aggregates when producing concrete pavement. Conduct tests according to AASHTO T 11 as modified by the department. Test at least one sample as early as it is practical each day and as mix or material conditions change. This testing frequency may be reduced, if the engineer approves, but maintain at least one test per 5 days of concrete production.

Document testing as specified in B.6.1, B.7.2.1, and B.7.2.2, by developing a combined gradation control chart for the percent passing the No. 200 (75 μm) sieve. Use the control limits defined in the concrete pavement mix report. Ensure that only results of QC tests are included in the 4-point running average.

B.5.3.2 Corrective Action

When an individual test approaches a warning limit, consider corrective action. Document corrective actions and include that documentation in the project records.

Notify the engineer if an individual test exceeds the warning limits. If a second consecutive individual test exceeds the warning limits, the engineer will assist in determining the course of corrective action. If the corrective action improves the property in question such that additional individual tests are within the warning limits, production may continue. If the correction does not improve the property, and new individual tests stay in the warning band, repeat the steps outlined here in B.7.3.2(2) starting with notifying the engineer.

Notify the engineer whenever an individual test value exceeds a control limit. Material is nonconforming when an individual test exceeds the control limit. The quantity of nonconforming material includes the material of the first test exceeding the control limit, continuing to but not including, the material from the first subsequent test that is within the control limits. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.5.4 Lot and Sublot Definition

Supplement standard spec 715.3.1.2.1 with the following:

Ensure that no single lot contains concrete of more than one mix design, or more than one placement method, except for mainline pavement gaps.

B.5.4.1 Lots by Lane-Feet

Supplement standard spec 715.3.1.2.2 with the following:

Lots and sublots may include concrete from more than one day of paving.

A sublot is 350 linear feet for 3-lane paving width or 2-lane plus shoulder.

Sublots at either end of a paving pass may be greater than 1000 lane-feet in size to accommodate the actual project length and staging requirements. For ease of layout, begin the first sublot at the first even station of the project. Place the resulting partial quantity into the first full sublot.

Document the locations and quantities of integral shoulders, and identify the travel lane sublot tests used for acceptance. For a shoulder pavement placed in a separate paving pass, designate separate lots and sublots.

Ancillary concrete placed integrally with a pavement may be accepted using the tests from the pavement subplot. Document the locations and quantities of integral concrete, and identify the pavement subplot tests used for acceptance.

B.5.4.2 Non-Mainline Surfaces

Non-mainline surfaces shall be defined as all concrete surfaces under this special provision, which are not mainline travel lanes or mainline shoulders.

Lots and sublots may include concrete from more than one day of paving.

A lot consists of a minimum of 4 sublots and a maximum of 8 sublots.

All sublots within a lot shall have the same approximate size.

A subplot is a maximum of 250 cubic yards of concrete.

B.5.5 Strength Evaluation

B.5.5.1 General

Supplement standard spec 715.3.2.1(1) with the following:

Include tests of concrete base and high early strength concrete for all other QC testing, except no 28-day cylinders are required for concrete base or for high early strength concrete.

B.5.5.2 Removal and Replacement

B.5.5.2.1 Pavement

Replace standard spec 715.3.2.2.1 with the following:

If a subplot strength is less than 3000 psi (17.2 MPa), the department may direct that subplot to be cored to determine its structural adequacy and whether to direct removal. Cut and test cores according to AASHTO T 24 as and where the engineer directs. Have an HTCP certified PCC technician I perform or observe the coring. Bear all coring and testing costs, fill all core holes with an approved grout, and provide traffic control during coring at no cost to the department.

The subplot pavement is conforming if the compressive strengths of all cores from the subplot are 3000 psi (17.2 MPa) or greater or the engineer does not require coring.

The subplot pavement is nonconforming if the compressive strengths of any core from the subplot is less than 3000 psi (17.2 MPa). The department may direct removal and replacement or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.5.6 Air Content

Supplement standard spec 710.5.3 with the following:

The lower warning limit for air content is 0.5 percent above the lower control limit. There is no upper warning limit.

B.5.6.1 Documentation

Maintain a control chart at a fixed location on the project site. Ensure that all test results are recorded and become part of the project records. Chart all results on the same day tests are conducted. Only plot results of samples selected randomly in the 4-point running average.

B.5.6.2 Corrective Action

If an individual air test is between the lower warning limit and lower control limit, double the air content test frequency to 2 tests per compressive strength subplot. Perform one of these tests from the same concrete sample used for the QC strength cylinders. Select the second sample randomly from the half of the subplot not used for the QC strength cylinders. Determine both random test locations within a subplot before paving that subplot. Continue testing at increased frequency until an individual test point is above the lower warning limit and below the upper control limit.

When the 4-point running average value trend is towards the lower warning limit or the upper control limit, consider corrective action.

Notify the engineer if a 4-point running average is less than the lower warning limit. If a second consecutive running average is below the warning limit, the engineer will assist in determining the course of corrective action. If the corrective action improves the property in question such that the new running average, after four additional individual tests, is between the lower warning limit and upper control limit, production may continue. If the new running average is below the lower warning limit, repeat the steps outlined here in B.7.5.2(3) starting with notifying the engineer.

If an individual air test is outside the control limits, notify the engineer, and perform additional air tests as often as it is practical on subsequent loads until the air content is inside the control limits. The material is nonconforming when an individual test exceeds the control limit. Material from the load with the first test exceeding the control limit, continuing to but not including the load with the first subsequent test within the control limits, is nonconforming. The department may direct removal and replacement or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.6 Department Testing

B.6.1 Verification Testing

Supplement standard spec 701.4.2 with the following:

The department will perform verification testing as follows:

	Testing Frequency Guide ^[1]	Sampling Material and Location	Test Method	Alternate Test Methods
Air content	1 per lot	Plastic concrete, ahead or behind ^[2] the paver	AASHTO T 152 as modified	Hardened air content testing ^[2] after construction
28-day compressive strength	1 per lot	Cylinders	AASHTO T 22, T 23 and T 141 as modified	Random cores ^[2] after construction

^[1] The engineer may increase the frequency at start-up or as necessary to validate the quality of the materials. The engineer may reduce the frequency based on a history of satisfactory contractor or material performance.

^[2] Evaluation of test results shall account for systematic differences in testing methods or sampling locations.

The department will conduct verification testing for pavement thickness as specified in standard spec 415.3.16.

Plot verification tests on the contractor's quality control charts as specified in B.4.1. Do not include verification tests in the 4-point running average.

B.6.2 Independent Assurance Testing

Supplement standard spec 701.4.3 with the following:

Plot the independent assurance tests on the contractor's quality control charts as specified in B.6.1. Do not include independent assurance tests in the 4-point running average.

B.7 Dispute Resolution

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

If the project personnel cannot resolve a dispute and the dispute affects payment or could result in incorporating nonconforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on

independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party tests to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

B.8 Acceptance

The department will accept concrete pavement based on the contractor QC tests unless it is shown through the verification or the dispute resolution process that the contractor's tests are in error.

C (Vacant)

D (Vacant)

E Payment

E.1 General

Replace standard spec 715.5.1(4) with the following:

The department will adjust pay for each lot using percent within limits (PWL) of the 28-day subplot average strengths for that lot. The department will measure PWL relative to the lower specification limit of 4500 psi.

E.2 Pavements

Replace standard spec 715.5.2(1) through 715.5.2(3) with the following:

The department will adjust pay for each lot using equation "QMP 3.02" as follows:

Percent Within Limits (PWL)	Pay Adjustment^[1] (dollars per square yard)
≥ 85 to 100	0
≥ 50 to < 85	$(1.5/55 \times \text{PWL}) - (127.5/55)$
< 50	-1.5

^[1] For lots with less than 4 sublots, the department will assess a disincentive based on the individual subplot average strengths. The department will reduce pay for sublots with an average strength below 4500 psi by \$1.50 per square yard.

77. Abatement of Asbestos Containing Material B-40-0089, Item 203.0210.S.0001.

A Description

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

B (Vacant)**C Construction**

Timothy G. Petrofske and Thomas McCoy, License Numbers 115985 and 117261, inspected Structure B-40-0089 for asbestos on June 2, 2009. Regulated Asbestos Containing Material (RACM) was found on this structure in the following locations and quantities:

Structure B-40-0089				
Location	Description	Analytical Results and Method	Category	Quantity
Bridge railing Bolts (Northeast)	Lock tite-Gray	PC 1.3% Chrysotile	Category I Non-Friable	48 (2in x 2 in)= 1.3sf
Bridge railing Bolts (Northwest)	Lock tite-Gray	PC 0.25% Chrysotile	Category I Non-Friable	-
Bridge railing Bolts (Southwest)	Lock tite-Gray	PC 0.75% Chrysotile	Category I Non-Friable	-
Bridge Deck East/West Center	Light Poles	ATC	Category II Non-Friable	2(30 ft x 6 in)
Bridge Deck Underside East	Conduit 3 in PVC	ATC	Category II Non-Friable	1(200 ft x 3 in)
Bridge Deck Underside East	Electrical Box	ATC	Category II Non-Friable	10(1 ft x 1 ft)
Bridge Column Center	Lights	ATC	Category II Non-Friable	4(1 ft x 1 ft)

Note: ATC = Assumed to Contain Asbestos

The RACM on this structure must be abated by a licensed abatement contractor. A copy of the inspection report is available from:

Name: Bill Mohr, P.E.

Address: 141 NW Barstow Street, Waukesha, WI 53187-0798

Phone: (262) 548-5666

Fax: (262) 548-6891

E-mail: Bill.mohr@dot.wi.gov

In accordance to NR447 and DHS159, ensure that DNR or DHS receives a completed Notification of Demolition and/or Renovation (DNR Form 4500-113 (R 4/11), or subsequent revision) via U.S. mail, hand-delivery, or using the online notification system at least 10 working days prior to beginning any construction or demolition. Pay all

associated fees. Provide a copy of the completed 4500-113 form and the abatement report to Bill Mohr at (262) 548-5666 and DOT BTS-ESS attn: Hazardous Materials Specialist PO Box 7965, Madison, WI 53707-7965. In addition, comply with all local or municipal asbestos requirements.

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

- Site Name: Structure B-40-0089, South 76th Street over IH 94 E-W Freeway
- Site Address: City of Milwaukee (53214)
- Ownership Information: WisDOT Transportation Southeast Region, 141 NW Barstow Street, PO Box 798, Waukesha, WI 53187-0798
- Contact: Kurt Fleirl
- Phone: (262) 548-8724
- Age: 46 years. This structure was constructed in 1967.
- Area: 17,681 SF of deck

Insert the following paragraph in Section 6.g.:

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

D Measurement

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

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
203.0210.S.0001	Abatement of Asbestos Containing Material Structure B-40-0089	LS

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

203-005 (20120615)

78. Removing Crash Barrels, Item 204.9060.S.0001.

A Description

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

B (Vacant)

C (Vacant)

D Measurement

The department will measure Removing Crash Barrels as each individual crash barrel, acceptably completed.

E Payment

Supplement standard spec 204.5 to include the following:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.0001	Removing Crash Barrels	Each

204-025 (20041005)

79. Removing Bike Rack, Item 204.9060.S.0002.

A Description

This special provision describes removing a concrete embedded bike rack in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Removing Bike Rack as a unit for each individual unit, acceptably completed.

E Payment

Supplement standard spec 204.5 to include the following:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.0002	Removing Gate, Posts and Footings	Each

80. Removing Gate, Posts and Footings, Item 204.9060.S.0003.

A Description

This special provision describes removing all gate panels, posts and footings associated with an exit/entrance in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Removing Gate, Posts and Footings as a unit for each individual unit, acceptably completed.

E Payment

Supplement standard spec 204.5 to include the following:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.0003	Removing Gate, Posts and Footings	Each

81. Removing Noise Barrier, Item 204.9090.S.0001.**A Description**

This special provision describes Removing Noise Barrier, including supports, footings and panels, in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)**C (Vacant)****D Measurement**

The department will measure Removing Noise Barrier by the linear foot for the locations shown in the plans, acceptably completed.

E Payment

Supplement subsection 204.5 to include the following:

ITEM NUMBER	DESCRIPTION	UNIT
204.9090.S.0001	Removing Noise Barrier	LF

82. Temporary Shoring, Item 206.6000.S.**A Description**

This special provision describes designing and providing temporary shoring at locations the plans show.

B Materials**B.1 Shoring Design**

Provide a shoring design for each location where the plan requires temporary shoring. Have a professional engineer, registered in the State of Wisconsin and knowledgeable of the specific site conditions and requirements, verify the adequacy of the design. Submit one copy of each shoring design, signed and sealed by the same professional engineer verifying the design, to the engineer for incorporation into the permanent project record.

C Construction

Provide temporary shoring at each required location conforming to the design developed for that location.

Remove the shoring when it is no longer needed unless the engineer allows it to remain in place. Backfill the space that is excavated but not occupied by the new permanent construction conforming to standard spec 206.3.13.

D Measurement

The department will measure Temporary Shoring by the square foot acceptably completed at locations the plans show, measured as the area of exposed face in the plane of the shoring from the ground line in front of the shoring to a maximum of one foot above the retained grade. Shoring used for staged construction in multiple configurations without removal and reinstallation will be measured once based on the configuration with the largest area of exposed face.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
206.6000.S	Temporary Shoring	SF

Payment is full compensation for designing and providing shoring; for providing a signed and sealed copy of the design; and for backfilling and removing the shoring.

The department will not pay for temporary shoring, installed for contractor convenience, that is not required in the plans.
206-005 (20110615)

83. Backfill Controlled Low Strength, Item 209.0200.S.

A Description

This special provision describes furnishing and placing a controlled low strength material designed for use as backfill in trenches for culverts, sewers, utilities, or similar structures, as backfill behind bridges abutments, or as fill for the abandonment of culverts, pipes, or tanks.

B Materials

Provide controlled low strength backfill that consists of a designed cementitious mixture of natural or processed materials. Allowable materials include natural sand, natural gravel, produced sand, foundry sand, produced gravel, fly ash, Portland cement, and other broken or fragmented mineral materials. The designed mixture shall be self-leveling and shall be free of shrinkage after hardening. Design the mixture to reach a state of hardening such that it can support foot traffic in no more than 24 hours. Provide a mixture that also meets the following requirements.

Test	Method	Value
Flow (inch)	ASTM D-6103	9 min
Compressive Strength (psi)	ASTM D-6024	20-40 @ 14 days 40-80 @ 28 days 80-120 @ 90 days

Chemical admixtures to control air content and setting time are allowable. Ten days prior to placement, furnish the engineer with a design mix detailing all components and their proportions in the mix. Also, provide documentation from the supplier of the industrial byproducts that the foundry sand and fly ash used in the mixture meet the requirements for Industrial Byproducts Categories 1, 2, 3, or 4 in NR 538 of the Wisconsin Administrative Code for use as a confined geotechnical fill.

C Construction

Place controlled low strength backfill at the locations and to the lines and grades as shown on the plan. Proportion and mix materials to produce a product of consistent texture and flow characteristics. The engineer may reject any materials exhibiting a substantial change in properties, appearance, or composition.

If the official Weather Bureau forecast for the construction site predicts temperatures at or below freezing within the next 24 hours after placement of controlled low strength backfill, protect the placed materials from freezing during that time period. If the temperature is not forecast to rise above 40° F for 72 hours after placement, the engineer may require protection from freezing for up to 72 hours.

No controlled low strength backfill shall be allowed to enter any stream, lake, or sewer system. The contractor shall be responsible for any clean up or remediation costs resulting from such occurrences.

D Measurement

The department will not measure Backfill Controlled Low Strength. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
209.0200.S	Backfill Controlled Low Strength	CY

Payment is full compensation for designing the mix; supplying all materials; preparing the proportioned mix; hauling it to the construction site; placing the material; and protecting it from freezing.

84. QMP Ride; Incentive IRI Ride, Item 440.4410.S.

A Description

- (1) This special provision describes profiling pavements with a non-contact profiler, locating areas of localized roughness, and determining the International Roughness Index (IRI) for each wheel path segment.
- (2) Profile the final riding surface of all mainline pavements, bridges, approaches, and railroad crossings. Roundabouts, and pavements within 150 feet of the points of curvature of roundabout intersections, are excluded from the testing requirements of this provision.
- (3) Pavements that are excluded from localized roughness according to C.5.2(1), bridges, and roundabout intersections are subject to engineer-directed straightedging according to the standard specifications. All other surfaces being tested under this provision are exempt from straightedging requirements.

B (Vacant)

C Construction

C.1 Quality Control Plan

- (1) Submit a written quality control plan to the engineer at or before the pre-construction conference. Ensure that the plan provides the following elements:
 1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of all quality control personnel.
 2. The process by which quality control information and corrective action efforts will be disseminated to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.
 3. The methods and timing used for monitoring and/or testing ride quality throughout the paving process.
 4. The evaluation process that will be used to make improvements to the construction operations if poor ride quality is found during the process control testing.
 5. The methods that will be used to ensure a smooth pavement transition when matching into existing surfaces such as bridges, bridge approaches, or railroad crossings.
 6. The segment locations of each profile run used for acceptance testing.
 7. The approximate timing of acceptance testing in relation to the paving operations.

C.2 Personnel

- (1) Have a profiler operator, certified under the department's highway technician certification program (HTCP), operate the equipment, collect the required data, and document the results using the methods taught in the HTCP profiling course.

C.3 Equipment

- (1) Furnish a profile-measuring device capable of measuring IRI from the list of department-approved devices published on the department's web site:
<http://roadwaystandards.dot.wi.gov/standards/qmp/index.htm>
- (2) Unless the engineer and contractor mutually agree otherwise, arrange to have a calibrated profiler available when paving the final riding surface. Calibrate the profiler according to the manufacturer's recommendations. Provide the engineer with a copy of the most recent calibration results, signed by the certified profiler operator.
- (3) Perform daily calibration verification of the profiler using test methods according to the manufacturer's recommendations. Notify the engineer prior to performing the calibration verification. If the engineer requests, arrange to have the engineer observe the calibration verification and operation. Maintain records of the calibration verification activities, and provide the records to the engineer upon request.

C.4 Testing

C.4.1 Run and Reduction Parameters

- (1) Enter the equipment-specific department-approved filter settings and parameters listed on the department's ride web site.

C.4.2 Contractor Testing

- (1) Operate profilers within the manufacturer's recommended speed tolerances. Perform all profile runs in the direction of travel. Measure the longitudinal profile of each wheel track of each lane. The wheel tracks are 6.0 feet apart and centered in the traveled way of the lane.
- (2) Coordinate with the engineer to schedule profile runs for acceptance. The department may require testing to accommodate staged construction or if corrective action may be required.
- (3) Measure the profiles of each standard or partial segment. Define primary segments starting at a project terminus and running contiguously along the mainline to the other project terminus. Field-locate the beginning and ending points for each profile run. When applicable, align segment limits with the subplot limits used for testing under the QMP Concrete Pavement specification. Define segments one wheel path wide and distinguished by length as follows:
 1. Standard segments are 500 feet long.
 2. Partial segments are less than 500 feet long.
- (4) Treat partial segments as independent segments.

- (5) The department will categorize each standard or partial segment as follows:

Segments with a Posted Speed Limit of 55 MPH or Greater	
Category	Description
HMA I	Asphalt pavement with multiple opportunities to achieve a smooth ride. The following operations performed under this contract are considered as opportunities: a layer of HMA, a leveling or wedging layer of HMA, and diamond grinding or milling of the underlying pavement surface.
HMA II	Asphalt pavement with a single opportunity to achieve a smooth ride.
HMA III	Asphalt pavement segments containing any portion of a bridge, bridge approach, railroad crossing, or intersection. An intersection is defined as the area within the points of curvature of the intersection radii.
PCC II	Concrete pavement including all gaps.
PCC III	Concrete pavement segments containing any portion of a bridge, bridge approach, railroad crossing, or intersection. An intersection is defined as the area within the points of curvature of the intersection radii.

Segments with Any Portion Having a Posted Speed Limit Less Than 55 MPH	
Category	Description
HMA IV	Asphalt pavement including intersections, bridges, approaches, and railroad crossings.
PCC IV	Concrete pavement including gaps, intersections, bridges, approaches, and railroad crossings.

C.4.3 Verification Testing

- (1) The department may conduct verification testing (QV) to validate the quality of the product. A certified HTCP profiler technician will perform the QV testing. The department will provide the contractor with a listing of the names and telephone numbers of all verification personnel for the project.
- (2) The department will notify the contractor before testing so the contractor can observe the QV testing. Verification testing will be performed independent of the contractor's QC work using separate equipment from the contractor's QC tests. The department will provide test results to the contractor within 1 business day after the department completes the testing.
- (3) The engineer and contractor will jointly investigate any testing discrepancies. The investigation may include additional testing as well as review and observation of both the department's and contractor's testing procedures and equipment. Both parties will document all investigative work.
- (4) If the contractor does not respond to an engineer request to resolve a testing discrepancy, the engineer may suspend production until action is taken. Resolve disputes as specified in C.6.

C.4.4 Documenting Profile Runs

- (1) Compute the IRI for each segment and analyze areas of localized roughness using the ProVAL software. Within 5 business days after completing a final acceptance profile run, submit a copy of the ProVAL smoothness assurance report showing the IRI for each segment and the areas of localized roughness exceeding an IRI of 175 in/mile. The ProVAL software and department-specified inputs are available on the department's web site:

<http://roadwaystandards.dot.wi.gov/standards/qmp/index.htm>

- (2) As part of the profiler software outputs and ProVAL reports, document the areas of localized roughness and the locations of individual features including construction joints, structure limits, design features, utility fixtures, and other features that might affect the department's evaluation of ride quality. Field-locate the areas of localized roughness prior to the engineer's assessment for corrective actions.
- (3) Within 5 business days after completing profiling of the pavement covered under this special provision, unless the engineer and contractor mutually agree to a different timeline, submit the electronic ProVAL project file containing the .ERD files for each profiler acceptance run. Submit profile data using the department's Materials Reporting System (MRS) software available on the department's web site:

<http://www.atwoodsystems.com/mrs>

C.5 Corrective Actions

C.5.1 General

- (1) Correct the ride as the engineer directs. The department will independently assess whether a repair will help or hurt the long-term pavement performance and/or public perception of the ride before deciding on corrective action.

C.5.2 Corrective Actions for Localized Roughness

- (1) Apply localized roughness requirements to all pavements, including HMA III, PCC III, HMA IV, and PCC IV; except localized roughness requirements will not be applied to pavements within 25 feet of the following surfaces if they are not constructed under this contract: bridges, bridge approaches, or railroad crossings. The department may direct the contractor to make corrections to the pavement within the 25-foot exclusionary zones and will compensate the contractor for the extra work.
- (2) The engineer will review each individual wheel track for areas of localized roughness. The engineer will assess areas of localized roughness that exceed an IRI of 175 in/mile and do one of the following for each location:
 1. Direct the contractor to correct the area to minimize the effect on the ride.
 2. Leave the area of localized roughness in place with no pay reduction.

3. Except for HMA IV and PCC IV segments, assess a pay reduction as follows for each location in each wheel path:

Localized Roughness IRI (in/mile)	Pay Reduction^[1] (dollars)
> 175	(Length in Feet) x (IRI – 175)

^[1] A maximum \$250 pay reduction may be assessed for locations of localized roughness that are less than or equal to 25 feet long. Locations longer than 25 feet may be assessed a maximum pay reduction of \$10 per foot.

- (3) The engineer will not direct corrective action or assess a pay reduction for an area of localized roughness without independent identification of that area as determined by physically riding the pavement. For corrections, use only techniques the engineer approves.
- (4) Re-profile corrected areas to verify that the IRI is less than 140 in/mile after correction. Submit a revised ProVAL smoothness assurance report for the corrected areas to validate the results.

C.5.3 Corrective Actions for Excessive IRI

- (1) If an individual segment IRI exceeds 140 in/mile for HMA I, HMA II, and PCC II pavements after correction for localized roughness, the engineer may require the contractor to correct that segment. Correct the segment final surface as follows:

HMA I:	Correct to an IRI of 60 in/mile using whichever of the following methods the engineer directs: Mill and replace the full lane width of the riding surface excluding the paved shoulder. Correct the full lane width using techniques approved by the engineer.
HMA II:	Correct to an IRI of 85 in/mile using whichever of the following methods the engineer directs: Mill and replace the full lane width of the riding surface excluding the paved shoulder. Correct the full lane width using techniques approved by the engineer.
PCC II:	Correct to an IRI of 85 in/mile using whichever of the following methods the engineer directs: Continuous diamond grinding of the full lane width of the riding surface including adjustment of the paved shoulders Correct the full lane width using techniques approved by the engineer.
- (2) Re-profile corrected segments to verify that the final IRI meets the above correction limits and there are no areas of localized roughness. Submit a revised ProVAL smoothness assurance report for the corrected areas to validate the results. Segments

failing these criteria after correction are subject to the engineer's right to adjust pay for non-conforming work under standard spec 105.3.

C.6 Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate testing procedures, and perform additional testing.
- (2) If the project personnel cannot resolve a dispute and the dispute affects payment or could result in incorporating nonconforming pavement, the department will use third party testing to resolve the dispute. The department's Quality Assurance Unit, or a mutually agreed on independent testing company, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent tester. The department may use third party tests to evaluate the quality of questionable pavement and determine the appropriate payment.

D Measurement

- (1) The department will measure Incentive IRI Ride by the dollar, adjusted as specified in E.2.

E Payment

E.1 Payment for Profiling

- (1) Costs for furnishing and operating the profiler, documenting profile results, and correcting the final pavement surface are incidental to the contract.

E.2 Pay Adjustment

- (1) The department will pay incentive for ride under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
440.4410.S	Incentive IRI Ride	DOL

- (2) Incentive payment is not limited, either up or down, to the amount the schedule of items shows.
- (3) The department will administer disincentives for ride under the Disincentive IRI Ride administrative item.
- (4) The department will not assess disincentive on HMA III or PCC III segments. Incentive pay for HMA III and PCC III segments will be according to the requirements for the category of the adjoining segments.
- (5) The department will adjust pay for each segment based on the initial IRI for that segment before any corrective action is taken. The department will base disincentives on the IRI after correction for pavement meeting the following conditions:

- All Pavement: The corrective work is performed in a contiguous, full lane width section 500 feet long, or a length as agreed with the engineer.
- HMA Pavements: The corrective work is a mill and inlay or full depth replacement and the inlay or replacement layer thickness conforms to standard spec 460.3.2.
- Concrete Pavements: The corrective work is a full depth replacement and conforms to standard spec 415.

- (6) The department will adjust pay for 500-foot long standard segments nominally one wheel path wide using equation “QMP 1.03” as follows:

HMA I	
Initial IRI (inches/mile)	Pay Adjustment^[1] (dollars per standard segment)
< 30	250
≥ 30 to <35	1750 – (50 x IRI)
≥ 35 to < 60	0
≥ 60 to < 75	1000 – (50/3 x IRI)
≥ 75	-250

HMA II and PCC II	
Initial IRI (inches/mile)	Pay Adjustment^{[1][2]} (dollars per standard segment)
< 50	250
≥ 50 to < 55	2750 – (50 x IRI)
≥ 55 to < 85	0
≥ 85 to < 100	(4250/3) – (50/3 x IRI)
≥ 100	-250

HMA IV and PCC IV	
Initial IRI (inches/mile)	Pay Adjustment^{[1][2]} (dollars per standard segment)
< 50	250
≥ 50 to < 75	750 – (10 x IRI)
≥ 75	0

^[1] If the engineer directs placing upper layer asphaltic mixtures between October 15 and May 1 for department convenience as specified in standard spec 450.3.2.1(5), the department will not adjust pay for ride on pavement the department orders the contractor to place when the temperature, as defined in standard spec 450.3.2.1(2), is less than 36 F.

^[2] If the engineer directs placing concrete pavement for department convenience, the department will not adjust pay for ride on pavement the department orders the contractor to place when the air temperature falls below 35 F.

- (7) The department will prorate the pay adjustment for partial segments based on their length.
440-010 (20100709)

85. HMA Longitudinal Joint Repair.

This special provision describes the milling, brooming, placing of HMA, and maintenance of the HMA Longitudinal Joint Repair item in accordance to the pertinent requirements of the standard specifications, and as hereinafter provided.

Delete standard spec 460.2.8.

Submit a mix design under the Asphaltic Pavement Repair Special bid item. Furnish an asphaltic mixture meeting the requirements specified for E30 under 460.2 of the standard specifications.

Provide asphaltic material PG 64-22 for this mix in accordance to standard spec 455.

Provide tack coat that is in accordance to standard spec 455.2.5.

Mill out an area no less than 2.0 feet wide to a depth down to the existing concrete pavement as shown on the construction detail and in the plans. The length of the repair will be determined by the engineer.

Clean the existing exposed concrete pavement surface with a power broom or other suitable equipment to remove millings or other objectionable matter prior to placing any HMA.

Conform to standard spec 315.3.1 for placement of the HMA pavement.

Maintain work done under the HMA Longitudinal Joint Repair item for the duration of the contract. This includes remilling and replacement of additional HMA pavement if required as determined by the engineer.

Payment for the HMA Longitudinal Joint Repair item is incidental to Removing Asphaltic Surface Milling and HMA Pavement Type E-30.

Hauling and disposing of existing pavements, brooming the milled area prior to placing the HMA pavement, placing tack coat, providing and placing the asphaltic pavement mixture (including asphaltic material), maintaining the HMA Longitudinal Joint Repair, and for furnishing all labor, equipment, and tools necessary to complete the work in accordance to the contract are incidental to Removing Asphaltic Surface Milling and HMA Pavement Type E-30.

**86. Architectural Surface Treatment R-40-525, Item 517.1050.S.0002;
Architectural Surface Treatment R-40-554, Item 517.1050.S.0003;
Architectural Surface Treatment R-40-555, Item 517.1050.S.0004.**

A Description

Construct a concrete masonry architectural surface treatment on the exposed concrete surfaces of the structure, as detailed in the plans and as hereinafter provided.

B Materials

Use form liners that attach easily to the forming system, and do not compress more than ¼-inch when poured at a rate of 10 vertical feet/hour.

Use a release agent that is compatible with the form liner and coloring materials.

Wall ties shall have set “break-backs” at a minimum of ¾-inches from the finished concrete surface.

C Construction

C.1 Equipment

Equipment and tools necessary for performing all parts of the work shall be satisfactory as to design, capacity, and mechanical condition for the purposes intended. Repair, improve, replace, or supplement all equipment that is not maintained in full working order, or which is proven inadequate to obtain the results prescribed.

C.2 Form Liner Preparation

Clean the form liner prior to each pour and ensure that it is free of any build-up. Visually inspect each liner for blemishes or tears, and repair if necessary per manufacturer’s recommendations.

Apply form release per manufacturer’s recommendations.

C.3 Form Liner Attachment

Place adjacent liners less than ¼-inch from each other, attach liner securely to forms in accordance to the manufacturer’s recommendations, and coordinate wall ties with form liner and form manufacturer, e.g., diameter, size, and frequency.

C.4 Surface Finishing

Ensure that the textured surface is free of laitance; sandblasting is not permitted.

Grind or fill pouring blemishes.

D Measurement

The department will not measure Architectural Surface Treatment (Structure). The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
517.1050.S.0002	Architectural Surface Treatment R-40-525	SF
517.1050.S.0003	Architectural Surface Treatment R-40-554	SF
517.1050.S.0004	Architectural Surface Treatment R-40-555	SF

Payment is full compensation for producing the proposed architectural surface treatment including: preparing the foundation; finishing and protecting the surface treatment; and for properly disposing of surplus material.

517-150 (20110615)

87. Noise Barriers Double-Sided Sound Absorptive N-40-70 Item 531.0300.S.0010; Noise Barriers Double-Sided Sound Absorptive N-40-71 Item 531.0300.S.0020; Noise Barriers Double-Sided Sound Absorptive N-40-72 Item 531.0300.S.0030.

A Description

This special provision describes designing, fabricating, transporting, and erecting double-sided sound absorptive noise barriers in accordance to the plans, applicable portions of the standard specifications, the department-approved installation specifications, and as hereinafter provided.

B Materials

All materials used in the work shall conform to the pertinent requirements of the standard specifications and as hereinafter specified.

Provide grade A, A-2, A-FA, A-S, A-T, A-IS, or A-IP concrete conforming to standard spec 501 for concrete posts and the core component of composite concrete sound absorbing panels.

B.1 System Pre-Qualification

The noise wall system supplied must be pre-qualified by the department. The department maintains a list of pre-qualified systems which can be viewed at:
<http://www.dot.wisconsin.gov/business/engrserv/approvedprod.htm>.

Systems eligible for use on this project shall be pre-qualified and added to that list prior to the award of this contract.

B.2 Design

The department specifies pre-qualified double-sided sound absorptive noise barrier products on the department's approved product lists available at:
<http://www.dot.wisconsin.gov/business/engrserv/approvedprod.htm>

Provide the name of the selected system to the engineer within 25 days after award of the contract. Schedule a pre-design meeting with the engineer subsequent to award of the contract and prior to beginning design of the noise barrier. The suppliers of the noise barrier components shall attend this meeting.

B.2.1 Structural and Foundation Design

The structural and foundation design of the noise barrier system shall be in accordance to the current edition of "Guide Specifications for Structural Design of Sound Barriers published by the American Association of State Highway and Transportation Officials (AASHTO), 444 North Capitol Street, NW, Suite 225, Washington, DC 20001.

Design the noise barrier to withstand wind pressure, applied perpendicular to the barrier, in each direction, of 28.5 pounds per square foot for ground mounted barriers, and 37.5 pounds per square foot for structure mounted barriers.

The top 3-feet of supporting soil shall be ignored in the design of ground-mounted barrier foundations.

B.2.2 Fire Hose Access Openings

Design fire hose access openings, at locations shown on the plans, with additional reinforcement and protective coating around the opening as necessary to maintain structural integrity. Detail drawings shall show the additional reinforcement and method for attaching the Fire Hydrant Location Signs to the barrier panel.

B.2.3 Barrier Profile

Unless otherwise shown on the plan or approved by the engineer, design the top of the noise barrier to be horizontal and at or above the acoustic elevation line shown on the plans. The bottom elevation of the noise barrier shall be as shown on the plans. Changes in elevation shall be accomplished by stepping sections at posts. Steps shall not exceed 3-feet in height. All joints shall be horizontal or vertical and shall be aligned with the adjacent panels.

B.2.4 Panel Orientation

Design the panels to prevent entrapment and ponding of water. Avoid inadvertently providing areas for perching, nesting of birds, or collecting of dirt and debris in the design of the noise barrier system.

B.2.5 Color and Surface Texture

Unless otherwise shown and provided for in the plans, wall pattern shall contain textures with relief features of sufficient depth and quantity to be distinguishable at an observation distance of 500-feet. The color(s) and texture(s) chosen will be within the following parameters; however, at the discretion of the engineer, a single color and/or a single texture may be selected for either side of the noise barrier.

	Freeway Side	Residential Side
Number of colors	2	2
In the proportion of	75:25 (±5%)	75:25 (±5%)
Number of textures	2	2
In the proportion of	75:25 (±5%)	75:25 (±5%)

The final color of the panels and posts shall be as shown on the plans and match the Federal Standard color system list. Coating and coloring of the post and panels shall be shop applied.

Base Color – 33564

Accent Color #1 - 33448

All individual noise barrier panels shall not be more than one color except as noted in the follow paragraph, and shall be the same color on both sides, unless otherwise approved by the engineer. Noise barrier posts shall be manufactured of the same materials throughout the project.

Supply and deliver to the engineer a 3-foot x 5-foot minimum test panel for each panel type, with the specified pattern and colors. Obtain the engineer's acceptance of the panel's pattern and color prior to production of the panels required for the contract. The accepted pattern and color test panels shall remain on the project site in a readily accessible location for the duration of the project. The accepted pattern and color sample panels will be the standard for all noise barriers on the project.

The engineer will visually inspect panels for color consistency upon arrival at the project. The panels shall have no substantial variation in color from the accepted sample panel submitted for the project. All panels with substantial color variation will be rejected and shall be removed from the project.

B.2.6 Sound Transmission Loss (TL)

Design the noise barrier panel material to achieve a transmission loss equal to or greater than 20 decibels in all test frequency bands.

B.2.7 Noise Reduction Coefficient (NRC)

Design the noise barrier so that at least 70 percent of the highway side of the noise barrier panels that are 2-feet above the ground shall have a minimum NRC of 0.80. The remaining noise barrier panels on the highway side that are 2-feet or more above the ground shall have a minimum NRC of 0.70. The minimum NRC for panels on the residential side, which are 2-feet above the ground shall be 0.70.

B.2.8 Structural Steel

Galvanize all structural steel after fabrication by the hot dip process in accordance to ASTM A123. Galvanize steel hardware and threaded fasteners, bolts, nuts, and washers in accordance to ASTM A153.

Shop coat all steel galvanized surfaces exposed to view with an approved paint system as hereinafter specified. Clean galvanizing surfaces to be painted 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.

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 surface and prepare the surface for the top coat. Apply a top coat matching the finished color specified in B.2.5. Use a pre-approved top coat that is resistant to the effects of the sun, and is suitable for use in a marine environment. Exercise care so as not to damage the painted surfaces during shipment and erection of the noise barriers.

Use one of the qualified paint sources and products given below. An equivalent system may be used with the written approval of the engineer. Supply the engineer with the product data sheets before applying any coating. 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.

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	NA
Carbolin 350 Hanley Industrial St Louis, MO 63144 (314) 644-1000	Tie	Rustbond Penetrating Sealer FC	1	36
	Top	Carboline 133 LH	4	NA
Wasser Corporation 4118 B Place NW Suite B Auburn, WA 98001	Tie	MC-Ferrox B 100	3.0 to 5.0	8
	Top	MC-Luster 100	2.0 to 4.0	NA

B.2.9 Design Coordination

B.2.9.1 Underground Utility and Drainage Crossings

Design the noise barrier post spacing so as not to interfere with the existing utility and drainage facilities.

Design the noise barrier post spacing so as not to interfere with proposed utility and drainage facilities shown in the plans. This includes proposed roadway lighting and ITS facilities.

B.2.9.2 Proposed Structures

For noise barriers mounted behind or near proposed retaining walls, coordinate and design the noise barrier post spacing so as to not interfere with embedded portion of the proposed retaining walls, including MSE wall soil reinforcement and tieback anchors on soldier pile and timber lagging retaining walls.

For noise barriers mounted on proposed bridges and retaining walls, coordinate and design the noise barrier post spacing to coincide with noise barrier post and embedded noise barrier anchor assembly spacing shown on the bridge and retaining wall plans. Coordinate any required changes to the noise barrier post spacing and embedded noise barrier anchor assembly locations shown on the bridge and retaining wall plans, if required for the design of the noise barrier.

B.2.10 Project Submittal Requirements

Submit three copies of the following documents to the engineer for review:

1. All structural and foundation design calculations.
2. Detailed design/shop drawings.
3. Certifications for all materials, including trade name of the products along with the name and address of the manufacturers.
4. Specifications regarding installation requirements and sequence of construction, including a detailed bill of materials.
5. Detailed colored plan of the aesthetic treatment for the entire noise barrier.

Submit the following documents to the Bureau of Structures Design Section:

1. Three sets of design/shop drawings and one set of design calculations for review and acceptance. Any necessary revisions and/or corrections required for acceptance will be noted and returned to the contractor.

Design calculations shall be on 8½-inch x 11-inch sheets, neatly bound with a title sheet listing the complete project identification number and sound barrier designation. Design/shop drawings shall conform to the contract plans and the requirements of these special provisions. The design/shop drawings shall consist of plan and profile sheets, details, explanatory notes, erection diagrams, aesthetic treatments, and other working plans. All dimensions, sizes of material, material information and other information necessary for the complete fabrication and construction of the noise barrier should be designated on the appropriate sheets. The design/shop drawings shall be drawn to an appropriate scale on reproducible sheets 11 x 17-inches including borders. Each sheet shall carry the complete project identification number and noise barrier designation. Design/shop drawings and calculations shall be signed, sealed and dated by a professional engineer licensed in the State of Wisconsin.

B.2.11 Review Process

All documents, including drawings, calculations and related material submitted for review will be given final acceptance by the engineer.

It is expressly understood that the engineer's review and acceptance of the drawings, calculations, and related material, submitted by the contractor, means only an acceptance of the character and sufficiency of the details, and does not relieve the contractor from responsibility in regard to errors or omissions on said submittals.

The final accepted design documents and/or shop drawings shall become a part of the contract. Any substitution of materials or dimensions contemplated by the contractor's submitted documents, different from materials or dimensions shown on the contract plans, shall be made only when approved by the engineer, and in such case, additional costs resulting from such substitution shall be borne by the contractor.

Ordering of materials by the contractor prior to acceptance of the submittal requirements shall be at the contractor's own risk.

B.3 Wall System Testing Requirements

All test reports required in section B.3 shall reference the specific facility which will be producing material for this contract. Test reports shall be representative of differing production lots on materials manufactured for this specific contract which is representative of the manufacturer's continuous production for wall systems. Panels tested or from which samples will be taken from shall be selected and appropriately marked by the engineer either at the manufacturer's plant or from panels delivered to the project at the engineer's option. Test reports will be required for each lot of material not to exceed 100,000 SF of noise barrier produced. Testing shall be conducted on panels within the first 30,000 SF of production of each lot not exceeding 100,000 SF. For projects that do not exceed 100,000 SF, a minimum of two lots of material will represent the project, each lot representing equivalent square footage. The first set of tests conducted for projects that do not exceed 100,000 SF shall be within the first third of the total square footage of the project.

Products tested should be tested as a system under the requirements in B.3.1 and B.3.2; this includes stain intended for the supplied concrete and composite concrete components wall panels.

B.3.1 Noise Reduction Coefficient (NRC)

The noise barrier panel shall be tested in accordance to ASTM C423, and placed in accordance to ASTM E795, mounting type A, to determine the noise reduction coefficient (NRC) of the material. Submit to the engineer an independent testing laboratory test report that shows that the noise barrier panels achieve an NRC as specified for each side of the barrier.

B.3.2 Salt Scaling Resistance

All sound absorbing composite concrete and composite concrete components shall be tested for salt scaling resistance in accordance to ASTM C672 and the following modifications and/or requirements.

B.3.2.1 Test Specimens

For the purposes of the test, three specimens of a full cross section of the composite panel at least 12 inches x 12-inches shall be selected at random from the provided composite panel as defined in B.3. Sample specimens shall be from production panels as selected and marked by the engineer, representative of the manufacturer's continuous production operation.

The surfaces of the sample specimen(s) shall be prepared for testing as follows. Brush the surfaces of the sample to remove any loose particles. The test specimens shall then be submerged in water for a period of 24 hours prior to testing. Immediately following this, the specimens shall be covered with the sodium chloride solution as stated below.

B.3.2.2 Test Procedure

Place samples in a 5 sided water tight container in which a solution of sodium chloride (concentration 3% by mass) fully submerges the specimen. A ¼- inch of sodium chloride solution shall be maintained above the top surface of the fully submerged specimen within the container.

The specimens shall then be subjected to continuous freeze-thaw cycles as follows:

After each five cycles, the salt solution and particles of deteriorated concrete shall be removed from the slab and collected in a watertight container. The operation is best accomplished by tilting the slab in a funnel approximately 20-inches in diameter and washing the surface of the slab with a 3% sodium chloride solution. This washing should continue until all loose particles are removed from the concrete. The solution shall then be strained through a filter and the residue dried out at 221 degrees Fahrenheit to a constant mass condition. The residue shall be cumulatively weighed after each five cycles. This residue shall be defined as the loss of mass and expressed in pounds per square foot of exposed slab area. This is to exclude the concrete core for composite concrete panels in the calculation of the area used to express the mass loss per square foot. The loss of mass shall be calculated to the nearest 0.01 pounds per square foot. The surfaces should be rated in accordance to 10.1.5 of ASTM C672 including any delamination of the sound absorbing material from the concrete core for composite concrete materials. After the washing of each slab, a new solution of sodium chloride (concentration 3% by mass) shall be placed in the 5 sided water tight container to fully submerge the specimen to a depth of ¼-inch above the top surface of the fully submerged test specimen.

The test shall continue until 50 freeze-thaw cycles have been completed.

During the test each specimen shall be positioned and supported to allow free circulation of the test solution under, around, and over test pieces. The bottom of the specimens shall be supported on blocks in a manner to assure movement of moisture through and around the test specimen(s).

B.3.2.3 Test Report

Submit to the engineer an independent testing laboratory test report which shows that all solid and composite concrete products meet or exceed the following criteria:

- a. After 50 freeze-thaw cycles the test specimens shall not exhibit excessive deterioration in the form of cracks, spalls, aggregate disintegration, delamination, or other objectionable features.
- b. Compliance with the test requirements is based upon a loss of mass of not more than 0.2 pounds per square foot from the surface after 50 cycles of freezing and thawing. The measured surfaces are not to include the exposed surface of any core material of a composite concrete component.
- c. The report shall include the following:
 1. Name of manufacturer.
 2. Location of production.
 3. Production description.
 4. Date product sample was cast.
 5. Commencement date of testing.
 6. Specimen identification.
 7. 5x7-inch color photographs of the test specimens before and after the 50 cycles freeze-thaw test.
 8. A graph of the cumulative mass loss of each specimen plotted against the number of freeze-thaw cycles for 5, 10, 15, 20, 25, 30, 40, and 50 freeze-thaw cycles.
 9. Visual rating in accordance to 10.1.5 ASTM C672 including report of any delamination of the sound absorbing material from the concrete core for composite concrete components.

B.4 Wall Systems Material Requirement

Contractor shall provide certification of compliance to all applicable requirements in B.4. All material certifications shall reference the specific facility manufacturing the material and this contract. Certifications will be required for each lot of material not to exceed 100,000 SF of noise barrier produced. For projects that do not exceed 100,000 SF, a minimum of 2 lots of material will represent the project, each lot representing equivalent square footage.

B.4.1 Sound Transmission Loss (TL)

Submit to the engineer certification of compliance that the sound transmission loss of the panel material, when tested in accordance to ASTM Standard E90, achieves a transmission loss as specified in B.2.6.

B.4.2 Structural Steel

Submit to the engineer certification of compliance that structural steel galvanized after fabrication is in accordance to ASTM A123. Steel posts of post and panel walls shall be galvanized. Any galvanized surfaces exposed to view shall be coated with an approved paint system as referenced in B.2.8.

B.4.3 Accelerated Weathering

Submit to the engineer certification of compliance that all coatings on barrier components, with the exception of structural steel and wood components, comply with the following requirements when tested by ASTM Standard G155, G153, or G152 after 2400 hours of exposure on a cement based test specimen(s).

1. No checking when rated in accordance to ASTM D660.
2. No cracking when rated in accordance to ASTM D661.
3. No blistering when rated in accordance to ASTM D714.
4. No difference in adhesion between the unexposed control sample and an exposed sample when tested in accordance to ASTM D3359, Method A.
5. No chalking less than #7 rating when rated in accordance to ASTM D4214.
6. No color change greater than 5 NBS units when measured in accordance to ASTM D2244, using illuminant D65 and the 1964 10 degree standard observer.

B.4.4 Corrosion Resistance (Salt Fog Exposure)

Submit to the engineer certification of compliance that all coated steel components, with the exception of structural steel, has a coating system that has been tested for corrosion resistance in accordance to ASTM B117 and comply with the following requirements:

1. No checking when rated in accordance to ASTM D660.
2. No blistering when rated in accordance to ASTM D714.
3. No loss of adhesion when tested in accordance to ASTM D3359 with no evidence of corrosion along the edges of the samples or along the score lines or other defects.

B.4.5 Steel Panels

All steel panels shall be minimum nominal 20 gauge galvanized steel. The steel panels shall be free from laminations, blisters, slivers, open seams, pits from heavy rolled-in scale, ragged edges or other defects that may affect their appearance or use for the intended purpose. All shearing, cutting, and punching shall be done prior to preparation of the panels for application of coatings.

B.4.6 Aluminum Panels

All aluminum panels shall be minimum 0.063 inch nominal thickness or greater. The aluminum panels shall be free from laminations, blisters, slivers, open seams, pits from heavy rolled-in scale, ragged edges or other defects that may affect their appearance or use for the intended purpose. All aluminum panels shall conform to the thickness tolerances of the Aluminum Association, Inc. All shearing, cutting, and punching shall be done prior to preparation of the panels for application of coatings.

B.4.7 Timber Components

All lumber and timber furnished for the work shall be in accordance to the requirements of standard spec 507 and as hereinafter specified.

B.4.7.1 Species of Wood

All lumber and timber, with the exception of Glue Laminated Timber, shall be from one of the following species: Douglas Fir-Larch, Southern Pine, and Hem-Fir.

Glue laminated timber shall be Southern Pine.

B.4.7.2 Preservative Treatment

All timber components shall receive a chemical preservative treatment. The wood shall be dried to 19% or less prior to treatment. The wood shall be treated using a chromated-copper arsenate solution in accordance to standard spec 507.2.2.6. After treatment, all wood having nominal dimensions less than 3-inches by 3-inches shall be air or kiln dried to a maximum moisture content of 15%. Wood in greater dimensions shall be dried to maximum moisture content of 19%. The required Certificate of Preservative Treatment shall indicate compliance with the maximum moisture content requirement(s), in addition to requirements of the preservative treatment specifications herewith set forth. Wood shall be protected from increases in moisture content until incorporated into the work.

B.4.7.3 Glue Laminated Timber

Glue laminated timber shall contain the mark of a recognized inspection agency as being in conformance with ANSI/AITC A190.1. A wet-use adhesive suitable for use with treated wood as shown in ANSI/AITC A190.1 shall be used. Members shall be of Industrial appearance grade per AITC 110.

Lumber to be glue laminated shall be pressure preservative treated prior to gluing to a retention of 0.4 pounds per cubic foot.

B.4.7.4 Lumber

Non-laminated timber shall not exceed the proportion of six (nominal width) to one (nominal thickness) and shall be No. 1 grade or better. Sound knots shall extend through members no farther than 50 percent of the cross-section width. Unsound knots are not permitted. Knots are not permitted in the fastening area of any member.

B.4.7.5 Plywood

Plywood shall be exterior type conforming to the provisions of the US Product Standards PS-1 and shall bear the mark of a qualified and approved inspection and testing agency.

B.4.7.6 Sealant/Stain

All wood components of the barrier system shall be coated with a wood sealer/stain as hereinafter provided.

The manufacturer shall select a sealer/stain from one of the sources on the department's approved product list. Product data sheets shall be provided which indicate the mixing directions and recommended method(s) of application. The method and rate of application shall be as recommended by the producer.

B.4.7.7 Hardware and Fasteners

All hardware and fastening devices shall be either hot dipped galvanized steel or made of nonferrous or stainless steel. Fastening devices shall be screws; no nails or staples shall be allowed.

B.4.7.8 Mineral Fiber Material

Mineral fiber material used to increase sound absorption shall be manufactured in accordance to Federal Specification HH-1-558B and ASTM C612. Mineral fiber material shall have a minimum density of 6 pounds per cubic foot, shall absorb less than 1 percent of water when tested in accordance to ASTM C553, be non-corrosive, and nonhygroscopic. The mineral fiber material shall be fastened to the noise barrier system in a manner to prevent sagging when in a saturated condition.

C Construction

C.1 General

Construct the noise barriers at the locations shown on the plans, in accordance to the contract specifications and design drawings and/or as directed by the engineer. All sound absorbing composite concrete components shall be delivered to the project site(s) as a finished component. A sound absorbing composite concrete system, which has the sound absorbing material glue-laminated or alternately affixed by a secondary adhesion method on the project site, will not be allowed.

Provide a minimum ten day notice to the engineer of the date that the fabrication of the noise barrier material will commence. Certifications and test reports will be required for each lot of material not to exceed 100,000 SF of noise barrier produced. For projects that do not exceed 100,000 SF a minimum of 2 lots of material will represent the project, each lot representing equivalent square footage.

Panels from which samples will be taken from for testing required in B.3 shall be selected and appropriately marked by the engineer either at the manufactures' plant or from panels delivered to the project at the engineer's option. Test reports will be required for each lot of material not to exceed 100,000 SF of noise barrier produced. Testing shall be conducted on panels within the first 30,000 SF of production of each lot not exceeding 100,000 SF. For projects that do not exceed 100,000 SF, a minimum of two lots of material will represent the project, each lot representing equivalent square footage. The first set of tests conducted for projects that do not exceed 100,000 SF shall be within the first third of the total square footage of the project.

Inspect all materials delivered to the construction site for proper dimensions, honeycombing, cracks, voids, surface defects, consistency in color and texture, and any other damage or imperfections, prior to installation.

If any part of the noise barrier material fails to comply with any requirements of the contract specification, the component shall either be corrected, permanently marked as unacceptable and be disposed of by the contractor or accepted at a reduced price. The decision will be made by the engineer and is dependent on the severity of the specification deviation.

C.2 Fire Hydrant Location Signs

Furnish and install fire hydrant location sign(s). These shall be attached to the noise barrier at each location shown on the plans by a method as shown on the department approved drawings. The signs shall conform and be of the type specified in the department's sign plate book, plate D9-54 and/or D9-54A.

Compensation for furnishing and placing the fire hydrant location signs shall be included in the contract price for Noise Barriers Double-Sided Sound Absorptive and no additional compensation therefore will be allowed.

C.3 Name Plates

Furnish and install name plates conforming to the requirements of standard spec 506.2.4.

Furnish and place one name plate on each noise barrier at the location indicated on the plans.

Rigidly attach each plate to the barrier by a means approved by the engineer.

Compensation for furnishing and placing of name plates shall be included in the contract price for Noise Barriers, Double-Sided Sound Absorptive Structure and no additional compensation therefore will be allowed.

C.4 Structure Mounted Noise Barriers

Do not erect noise barriers mounted to bridge or retaining wall structures until after the concrete masonry for bridge decks and parapets or retaining wall moment slabs and parapets have attained their specified 28-day strength.

For noise barriers mounted to moment slabs and parapets on top of MSE retaining walls, erection of the noise barrier is limited to two-thirds of the height of the noise barrier acoustical line shown in the plans prior to placement of earth fill or pavement over the top of the moment slab as shown in the plans. Erection of the noise barrier in excess of two-thirds its height to the full height of the noise barrier acoustical line shown on the plans may not occur until after the earth fill or pavement structure over the top of the moment slab shown in the plans is complete.

C.5 Tolerances The posts and panels comprising the noise barrier shall be installed plumb within ½-inch of vertical in 15-feet. The posts shall be located to the line and grades as shown in the plans to within +/- ¾-inch. Horizontal joints of adjacent panels shall be lined up to a vertical tolerance of ¼-inch. Where vertical adjustments are

required for alignment, a mortar base or steel shims shall be used. Galvanize and prime coat steel shims in accordance to B.2.8.

D Measurement

The department will not measure Noise Barriers Double-Sided Sound Absorptive (Structure). The department will use pay plan quantity according to the Pay Plan Quantity article. Any modifications to the contract quantity caused by corrections or revisions of the original contract plan, which have been approved by the engineer, will be measured by the square foot. This area in square feet will be determined by measuring the length in linear feet along the faces of the noise barrier, and height in linear feet from bottom to top of the noise barrier, then multiplying the measured length by the measured height, and the contract quantity will be adjusted accordingly to determine the final pay quantity.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
531.0300.S.001	Noise Barriers Double-Sided Sound Absorptive N-40-70	SF
531.0300.S.002	Noise Barriers Double-Sided Sound Absorptive N-40-71	SF
531.0300.S.002	Noise Barriers Double-Sided Sound Absorptive N-40-72	SF

Payment is full compensation for preparing the design drawings and calculations; supplying and delivering samples and test barrier panels as required in B.2.5 and B.3; furnishing all labor, equipment, and materials required for the manufacture, testing, supply, and delivery of the noise barrier material including aesthetic patterns on panel and coloring; furnishing all labor, tools, equipment, and materials required to construct the noise barriers, including site preparation, all necessary excavation, disposing of materials, constructing foundations, and erecting posts and panels.

88. Cover Plates Temporary, Item 611.8120.S.

A Description

This special provision describes furnishing, installing and removing a steel plate to cover and support asphaltic pavement and traffic loading at manholes, inlets and similar structures during milling and paving operations.

B Materials

Provide a 0.25-inch minimum thickness steel plate that extends to the outside edge of the existing masonry.

C (Vacant)

D Measurement

The department will measure Cover Plates Temporary, acceptably completed in place, as units.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
611.8120.S	Cover Plates Temporary	Each

Payment is full compensation for furnishing, installing, and removing the cover plates.

The steel plates shall become the property of the contractor when no longer needed in the contract work.

611-006 (20030820)

89. Pipe Grates, Item 611.9800.S.**A Description**

This special provision describes furnishing and installing pipe grates on the ends of pipes as shown in the plans, and as hereinafter provided.

B Materials

Furnish steel conforming to the requirements of standard spec 506.2.2.1. Furnish steel pipe conforming to the requirements of standard spec 506.2.3.6.

Furnish pipe grates galvanized according to ASTM A123.

Furnish angles and brackets galvanized according to ASTM A123.

Furnish required hardware galvanized according to ASTM A153.

C Construction

Repair pipes, rods, angles and brackets on which the galvanized coating has been damaged in accordance to the requirements of AASHTO M36M.

D Measurement

The department will measure Pipe Grates in units of work, where one unit is one grate, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
611.9800.S	Pipe Grates	Each

Payment is full compensation for furnishing and installing all materials; and for drilling and connecting grates to pipes.

611-010 (20030820)

90. Fence Temporary, Item 616.0600.S.

A Description

This special provision describes furnishing, erecting, and removing temporary fencing at the locations shown on the plans and as directed by the engineer.

B (Vacant)

C Construction

Construct fence to the minimum strength and height required to contain livestock, as approved by the engineer.

D Measurement

The department will measure Fence Temporary in place by the linear foot from end posts, center to center, along the ground line.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
616.0600.S	Fence Temporary	LF

Payment is full compensation for furnishing all materials; erecting posts and fence; and for removing and disposing of fencing.

616-025 (20101008)

91. Fence Safety, Item 616.0700.S.

A Description

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

B Materials

Furnish notched conventional metal “T” or “U” shaped fence posts.

Furnish fence fabric meeting the following requirements.

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

C Construction

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

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

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

D Measurement

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

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
616.0700.S.	Fence Safety	LF

Payment is full compensation for furnishing and installing fence and posts; maintaining the fence and posts in satisfactory condition; and for removing and disposing of fence and posts at project completion.

616-030 (20070510)

92. Pavement Marking Grooved Wet Reflective Contrast Tape 4-Inch, Item 646.0841.S; 8-Inch, Item 646.0843.S.

A Description

This special provision describes furnishing, grooving and installing preformed wet reflective pavement marking contrast tape for grooved applications as shown on the plans, according to standard spec 646, and as hereinafter provided.

B Materials

Furnish wet reflective pavement marking contrast tape and adhesive material, per manufacturer's recommendation if required, from the department's approved products list.

Furnish a copy of the manufacturer's recommendations to the engineer before preparing the pavement marking grooves.

C Construction

C.1 General

For quality assurance, provide the project engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of pavement marking contrast tape.

Plane the grooved lines according to details in the plan and per manufacturer's recommendations. Use grooving equipment with a free-floating, independent cutting head. Plane a minimum number of passes to create a grooved surface per manufacturer's recommendations.

C.2 Groove Depth

Cut the groove to a depth of 120 mils $\pm$ 10 mils from the pavement surface or, if tined, from the high point of the tined surface. To measure the depth, the contractor may use a depth plate placed in the groove and a straightedge placed across the plate and groove, or the contractor may use a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Longitudinal Markings

Cut the groove one-inch wider than the width of the tape.

C.4 Groove Position

Position the groove edge according to plan details. Groove a minimum of 4 inches, but not greater than, 12 inches from both ends of the tape segment. Achieve straight alignment with the grooving equipment.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with high-pressure water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, and prior to pavement marking application. The groove surface shall be clean and dry before applying the adhesive, and the pavement marking tape. Use a high-pressure air blower with at least 185 ft³/min air flow and 120 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement five or more days after paving.

Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.6 Tape Application

Apply the tape when both the air and surface temperature are 40 degrees F and rising.

Apply tape in the groove as per manufacturer's recommendations. If manufacturer's recommendations require surface preparation adhesive

- 1) For the Southeast Region and the ozone non-attainment Northeast Region counties of Sheboygan, Manitowoc, and Kewaunee:
 - Apply SPA-60 during May 1 to September 30, both dates inclusive due to Volatile Organic Compound Limitations..
 - Apply P-50 during October 1 to April 30, both dates inclusive. –
- 2) For the remainder counties:
 - Apply either adhesive.

Refer to the manufacturer's instructions for determining when the surface preparation adhesive is set.

Tamp the wet reflective pavement marking contrast tape with a tamper cart roller, with a minimum of a 200-lb load, cut to fit the groove. Tamp a minimum of three complete cycles (6 passes) with grooved modified tamper roller cart.

D Measurement

The department will not measure Pavement Marking Grooved Wet Reflective Contrast Tape (Width). The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
646.0841.S	Pavement Marking Grooved Wet Reflective Contrast Tape 4-Inch	LF
646.0843.S	Pavement Marking Grooved Wet Reflective Contrast Tape 8-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface; furnishing and installing the material; and for removing temporary pavement marking, if necessary.

646-022 (20120615)

93. Install Conduit Into Existing Item, Item 652.0700.S.

A Description

This special provision describes installing proposed conduit into an existing manhole, pull box, junction box, communication vault, or other structure.

B Materials

Use nonmetallic conduit, as provided and paid for under other items in this contract. Furnish backfill material, topsoil, fertilizer, seed, and mulch conforming to the requirements of pertinent provisions of the standard specifications.

C Construction

Expose the outside of the existing structure without disturbing existing conduits or cabling. Drill the appropriate sized hole for the entering conduit(s) at a location within the structure without disturbing the existing cabling and without hindering the installation of new cabling within the installed conduit. Fill void area between the drilled hole and conduit with an engineer-approved filling material to protect against conduit movement and entry of fill material into the structure. Tamp backfill into place.

D Measurement

The department will measure Install Conduit Into Existing System by the unit, acceptably installed. Up to five conduits entering a structure per entry point into the existing structure will be considered a single unit. Conduits in excess of five, or conduits entering at significantly different entry points into the existing pull box, manhole, or junction box will constitute multiple units of payment.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
652.0700.S	Install Conduit Into Existing Item	Each

Payment is full compensation for excavating, drilling holes; furnishing and installing all materials, including bricks, coarse aggregate, sand, bedding, and backfill; for excavating and backfilling; and for furnishing and placing topsoil, fertilizer, seed, and mulch in disturbed areas; for properly disposing of surplus materials; and for making inspections.
652-070 (20100709)

94. Install ITS Field Cabinet, Item 673.0200.S.

A Description

This special provision describes installing a state-furnished type 170, size 334 field cabinet.

B Materials

The department will furnish the type 170, size 334 field cabinet. Provide all necessary miscellaneous mounting hardware and internal power cables. With the field cabinet, the department will furnish cabinet bolts to anchor the cabinet to the concrete base.

C Construction

Install the field cabinet on a new or existing concrete base paid separately. Make all power connections to the cabinet, isolating the neutral bus from the cabinet and equipment ground.

Effectively ground all cable grounding shields and any spare or unused conductors in the field cabinet to the equipment grounding terminal strip.

D Measurement

The department will measure Install ITS Field Cabinet by the unit, installed according to the contract and accepted.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
673.0200.S	Install ITS Field Cabinet	Each

Payment is full compensation for installing the state-furnished field cabinet; making all connections; and grounding as necessary.
673-005 (20100630)

95. Install Ethernet Switch, Item 675.0400.S.**A Description**

This special provision describes installing an Ethernet switch, and providing all necessary associated wiring.

B Materials

The department will furnish the Ethernet switch. Provide all necessary cables between the Ethernet switch and terminal server or other device.

C Construction

Install the Ethernet switch in a new or existing field cabinet. Connect it to devices as shown on the plans, or as directed by the engineer.

D Measurement

The department will measure Install Switch by the unit, installed in accordance to the contract, tested and accepted.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
675.0400.S	Install Ethernet Switch	Each

Payment is full compensation for installation of the Ethernet switch; furnishing all necessary incidental hardware; and making all necessary connections.

675-040 (20100630)

96. Removing Advance Flasher Assemblies Type 1, Item 676.9001.S.**A Description**

Remove advance flasher assemblies at the locations shown on the plan. Rewire and disconnect all wiring in the control cabinet as necessary and properly dispose of materials, according to the pertinent provisions of standard spec 204 and as hereinafter provided.

B Materials

Dispose of all materials resulting from removing the Advance Flasher Assemblies including but not limited to poles, break-a-way bases, signal assemblies, bulbs, and wire off the job site.

C Construction

Do not remove existing advance flasher assemblies until proper disconnects and wiring changes in the controller cabinet have been made.

Where an existing advance flasher assembly is mounted to a light pole, remove all signal hardware including wire, conduit, signal assemblies and mounts. Where existing conduit has been installed under concrete sidewalk or roadway, do not remove buried conduit unless directed otherwise by the engineer or unless it is not possible to install new wire through the existing conduit.

D Measurement

The department will measure Removing Advance Flasher Assemblies (Type 1) by the unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
676.9001.S	Removing Advance Flasher Assemblies, Type 1	Each

Payment is full compensation for removing advanced flasher assemblies; for rewiring, as necessary; for disconnecting wiring as necessary in the controller cabinet; and for properly disposing of all materials.

Removal of concrete bases and signs associated with this item will be measured and paid for separately.
676-900 (20100630)

97. Install Video Encoder, Item 677.0300.S.

A Description

This special provision describes installing a state-furnished video encoder in a pole mounted cabinet or field cabinet as shown on the plans and as hereinafter provided.

B Materials

Provide Category 5 or better Ethernet cable to connect the Ethernet video encoder to the Ethernet switch. The department will furnish the video encoder or it will be an existing and salvaged encoder.

C Construction

Make the necessary electrical and communication network connections to the video encoder. Mount the video encoder in the pole mounted cabinet or field cabinet. Program the video encoder according to the manufacturer's instructions.

D Measurement

The department will measure Install Video Encoder by each individual assembly, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
677.0300.S	Install Video Encoder	Each

Payment is full compensation for installing the video encoder in a pole mounted cabinet or field cabinet; for making all connections; and for furnishing all programming.
677-030 (20100630)

98. Removing 50-Foot Camera Pole, Item 677.9051.S.

A Description

This special provision describes removing an existing camera pole.

B (Vacant)

C Construction

Disconnect all cables, wiring and equipment that are mounted on or in the poles, and remove the pole from the concrete footing. The department will pick up any antennae, cameras, or other equipment mounted on the pole; contact maintenance staff at (414) 227-2166 at the department's Statewide Traffic Operations Center, when the

material is ready to be picked up. Properly dispose of the pole, conduit, cabling, and wiring away from the project site.

D Measurement

The department will measure Removing 50-Foot Camera Pole by the unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
677.9051.S	Removing 50-Foot Camera Pole	Each

Payment is full compensation for removing and disposing of the existing camera pole; disconnecting any necessary wiring; removing the equipment mounted on the poles; disposing of cabling and wiring; and transportation.

677-901 (20100630)

99. Removing CCTV Camera, Item 677.9200.S.

A Description

This special provision describes removing an existing CCTV camera from an existing camera pole as described in the plan.

B (Vacant)

C Construction

Disconnect all wiring at the control cabinet and at the top of the camera pole. Remove all fastening hardware and remove the existing camera and pan, tilt, and zoom mechanisms from the top of the pole. Salvage and store the cameras for pick up by the department; contact maintenance staff at (414) 227-2166 at the department's Statewide Traffic Operations Center to coordinate when the materials will be picked up.

The contractor may request a meeting with the engineer to assess the condition and operability of the camera prior to beginning work on removing the camera. Any damage or improper operation not noted at the meeting, or prior to the contractor starting work on the removal, will be assumed to be the fault of the contractor; repair or replace the camera at no additional cost to the department. Store the camera until the department picks up the camera.

D Measurement

The department will measure Removing CCTV Camera by the unit, acceptably and completely removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
677.9200.S	Removing CCTV Camera	Each

Payment is full compensation for removing an existing CCTV camera; for disconnecting all necessary cables and wiring; and properly storing the materials.
677-902 (20100630)

100. Loading, Hauling, and Reuse of Solid Waste Soil, Item SPV.0035.0010.

A General

A.1 Description

This special provision describes loading, hauling, and reuse of solid waste soil on-site at the project. Excavation for this item is paid for under other bid items within this contract.

Perform this work in accordance to the requirements of standard spec 205 and with pertinent parts of Chapters NR 700-754 of the Wisconsin Administrative Code, as supplemented herein. Per NR 718.07, a solid waste collection and transportation service-operating license is required under NR 502.06 for each vehicle used to transport contaminated soil.

A.2 Notice to the Contractor – Impacted Soil Locations

The department completed testing for soil contamination for locations within this project where excavation is required. Testing indicated that relatively low-levels of diesel range organics (DRO), lead and/or naphthalene are present in soil at the following locations:

- Structure B-40-892 Station 29+00 to 40+00, project limits from left to right, Zero feet bgs, estimated 63,105 cubic yards.

All material excavated from this location shall be reused as upland fill as described in A3.

If unexpected hazardous material conditions are encountered at the above locations or elsewhere on the project (i.e. soils containing significantly larger percentages of non-exempt solid waste, buried drums, tanks, noxious odors or liquids, etc.), terminate excavation activities in the area immediately and notify the engineer.

A.3 Reuse of Solid Waste Soils

Soil containing solid waste excavated from the location listed in A.2 shall be reused as fill material within the Zoo Interchange right-of-way, as shown in the plans, covered with a 1-foot minimum layer of clean soil at the following locations:

- Structure B-40-895, as structural fill above the completed structure
- IH 894/USH 45 northbound at Greenfield Ave, East side, from Greenfield Avenue to 750 feet south of Greenfield Avenue
- Ramp NW Surcharge

A.4 Excavation Management Plan Approval

The excavation management plan for this project has been designed to minimize the off-site disposal of contaminated material. The excavation management plan, including these special provisions, has been developed in cooperation with the WDNR. The WDNR concurrence letter is on file at the Wisconsin Department of Transportation. For further information regarding previous investigation and remediation activities in these areas contact:

Name: Michael Cape, P.G.
Address: 141 NW Barstow Street, Waukesha, WI 53187-0798
Phone: (262) 548-5930
Fax: (262) 548-6891
E-mail: michael.cape@dot.state.wi.us

A.5 Coordination

Coordinate work under this contract with the environment consultant:

Consultant: TRC Environmental Corporation
Address: 150 N. Patrick Blvd. Ste. 180, Brookfield, WI 53045
Contact: Mr. Ken Yass, P.E., CHMM
Phone: (262) 901-2145
Fax: (262) 879-1220
E-mail: kyass@trcsolutions.com

The role of the environmental consultant will be limited to:

- Determining the location and limits of solid waste soil to be excavated and reused as fill based on soil analytical results from previous investigations, visual observations, and field screening of soil that is excavated;
- Documenting that activities associated with management of solid waste soil are in conformance with the solid waste management methods for this project as specified herein; and,
- Obtaining the necessary approvals for the reuse of solid waste soils from the WDNR.

Provide at least a 14-calendar day notice of the preconstruction conference date to the environmental consultant. At the preconstruction conference, provide a schedule for all excavation activities in the areas specified above to the environmental consultant. Also notify the environmental consultant at least 3 calendar days prior to commencement of excavation activities in each solid waste soil area.

Coordinate with the environmental consultant to ensure that the environmental consultant is present during excavation activities in the solid waste soil areas. Perform excavation work in each of these areas on a continuous basis until excavation work is completed.

The environmental consultant will be responsible for obtaining the necessary approvals for on-site reuse of the excavated solid waste from the WDNR. Do not transport soil offsite without prior approval from the environmental consultant.

A.6 Health and Safety Requirements

Supplement standard spec 107.1 with the following:

During excavation activities, expect to encounter soil impacted with diesel range organics and lead. Site workers taking part in activities that will result in the reasonable probability of exposure to safety and health hazards associated with hazardous materials shall have completed health and safety training that meets the Occupational Safety and Health Administration (OSHA) requirements for Hazardous Waste Operations and Emergency Response (HAZWOPER), as provided in 29 CFR 1910.120.

Prepare a site-specific Health and Safety Plan, and develop, delineate and enforce the health and safety exclusion zones as required by 29 CFR 1910.120. Submit the site-specific health and safety plan and written documentation of up-to-date OSHA training to the engineer prior to the start of work.

B (Vacant)

C Construction

Supplement standard spec 205.3 with the following:

Control operations in the impacted areas to minimize the quantity of solid waste soil excavated and hauled for reuse within the right-of-way.

The environmental consultant will periodically evaluate soil excavated from the area specified above. The environmental consultant will evaluate excavated soil based on field screening results, visual observations, and soil analytical results from previous environmental investigations. Assist the environmental consultant in collecting soil samples for evaluation using excavation equipment. The sampling frequency shall be a maximum of one sample for every 15 cubic yards excavated.

Directly load and haul soils designated by the environmental consultant for reuse. Use loading and hauling practices that are appropriate to prevent any spills or releases of soil during transit. Prior to transport, sufficiently dewater soils designated for on-site reuse so as not to contain free liquids.

If dewatering is required in area of known contamination, water generated from dewatering activities may contain very low-level metals. Based on the limited groundwater testing performed in the Phase 2.5 investigation, the water generated may meet the effluent limits specified in “Contaminated Groundwater from Remedial Action Operations” (WPDES Permit No. WI-0046566-5), Table 3.1 once standard construction sediment removal is employed. Notify the engineer of any dewatering activities, and obtain any permits necessary to discharge water. Provide copies of such Permit to the

engineer. Ensure continuous dewatering and excavation safety at all times. Provide, operate, and maintain adequate pumping equipment and drainage and disposal facilities. Meet any requirements and pay any costs for obtaining and complying with such permit use. Follow all applicable legislative statutes, judiciary decisions, and regulations of the State of Wisconsin.

Costs associated with excavation dewatering in the contaminated area are considered incidental to this pay item. The Wisconsin Department of Transportation will be the generator of regulated solid waste from this construction project.

D Measurement

The department will measure Loading, Hauling, and Reuse of Solid Waste Soil in cubic yards of solid waste soil reused as documented by the environmental consultant.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.0010	Loading, Hauling, and Reuse of Solid Waste Soil	CY

Payment is full compensation for segregating, loading, hauling, placing and grading of solid waste soil; obtaining solid waste collection and transportation service operating licenses; assisting in the collection of soil samples for field evaluation; dewatering of soils prior to transport, if necessary; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

101. HPC Masonry Structures, Item SPV.0035.4000.

This special provision describes specialized material and construction requirements for high-performance concrete used in bridge structures. Conform to standard spec 501, 502 and 509, as modified in this special provision. This special provision also describes QMP concrete pavement and structures. Conform to standard spec 715 as modified in this special provision.

MODIFY THE STANDARD SPECIFICATIONS AS FOLLOWS:

501.2.5.4.1 General

Replace the entire text with the following:

- (1) Use clean, hard, durable crushed limestone with 100% fractured surfaces and free of an excess of thin or elongated pieces, frozen lumps, vegetation, deleterious substances or adherent coatings considered injurious.
- (2) Use virgin aggregates only.

501.2.5.4.2 Deleterious Substances

Replace paragraph one with the following:

- (1) The amount of deleterious substances must not exceed the following percentages:

DELETERIOUS SUBSTANCE	PERCENT BY WEIGHT
Shale.....	1.0
Coal	1.0
Clay lumps	0.3
Soft fragments	5.0
Any combination of above.....	5.0
Thin or elongated pieces based on a 3:1 ratio.....	15.0
Materials passing the No. 200 sieve	1.5
Chert ^[1]	1.0

^[1]Material classified lithologically as chert and having a bulk specific gravity (saturated surface-dry basis) of less than 2.45. Determine the percentage of chert by dividing the weight of chert in the sample retained on a 3/8-inch sieve by the weight of the total sample.

501.2.5.4.3 Physical Properties

Replace paragraph one with the following:

- (1) The department will ensure that Los Angeles wear testing conforms to AASHTO T 96, soundness testing conforms to AASHTO T 104 using 5 cycles in sodium sulfate solution on aggregate retained on the No. 4 sieve, and freeze-thaw soundness testing conforms to AASHTO T 103. The percent wear must not exceed 30, the weighted soundness loss must not exceed 6 percent, and the weighted freeze-thaw average loss must not exceed 15 percent.

501.3.2.4.3.3 Extended Delivery Time

Delete paragraph one.

501.3.5.1 General

Replace paragraph one with the following:

- (1) Use central-mixed concrete as defined in 501.3.5.1(2) for all work under this special provision.

501.3.5.2 Delivery

Replace paragraph three with the following:

- (3) Deliver and completely discharge concrete within one hour beginning when adding water to the cement, or when adding cement to the aggregates. A decrease in air temperature below 60° F or the use of department-approved retarders does not increase the discharge time.

501.3.7.1 Slump

Replace the entire text with the following:

- (1) Use a 2-inch to 4-inch slump.
- (2) Perform the slump tests for concrete according to AASHTO T 119.

501.3.8.2.1 General

Replace paragraphs one and two with the following:

- (1) The contractor is responsible for the quality of the concrete placed in hot weather. Submit a written temperature control plan at or before the pre-pour meeting. In that plan, outline the actions the contractor will take to control concrete temperature if the concrete temperature at the point of placement exceeds 80° F. Do not place concrete without the engineer's written acceptance of that temperature control plan. Perform the work as outlined in the temperature control plan.
- (2) If the concrete temperature at the point of placement exceeds 80° F, do not place concrete for items covered in this special provision.

501.3.8.2.2 Bridge Decks

Replace the entire text with the following:

- (1) Do not place concrete for bridge decks when the ambient air temperature is above 80° F.
- (2) For concrete placed in bridge decks, submit a written evaporation control plan at each pre-pour meeting. In that plan, outline the actions the contractor will take to maintain concrete surface evaporation at or below 0.15 pounds per square foot per hour. Do not place concrete for bridge decks without the engineer's written acceptance of that evaporation control plan. If the engineer accepts an evaporation control plan calling for ice, the department will pay \$0.75 per pound for that ice. Perform the work as outlined in the evaporation control plan.
- (3) If predicting a concrete surface moisture evaporation rate exceeding 0.15 pounds per square foot per hour, do not place concrete for bridge decks.
- (4) Provide evaporation rate predictions to the engineer 24 hours prior to each bridge deck pour.
- (5) Compute the evaporation rate from the predicted ambient conditions at the time and place of the pour using the nomograph, or computerized equivalent, specified in CMM 5.25, figure 1. Use weather information from the nearest national weather service station. The engineer will use this information to determine if the pour will proceed as scheduled.

- (6) At least 8 hours before each pour, the engineer will inform the contractor in writing whether or not to proceed with the pour as scheduled. If the actual computed evaporation rate during the pour exceeds 0.15 pounds per square foot per hour, at the sole discretion of the engineer, the contractor may be allowed to implement immediate corrective action and complete the pour. If the engineer allows the placement to continue, the department will pay \$0.75 per pound for the quantity of ice required to maintain the concrete surface evaporation at or below 0.15 pounds per square foot per hour.

502.2.6.2 Burlap

Replace the entire text with the following:

- (1) Furnish burlap conforming to AASHTO M 182, class 1, 2, 3 or 4.

502.3.2.1 Detailed Plans

Replace the entire text with the following:

- (1) As specified in 105.2, submit four copies of detailed plans and computations for falsework, signed and sealed by a professional engineer registered in the State of Wisconsin, three weeks prior to erection of falsework for review and acceptance. Acceptance of the detailed plans and computations will in no way relieve the contractor of the responsibility of providing a safe and stable structure, and obtaining satisfactory results.

502.3.5.4 Superstructures

Delete paragraph six.

502.3.7.8 Floors

Replace paragraph five with the following:

- (5) The contractor shall set the rails or tracks that the finish machine rides on, to the required elevation; and ensure they adjust to allow for settlement under load. The rails or tracks shall be supported outside the limits of the finished riding surface. Rails or tracks are not allowed to be supported on the tops of girders, or within the finished riding surface, without written permission of the engineer.

Delete paragraph thirteen, fourteen and fifteen.

Add the following to the end as paragraphs nineteen, twenty, twenty-one, twenty-two, and twenty three.

- (19) Do not place bridge deck concrete more than 10 feet ahead of the finishing machine. If there is a delay of more than 10 minutes during the placement of a bridge deck, cover all concrete (unfinished and finished) with wet burlap to protect the concrete from evaporation until placement operations resume.

- (20) Hand finishing, except for the edge of deck, must be kept to a minimum. The finishing machine must be equipped with a pan behind the screed. Apply micro texture using a broom or turf drag following the use of a 10-foot straight edge. Only finish by hand as necessary to close up finished concrete. Begin wet curing the deck immediately following the micro texture.
- (21) For bridge decks with a design speed of 40 mph or greater, provide longitudinal grooving according to the provision included in this contract.
- (22) Place HPC Masonry Structures for bridge decks during nighttime hours. Begin work no earlier than two hours before sunset and end no later than 2 hours after sunrise; unless alternate begin and end times are approved prior to the concrete placement by the engineer. To determine acceptable hours, use the sunset and sunrise times published by the National Weather Service for the proposed date of the concrete placement or as mutually agreed to by the contractor and the engineer.
- (23) Provide lighting as necessary to safely perform the required work and facilitate inspection during nighttime hours. Ensure that lighting does not interfere with or impede traffic on open roadways and does not cause glare, shine or directly face the eyes of oncoming drivers. After initial setup, drive through and observe the lighted work area from each direction on the main roadway. Adjust lighting alignment if lighting causes glare, shine or directly faces the eyes of oncoming drivers

502.3.8.1 General

Replace paragraph one with the following:

- (1) Maintain adequate moisture throughout the concrete mass to support hydration for at least 14 days.

502.3.8.2.1 General

Replace the entire text with the following:

- (1) Wet-cure the concrete for bridge decks, structural approach slabs, sidewalks on bridges and raised medians on bridges for 14 days by use of a soaker hose system, or other engineer-approved methods. Cover the finished surface of bridge decks and overlays with one layer of wetted burlap or wetted cotton mats within 10 minutes after the finishing machine has passed. Apply the burlap/cotton gently so as to minimize marking of the fresh concrete. Keep the first layer of burlap/cotton continuously wet until the bridge deck or overlay is sufficiently hard to apply a second layer of wetted burlap/cotton. Immediately after applying the second layer of burlap/cotton, continue to keep the deck wet until placing and activating the soaker hose system. Throughout the remainder of the curing period, keep the burlap/cotton continuously wet with soaker hoses hooked up to a continuous water source. Inspect the burlap/cotton twice daily to ensure the entire surface is moist. If necessary, alter the soaker hose system as needed to ensure the entire surface is completely covered and stays

moist. After 48 hours from the time of completion of the bridge deck or overlay pour, the soaker hose system and burlap/cotton may be covered with polyethylene sheeting. Provide a continuous flow of water through the soaker hose system for the entire curing period.

- (2) Do not uncover any portion of the deck at any time for any reason during the first 7 days of the curing period except as permitted by the engineer.
- (3) Set up and test the fogging system before each bridge deck, structural approach slab, bridge mounted sidewalk or bridge mounted raised median pour. The fogging system must remain set up and in operating condition for the duration of the pour.

502.3.8.2.3 Decks

Delete the entire text.

502.3.8.2.4 Parapets

Replace the entire text with the following:

- (1) Cure the inside and outside concrete faces and tops of railings or parapets by covering with wetted burlap immediately after form removal and surface finish application. Keep the burlap thoroughly wet for at least 7 days; or by covering for the same period with thoroughly wet polyethylene-coated burlap conforming to 502.2.6.4
- (2) Secure coverings along all edges to prevent moisture loss.

502.3.9.6 Bridge Decks

Replace paragraph two with the following:

- (2) Protect the underside of the deck, including the girders, for bridge deck and overlay pours by housing and heating when the national weather service forecast predicts temperatures to fall below 32° F during the cold weather protection period. Maintain a minimum temperature of 40° F in the enclosed area under the deck for the entire 14-day curing period.

502.5.1 General

Replace paragraph one with the following:

- (1) The department will pay for measured quantities at the contract unit price and incidentals necessary to complete the work under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.4000	HPC Masonry Structures	CY

Lighting for nighttime bridge deck placement is included in the item HPC Masonry Structures and will not be measured or paid for separately.

710.5 Sampling and Testing

Add the following subsection:

710.5.7 Chloride Penetration Resistance

- (1) For each new or changed mix design, measure chloride penetration resistance according to AASHTO T 277 (Rapid Chloride Permeability Test) at a frequency of 1 test per 3 months (quarterly) of production.
- (2) Permeability samples for AASHTO T 277 testing must be stripped of their molds and wet cured to an age of 7 days in a standard moist room or water tank. After 7 days, submerge the samples in water heated to 100° F until an age of 28 days. Upon completion of the curing process, obtain one sample from each cylinder and test according to AASHTO T 277.
- (3) Ensure that the initial accepted mix designs meet the chloride penetration resistance limit of 1500 coulombs based on the AASHTO T 277 Rapid Chloride Permeability test. Chloride resistance testing conducted quarterly using AASHTO T 277 Rapid Chloride Permeability Test during production will not be used for acceptance of previously accepted mixes and concrete masonry mixed and placed according to the contract requirements. For quarterly chloride resistance test results exceeding 1500 coulombs, the department may require adjustment of the concrete mix going forward to improve the chloride penetration resistance.

715.2.3.2 Structures

Replace paragraph one with the following:

- (1A) Develop and test each mix to be used for HPC Masonry Structures. Produce a laboratory trial mix for each mix, as well as a trial mix from each plant used to supply the project. Test all mixes at a department-qualified laboratory.
- (1B) The laboratory trial mix data must include the results of the following tests:
 1. AASHTO T 119 Slump of Hydraulic Cement Concrete.
 2. AASHTO T 121 Mass per Cubic Foot, Yield
 3. AASHTO T 152 Air Content.
 4. AASHTO T 22 Compressive Strength.
 5. AASHTO T 277 Rapid Determination of the Chloride Permeability of Concrete, using the modified curing procedure according to 710.5.7 (2) herein.
 6. AASHTO T 309 Temperature.
 7. Water Cement Ratio.

- (1C) The 28-day compressive strength must be greater than or equal to 4000 psi. The 28-day results of the permeability test must be less than or equal to 1500 coulombs.

Replace paragraph two with the following:

- (2) Provide a minimum cementitious content of 470 pounds per cubic yard and a maximum cementitious content of 540 pounds per cubic yard. For all superstructure and substructure concrete, unless the engineer approves otherwise in writing, conform to one of the following:
1. Use class C fly ash or grade 100 or 120 slag as a partial replacement for Portland cement. For binary mixes use 15% to 30% fly ash or 20% to 30% slag. For ternary mixes use 15% to 30% fly ash plus slag in combination. Percentages are stated as percent by weight of the total cementitious material in the mix.
 2. Use a type IP or IS blended cement.

102. Concrete Masonry Soldier Pile Footings, Item SPV.0035.4010.

A Description

Work under this item consists of furnishing and placing concrete in predrilled holes for soldier piles and installation of soldier piles. Perform work in accordance to pertinent parts of the standard specifications, the plans, and these special provisions.

B Materials

Provide and use concrete masonry for Concrete Masonry Soldier Pile Footings conforming to grade A or grade A-FA as specified in section 501 of the standard specifications.

C Construction

Before placing concrete masonry give the engineer sufficient notice to allow inspection of the predrilled holes, soldier piles, and casting preparations. For concrete masonry soldier pile footings constructed without the use of slurry, no more than 3 inches of standing water is permitted in the bottom of the drilled hole prior to beginning soldier pile installation and immediately prior to placing concrete masonry in the hole around the soldier pile. If necessary, place up to 2 feet of concrete at the bottom of the hole to assist in aligning the soldier pile. Block or clamp the soldier pile in place at the ground surface before placing concrete.

For holes drilled or excavated without slurry, the department will allow the contractor to place concrete by free-falling the concrete from the ground surface down the shaft around the soldier pile. If temporary casing is used, begin placement of the concrete before removing the casing. Remove the casing while the concrete remains workable. For holes drilled or excavated using slurry, place concrete using a tremie method from the bottom of the shaft. Withdraw the tremie pipe slowly as the level of concrete rises in the shaft and never let the level of the tremie pipe outlet exceed the height of the slurry.

D Measurement

The department will not measure Concrete Masonry Soldier Pile Footings. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.4010	Concrete Masonry Soldier Pile Footings	CY

Payment for Concrete Masonry Soldier Pile Footings is full compensation for furnishing all materials, pumping, placing, finishing, curing, protecting, and heating for installation of soldier piles and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the work.

103. Filter Riprap, Item SPV.0035.4020.

A Description

Furnish and place filter riprap as shown on the plan.

B Materials

The filter riprap shall be free of unconsolidated overburden materials, topsoil, organic materials, and other deleterious materials. It may be crushed or uncrushed or a washed gravel with the following specifications.

Sieve Size	% Passing by weight
2 inch	100%
1 inch	90-100%
¾ inch	80-90%
3/8 inch	0-75%
No. 4	0-25%
No. 10	0-5%

Do not place material without the engineer's approval of the stone quality and size.

Recycled concrete slabs, reclaimed asphalt, reprocessed or blended material for filter riprap is not allowed.

C Construction

Prepare the bed for the filter riprap by excavating, shaping the slopes, and constructing the toe for filter riprap installation. Remove brush, trees, stumps and other objectionable material. Any fill required in the subgrade shall be compacted to a density approximating that of the surrounding undisturbed material. If placed on fill, fill shall be 95% compacted as determined by Standard Proctor Density. Compact the filter riprap thoroughly as construction progresses. Make the finished surface even and tight. After placing the filter riprap, restore the surface of adjacent work and dispose of surplus material.

Placement of medium riprap should follow immediately after the placement of filter riprap.

D Measurement

The department will measure Filter Riprap by the cubic yard, acceptably completed, measured as the volume within the limiting dimensions the contract designates or the engineer establishes in the field.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.4020	Filter Riprap	CY

Payment under this section is full compensation for preparing the bed, providing and placing the filter riprap, restoring adjacent work, and disposing of surplus material. The department will pay for excavation in excess of approximate volume of earth occupied by the filter riprap under the Excavation Common bid item as specified under standard spec 205.5 as extra work. The placement of medium riprap will be measured and paid under a separate bid item.

104. Temporary Crosswalk/Sidewalk, Item SPV.0045.0010.

A Description

This special provision describes maintaining accessible crosswalks/sidewalks crossing the construction zone. Maintaining accessible crosswalks/sidewalks consists of maintaining a crosswalk/sidewalk on existing pavement, new pavement, or temporary surface material.

B Materials

Furnish a hard temporary surface material consisting of asphaltic surface temporary in accordance to standard spec 465, any grade of concrete, skid resistant steel plating, or alternative material as approved by the engineer. Gravel or base course material is not acceptable.

C Construction

Install, maintain, move, and remove temporary surface material at temporary crosswalk/sidewalk locations as shown on the plans and as directed by the engineer. Level and compact the surface prior to placing temporary surface material. Provide a minimum clear width of 4 feet; be located outside the immediate work area, as approved by the engineer; meeting the requirements of the current Americans with Disabilities Act Accessibility Guidelines (ADAAG). Reconstruct or relay temporary crosswalk/sidewalk when disturbed by construction operations or utility trenches.

D Measurement

The department will measure Temporary Crosswalk/Sidewalk by the day acceptably completed. The measured quantity will equal the number of calendar days a crosswalk/sidewalk through the work area, as shown on the traffic control plans, is open to pedestrian traffic. A crosswalk is defined as an accessible crossing of a single leg of an intersection. A sidewalk is defined as an accessible path between two intersections. A crossing of a street with an island within the route will be considered a single crosswalk. Each day that the crosswalk/sidewalk is out of service for more than 2 hours will result in one day being deducted from the quantity measured for payment.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0045.0010	Temporary Crosswalk/Sidewalk	Day

Payment is full compensation for furnishing, loading, hauling; for preparing the foundation; for furnishing, placing, maintaining, and removing temporary surface material; and for reconstructing or relaying the temporary surface material.

105. Truck Mounted Attenuator, Item SPV. 0045.0020.

A Description

This special provision describes furnishing, maintaining and operating a Truck Mounted Attenuator (TMA) during moving operations and short term stationary work in a closed lane of traffic as shown on the plans or when deemed necessary by the engineer.

B Materials

B.1 General

The TMA shall be a model that has been approved by the Federal Highway Administration for meeting NCHRP 350 Test Level 3 Crashworthiness. The attenuator shall be mounted to a suitable truck in a manner meeting the manufacturer's specifications with a minimum total gross weight of 25,000 pounds.

C Construction

Place the TMA in the closed lane in advance of the equipment and personnel, located as recommended by the manufacturer and approved by the engineer. If the TMA is not available when the work requires its use, postpone the work until the TMA is available.

If utilized in a mobile operation, the TMA support vehicle shall shadow the mobile operation and maintain a consistent distance from the mobile operation as recommended by the manufacturer. An operator shall be provided and remain with the vehicle at all times during mobile operations.

D Measurement

The department will measure Truck Mounted Attenuator by the day. For this special provision, the number of days measured is defined as the number of calendar days that the truck, TMA and operator are used in moving operations or short-term stationary work. A calendar day begins with each deployment within a defined time period and exceeding two hours.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0045.0020	Truck Mounted Attenuator	DAY

Payment is full compensation for furnishing, maintaining and operating the TMA and its operator; and for furnishing all labor, tools, equipment, services, and incidentals necessary to complete the contract work.

106. Lane Rental Assessment, Item SPV.0055.0010.

A General

This contract includes a lane rental charge procedure under which a rental charge is assessed for each freeway shoulder closure, each freeway lane closure, each service ramp closure, each system ramp closure, and each full closure of a directional freeway roadway from the time of notice to proceed until the project is complete. If a lane is obstructed at any time due to operations, it is considered a closure. The purpose of lane rental is to discourage unnecessary short term closures, especially during time periods outside night time hours.

A.1 Lane Rental Assessment Table

The hourly rental rate will be assessed for each shoulder closure, each freeway lane closure, each service ramp closure, each system ramp closure, and each full closure of a freeway roadway as follows:

Lane Rental Assessment Table								
Freeway Closure Type	Peak Hours		Weekday Off-Peak and Weekend Peak Hours		Weekend Off-Peak Hours		Night Time Hours	
	Hourly Rental	Closure Hour Credits	Hourly Rental	Closure Hour Credits	Hourly Rental	Closure Hour Credits	Hourly Rental	Closure Hour Credits
Shoulder when at least 8 ft, shoulder is reduced to less than 8 ft.	\$2,000	0	\$400	16	\$200	20	\$20	24
Single Lane when 2 or more lanes next to closure are open to traffic	\$20,000	0	\$4,000	16	\$2,000	20	\$200	160
Single Lane when only 1 lane next to closure is open to traffic	\$40,000	0	\$8,000	0	\$4,000	0	\$400	48
2 Adjacent Lanes when 1 or 2 basic lanes next to closure are open to traffic	\$40,000	0	\$8,000	16	\$4,000	20	\$400	200
Service Ramp	\$10,000	0	\$2,000	16	\$1,000	20	\$100	275
System Ramp	\$40,000	0	\$8,000	16	\$4,000	20	\$400	55
Full Roadway Closure	\$80,000	0	\$16,000	0	\$8,000	0	\$800	80

The monetary amount represents the average hourly cost of the interference and inconvenience to the road user for each closure. Lane rental in excess of the maximum credited hours specified will be assessed. The assessment will be the total number of hours that each shoulder, lane, roadway, or ramp closure exceeds the "closure hour credits", multiplied by the "hourly rental" rate as defined in the Lane Rental Assessment Table.

The rental assessment will be 15-minute increments for closure time periods equal to or less than 60 minutes in length. All shoulder, lane, roadway, or ramp closure event durations will be rounded up or down to the nearest quarter hour for the purposes of this computation except where freeway shoulders or lanes of traffic and/or ramps are not opened to traffic by the specified times, as noted in the article Prosecution and Progress

under Freeway Work Restrictions. Deductions will be made from the monies based on the hourly rental rate for the closure type and hourly definition that the non-compliant closure occurs. The deduction will be made based on the applicable rate for any and all closures whether work is being performed or not. The engineer, or designated representative, will be the sole authority in determining time period length for the lane rental charge.

Lane rental will not be assessed for closures noted in the plans under the title "Traffic Control/Construction Stage XX". Additional lane or ramp closures shown beyond those in the plans under the title "Traffic Control/Construction Stage XX" will be assessed if the closures exceed the credited hours.

Lane rental will not be assessed for ramp closures noted in the plans under the title "Traffic Control/Construction Stage XX" if the plans and construction operations already include such closures. Additional ramp closures shown beyond those in the plans under the title "Traffic Control/Construction Stage XX" will be assessed if the closures exceed the credited hours.

Lane rental will not be assessed for closure of auxiliary lanes noted in the plans under the title "Traffic Control/Construction Stage XX" if the plans and construction operations already include such closures. However, when closure of an auxiliary lane requires the closure of a ramp, then lane rental will be assessed for each service and/or system ramp closure. Additional ramp closures shown beyond those in the plans under the title "Traffic Control/Construction Stage XX" will be assessed if the closures exceed the credited hours.

Lane rental for shoulder shall only apply to shoulders along the traveled way of IH 94 westbound. A shoulder is considered closed when a paved shoulder area with 8 feet or more of width is reduced to a dimension less than 8-feet wide by contractor's equipment or traffic control devices, excluding spot locations of advance traffic control devices "in use" for other lane or ramp closures. Lane rental for shoulder shall not apply to shoulders along ramps or along closed traffic lane(s).

Lane rental will not be assessed for maintenance of temporary surfaces, if in the opinion of the engineer, maintenance of the damaged pavement was completed expeditiously, and the lack of maintenance would cause safety concerns to the traveling public.

Lane rental will not be assessed for closures due to crashes, accidents or emergencies.

A1.1 Lane Rental Assessment and Liquidated Damages

On those days when charged with the liquidated damage fee; and a shoulder, ramp or lane closure is in effect to facilitate construction operations that are exceeding credited hours; both the lane rental assessment and the liquidated damages fee will be charged.

B (Vacant)

C (Vacant)

D Measurement

The department will assess Lane Rental Assessment by the dollar. The charge will be the total dollar amount of each freeway closure type category where the total number of hours that each shoulder, lane, ramp, or roadway closure exceeds the project maximum number of “closure hour credits,” as defined in the Lane Rental Assessment Table, multiplied by the “hourly rental” as defined in the Lane Rental Assessment Table. The Lane Rental Assessment total will not be reduced or offset with freeway closure type categories where the total closure hours were less than “closure hour credits.”

Lane Rental Assessment will be in effect from the time of notice to proceed until such time that the project is complete.

E Payment

The department will assess lane rental assessment, as described above under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0055.0010	Lane Rental Assessment	DOL

107. Surface Settlement Plate Extension, Item SPV.0060.0007.

A Description

This special provision describes the work necessary to extend geotechnical settlement plates that were placed in the North to West Ramp of the Core of the Zoo Interchange; for maintenance of settlement plates; and taking subsequent plate elevation readings; and removing the settlement plates at the completion of the contract in November 2014. The contractor shall be responsible for monitoring ground movement as necessary to conform to the requirements of the contract. The instrumentation program specified herein and shown on the plans is not intended to be used to ensure the safety of the work.

A.1 Definitions

Open Ground

Ground without any above- or below-grade facilities, paved or unpaved roads, and utilities within a 25-foot horizontal radius.

Surface Settlement Plates

Settlement Plates are plates attached to rods installed in unpaved areas at predetermined locations to measure vertical (elevation) changes of the original ground surface.

Fill

Fill is soil used to raise the grades in the North to West Ramp location. The fill must be placed and compacted according to the QMP Subgrade special provision for the project.

A.2 Personnel Qualifications

Surveyor licensed in Wisconsin with a minimum of 5 years experience in surveying monuments similar to those specified herein. The surveyor must be physically present at the site to take settlement plate readings.

A.3 Submittals

Submit the following specific information for information only, at least 15 days prior to the start of extending the settlement plates, except submit copies of DNR forms as soon as possible after settlement plates are abandoned:

1. Submit surveyor's state of Wisconsin registration information.
2. Drawing that indicates the locations of control points and benchmarks associated with surveys for monitoring geotechnical settlement plates. Drawing also needs to indicate planned settlement plate locations.
3. Description of methods for adding to and protecting all settlement plates.
4. Schedule of settlement plate elevation readings and plate extensions related to fill placement activities or milestones in the overall project.
5. Prior to the start of fill placement, submit drawings showing the instrument identification number, and installed locations of control points and benchmarks associated with surveys for monitoring geotechnical settlement plates. Include details of extended settlement plates, accessories, and protective measures including all dimensions and materials used.

A.4 Review of Instrumentation Plan

Prior to extending settlement plates, discuss with the engineer as to the suitability of the planned settlement plate extensions. The instrumentation plan specified herein and shown on the plans may be modified by the contractor prior to installation, to suit the contractor's means and methods of construction.

Replace, at no cost to the department, plates in place that become inaccessible or unreadable as a result of the contractor's means and methods of construction or changes in the contractor's means and methods of construction that could have been anticipated by the contractor prior to extending the plates.

B Materials

B.1 Settlement Plates

Each settlement plate shall be compatible with the existing plates and composed of the same pipe materials with the diameter and threads which consist of 3/4 inch black steel pipe attached via couplings to the existing plate rods. The steel pipe must be in 5-foot lengths. The total length of pipe per plate is estimated at 15 feet but the contractor must provide enough pipe so that the pipes extend at least 1 foot above the final fill height at each plate location. The steel pipe will need to be added to as the fill height progresses over time as to extend above the fill.

B.2 Sleeve Casing

Riser pipe for sleeve casing shall consist of schedule 40 or thicker PVC pipe with glued couplings. All PVC pipe shall have a nominal diameter of 2 inches. The PVC pipe is

required to prevent fill soil around the pipe from attaching to the pipe and resulting in erroneous settlement readings. The PVC pipe must be in maximum 5-foot lengths and centered around the steel pipe. The total length of PVC pipe per plate is estimated at 14 feet but the contractor must provide enough PVC pipe so that the pipes extend at least 1/2 foot above the final fill height at each plate location. The PVC pipe will need to be added to as the fill height progresses.

C Construction

C.1 General

Notify the engineer at least 48 hours prior to all instrumentation extension operations so that the engineer may monitor the extension work. Provide the engineer and the department access to the settlement plates at all times.

C.2 Control Points

Reference surveys performed by the surveyor for monitoring geotechnical instrumentation to the same control points and benchmarks established for setting out the work. Obtain the control points and benchmarks from the Department. Settlement plate elevations must be determined to 1/100 of a foot. Tie control points to benchmarks and monuments outside of the zone of ground movements that might result from underground excavations.

C.3 Tolerances

Settlement plates must coincide with the existing plate locations as indicated on the plans.

C.4 Execution

C.4.1 General

Extend settlement plates at the locations indicated on the plans, and as approved by the engineer. Extension of settlement plates must be under the direct supervision of the contractor's surveyor and the engineer. Plates must be extended when the fill placement is within 1 foot of the top of the steel pipe.

Check geotechnical settlement plates for height above existing fill grade and complete baseline surveys/initial readings under this contract before commencing any fill placement work on the North to West ramp of the project. Settlement plate elevations must be determined to 1/100 of a foot.

Collect survey data from the settlement plates required by this article and provide to the engineer as specified herein.

C.5 Installation

C.5.1 General

Complete extension and initial survey of each settlement plate a minimum of 1 week prior to fill placement within 100 feet of the plate under this contract.

Clearly mark, permanently label, and protect settlement plates to avoid being obstructed or otherwise damaged by construction operations or the general public. Mark sleeve casings.

C.5.2 Extending Settlement Plates

The existing settlement plates are at the locations shown on the plans. The settlement plate identification numbers are shown below:

Surface Settlement Plate	Station
SP-1	477NW+00 Centerline of Roadway
SP-2	479NW+00 Centerline of Roadway
SP-3	481NW+00 Centerline of Roadway
SP-4	483NW+00 Centerline of Roadway
SP-5	485NW+00 Centerline of Roadway
SP-6	487NW+00 Centerline of Roadway

C.6 Protection

Flag and protect all locations. Exercise care during construction so as to avoid damage to plates. Repair or replace settlement plates that are damaged as a result of the contractor's operation at the contractor's expense. The engineer will determine whether repair or replacement is required. Complete the repair or replacement within one day after written notification by the engineer as to whether a repair or replacement is required.

C.6.1 Maintenance of Surface Settlement Plates

Maintain settlement plates to ensure their availability for use for the duration of the work. Surface settlement plates shall be painted with fluorescent orange paint prior to the contractor leaving the project for the last time.

C.7 Monitoring Settlement plates

Take all surveyor readings as specified in this article. Provide access to the plates as requested by the engineer. Make all survey data available to the engineer within 3 working days of reading. The elevations of the top of the black steel pipes that comprise the plates must be determined over time. Perform initial plate elevation survey at a minimum of 1 week prior to any fill placement within 100 feet of the plates under this contract. Additional plate surveys are required at least twice a month during monitoring until the end of the filling or contract, whichever is longer. Survey the fill surface elevation at each settlement plate according to the same schedule as the settlement plates.

Add sections of black steel pipe and PVC sleeve pipe to the settlement plates as the fill placement proceeds. Survey the top elevation of the existing steel pipe immediately prior to adding another section of steel pipe and PVC pipe and also survey the top of the new pipe section at the same time so that the increase in height and base plate elevation/settlement can be calculated. Calculate the base plate elevation and settlement from the previous elevation survey.

C.8 Removal of Settlement plates

At completion of the contract the contractor must remove a portion of the settlement plates. The contractor is required to remove the top 5-foot section of steel pipe and the corresponding portion of the PVC pipe. The pipe removal can consist of cutting off the pipe or removing the pipe at the first coupling below the top of the pipe. The pipe must be removed at least 3 feet below the final pavement subgrade elevation. Any excavations required for pipe removal must be backfilled with approved compacted fill or BCLS. The fill must be placed and compacted according to the QMP Subgrade special provision for the project.

D Measurement

The department will measure the total number of surface settlement plates satisfactorily extended and surveyed over the course of the project as specified herein.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0007	Surface Settlement Plate Extension	L.F

Payment is full compensation for extending each settlement plate, all materials, labor, tools and equipment necessary for providing submittals, furnishing materials, extension, protection, maintenance, replacement or repair of damaged settlement plates, replacement of inaccessible or unreadable plates, all survey readings, providing access to the engineer for reading, plate removal including backfill placement and compaction, and all other specified items of work for which no separate bid item is provided.

108. Pavement Marking Grooved Preformed Thermoplastic Arrows Type 2, Item SPV.0060.0011; Pavement Marking Grooved Preformed Thermoplastic Words, Item SPV.0060.0013.

A Description

This special provision describes grooving the pavement surface, and furnishing and installing preformed thermoplastic pavement marking as shown on the plans, in accordance to section 647 of the standards specifications, and as hereinafter provided.

B Materials

Furnish preformed thermoplastic pavement marking and sealant material, if required, from the department's approved products list.

C Construction

C.1 General

For quality assurance, provide the engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of preformed thermoplastic pavement marking.

Plane the grooved lines in accordance to the plan details. Use grooving equipment with a free-floating, independent cutting or grinding head. Plane a minimum number of passes to create a smooth groove.

C.2 Groove Depth

Cut the groove to a depth of 120 mils $\pm$ 10 mils deeper than the thermoplastic thickness, from the pavement surface or, if tined, from the high point of the tined surface. Measure depth using a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Linear Markings

Cut the groove 1-inch wider than the width of the thermoplastic.

C.4 Groove Position

Position the groove edge in accordance to the plan details.

C.4.1 Linear Marking

Groove at a minimum of 4-inches, but not greater than, 12-inches from both ends of the line segment. Achieve straight alignment with the grooving equipment.

C.4.2 Special Marking

Groove a box around the special marking up to 4 inches from the perimeter of the special marking.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, after removal of excess water, and prior to pavement marking application. Clean and dry the groove for proper application of the sealant, and placement of the pavement marking. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement 10 or more days after paving. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

C.5.4 Asphalt

Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.6 Preformed Thermoplastic Application

Preheat the surface if necessary based on manufacturer's recommendation.

Application of the preformed thermoplastic in the groove without sealant will be as follows:

- May 1 to September 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- June 1 to August 31 – the Southwest Region, and the Northeast, North Central, and Northwest Regions except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

Application of the preformed thermoplastic in the groove with sealant materials will be as follows:

- October 1 to April 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- September 1 to May 31, both dates inclusive – the Southwest Region and the Northeast, North Central, and Northwest Regions, except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

The sealant must be wet.

D Measurement

The department will not measure Pavement Marking Grooved Preformed Thermoplastic. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0011	Pavement Marking Grooved Preformed Thermoplastic Arrows Type 2	Each
SPV.0060.0013	Pavement Marking Grooved Preformed Thermoplastic Words	Each

Payment is full compensation for cleaning and preparing the pavement surface, furnishing and installing the material; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

109. Traffic Control Close-Open Freeway Entrance Ramp, Item SPV.0060.0014.

A Description

This item shall consist of furnishing the labor and equipment required for closing and subsequently opening a freeway entrance ramp in accordance to standard spec 643, the plans, and as directed by the engineer. Drums, barricades and signs may remain along the roadway when the exit ramp is open to traffic. Signs shall not be visible to traffic when the ramp is open. Drums, barricades and signs will be paid for separately under the various traffic control items.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Traffic Control Close-Open Freeway Entrance Ramp by each individual traffic control, close-open freeway ramp, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0014	Traffic Control Close-Open Freeway Entrance Ramp	Each

Payment is full compensation for closing and subsequently opening a freeway entrance ramp; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work in accordance to the contract.

110. Traffic Control Close-Open Freeway to Freeway System Ramp, Item SPV.0060.0015.

A Description

This item shall consist of furnishing the labor and equipment required for closing and subsequently opening a freeway to freeway system ramp in accordance to standard spec 643, the plans, and as directed by the engineer. Drums, barricades and signs may remain

along the roadway when the system ramp is open to traffic. Signs shall not be visible to traffic when the system ramp is open. Drums, barricades, lights, arrow boards and signs will be paid for separately under the various traffic control items.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Traffic Control Close-Open Freeway to Freeway System Ramp by each individual traffic control, close-open freeway system ramp, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0015.	Traffic Control Close-Open Freeway to Freeway System Ramp	Each

Payment is full compensation for closing and subsequently opening a freeway to freeway system ramp; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work in accordance to the contract.

111. Traffic Control Interim Freeway Lane Closure, Item SPV.0060.0016.

A Description

This item shall consist of adjusting existing traffic control items that have previously been placed on the freeway for a lane closure, intended lane closure or are in position for staged construction as shown on the plans into position for an additional lane or two lane closures, and for readjusting the traffic control items to their original state or position upon removal of the additional lane or two lane closure within a 24 hour period. All work shall be in accordance to standard spec 643, the plans, and as directed by the engineer.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Traffic Control Interim Freeway Lane Closure as each individual freeway lane or two-lane closure is setup and subsequently removed per direction of traffic within a 24-hour time period, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0016	Traffic Control Interim Freeway Lane Closure	Each

Payment is full compensation for setup and subsequent removal per direction of traffic within a 24-hour time period of a freeway lane or two-lane closure; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work

112. Mobilizations Emergency Pavement Repair, Item SPV.0060.0017.

A Description

Furnish and mobilize personnel, equipment, traffic control, and materials to the project site to repair the existing pavement or Asphaltic Surface Temporary on an emergency basis as the engineer directs.

B (Vacant)

C Construction

Mobilize with sufficient personnel, equipment, traffic control, materials and incidentals on the jobsite within 4 hours of the engineer's written order to repair the existing pavement on an emergency basis.

An emergency is a sudden occurrence of a serious and urgent nature, beyond normal maintenance of the existing pavement or the Asphaltic Surface Temporary. Under this definition, an emergency mobilization requires immediate action to move necessary personnel, equipment, and materials to the emergency site followed by immediate repairs of the existing pavement or the Asphaltic Surface Temporary.

D Measurement

The department will measure Mobilizations Emergency Pavement Repair as each individual mobilization, acceptably completed. The department will not include delivering and installing pavement repair or maintenance materials provided for in specific contract bid items. All traffic control items used for each Mobilization will be considered incidental to the Mobilization.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0017	Mobilizations Emergency Pavement Repair	Each

Payment is full compensation for the staged moving of personnel, moving equipment, setting up and removing traffic control, traffic control materials, and moving materials. The department will pay separately for delivery and installation of pavement repair materials under the other bid items in this contract. The department will not pay separately for traffic control items and materials even though they may be included in other bid items in this contract and will consider them incidental to each Mobilization.

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113. Removing Pillar and Footing, Item SPV.0060.0021.

A Description

This special provision describes removing an existing brick veneered sign pillar and its footing as shown on the plans and in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)

C Construction

Remove all materials below existing ground to an elevation of two feet below existing subgrade, or as specified by the engineer. Dispose of all removed material at an offsite location.

Disconnect power and remove electrical control box. Avoid damaging any utilities during construction operations. Complete all necessary operations to remove the foundation. Backfill all trenches, holes, and pits with suitable fill material conforming to standard spec 209.

D Measurement

The department will measure Removing Pillar and Footing by each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0021	Removing Pillar and Footing	Each

Payment is full compensation for breaking down and removing pillar and its footing as outlined in this specification; for disconnecting power and removing electrical control box; for furnishing all excavating; for placing and compacting backfill material; for disposing of all materials; repairing all damage; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work in accordance to the plans and contract.

114. Traffic Control Barricades Type III Left In Place, Item SPV.0060.0035.

A Description

This special provision describes furnishing, installing, and maintaining Traffic Control Barricades Type III Left In Place as shown on the plans.

Traffic Control Barricades Type III Left In Place becomes property of the department after final acceptance by the engineer.

B Materials

This work shall be in accordance to the pertinent provisions of standard spec 643.2.4 and as hereinafter provided.

C Construction

This work shall be in accordance to the pertinent provisions of standard spec 643.3, as shown on the plans, and as hereinafter provided.

D Measurement

The department will measure Traffic Control Barricades Type III Left In Place as each individual barricade, acceptably left in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0035	Traffic Control Barricades Type III Left In Place	Each

Payment is full compensation for providing, installing, and maintaining the Traffic Control Barricades Type III and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

115. Traffic Control Warning Lights Type A Left In Place, Item SPV.0060.0036.**A Description**

This special provision describes furnishing, installing, and maintaining Traffic Control Warning Lights Type A Left In Place as shown on the plans.

Traffic Control Warning Lights Type A Left In Place becomes property of the department after final acceptance by the engineer.

B Materials

This work shall be in accordance to the pertinent provisions of standard spec 643 and as hereinafter provided.

C Construction

This work shall be in accordance to the pertinent provisions of standard spec 643.3.5.2, as shown on the plans, and as hereinafter provided.

D Measurement

The department will measure Traffic Control Warning Lights Type A Left In Place as each individual working light, acceptably left in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0036	Traffic Control Warning Lights Type A Left In Place	Each

Payment is full compensation for providing, installing, and maintaining the Traffic Control Warning Lights Type A and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

116. 24-Hour Baseline Vibration Monitoring , Item SPV. 0060.0038; Daily Vibration Monitoring, Item SPV. 0060.0039.

A Description

This special provision describes developing a vibration monitoring plan, deploying seismographs, documentation, and reporting for the entire project work site.

B (Vacant)

C Construction

C.1 Equipment

Monitor the following operations with a seismograph meeting the requirements of Wisconsin Department of Safety and Professional Services SPS307.43.

- Bridge and sign bridge pile driving or bridge demolition.
- Sheet pile installation and removal.
- MSE wall compaction.
- Asphalt compaction.
- Pavement breaking.
- All compaction activities utilizing large vibratory rollers
- Any other activities that may cause vibration damage to adjacent buildings, structures, or utilities.

C.2 Preconstruction Survey

The engineer will conduct preconstruction surveys of structures that may be potentially affected by vibration prior to any work. The engineer will visually inspect and record all existing defects in the structures before construction. Photographs and/or video may be used to assist in documentation.

The contractor has the option to conduct and document pre-construction surveys of any nearby buildings or structures that have a potential for vibration damage. Make these records available to the engineer for review. Any damage resulting from excessive vibration-causing operations is the responsibility of the contractor. The contractor may, at their own expense, monitor vibrations that are not part of the vibration monitoring plan for their own record keeping purposes.

C.3 Monitoring Plan

Submit a monitoring plan that includes the following:

- Copies of the contractor's pre-construction survey, if conducted, with discussion of findings.
- Location of each vibration inducing activity to be monitored.
- Locations at which the approved seismograph will be placed.
- Anticipated vibration levels at the closest building(s) or other sensitive facility.
- Monitoring duration for baseline and daily vibration monitoring.
- Maximum allowable vibration limits.
- Mitigation plan to reduce potentially excessive vibration levels to acceptable limits.

Obtain the engineer's acceptance seven calendar days before any vibration inducing activity for the project.

C.4 Monitoring and Recording

Ensure that a trained person who has been approved by the engineer performs vibration monitoring. Obtain approval of seismograph locations from the engineer. Monitor between the vibration-causing work and the closest structure or other sensitive facility subject to vibration damage, and as close as practical to the subject structure or facility. Monitor vibration levels in accordance to the figures 1 and 2 and SPS 307.43:

If any vibration levels exceed the nuisance levels shown in Figure 1 and Figure 2, immediately halt the vibration-causing work and notify the engineer.

Nuisance Limit		Damage Limit	
Frequency (Hz or CPS)	Peak Velocity	Frequency (Hz or CPS)	Peak Velocity
		1	0.18
2	0.5		
		4	0.75
5	0.35		
10	0.35		
		15	0.75
20	0.27		
30	0.21		
		35	2.0
40	0.21	40	2.0
50	0.21	50	2.0
60	0.2	60	2.0
		70	2.0
		80	2.0
		90	2.0
		100	2.0

Figure 1

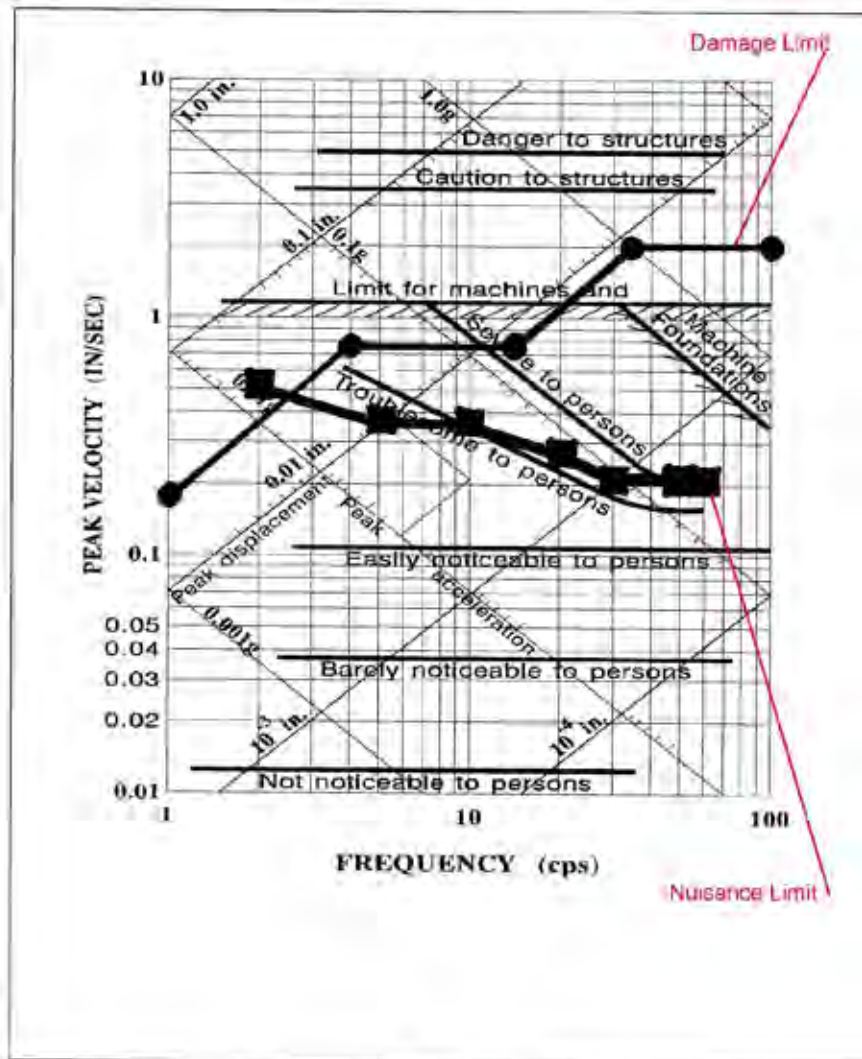


Figure 2
Amplitude of Vertical Vibrations

Perform 24-hour baseline vibration monitoring for the following construction operations at each seismograph recording location as described herein in accordance to the approved vibration monitoring plan to establish baseline vibrations:

- Bridge and sign bridge pile driving or bridge demolition.
- Sheet pile installation and removal.
- MSE wall compaction.
- Asphalt compaction.
- Pavement breaking.
- All compaction activities utilizing large vibratory rollers.
- Other activities not listed that may cause vibration damage to adjacent buildings, structures, or utilities.

Compare the measured peak particle velocity and frequency data to the nuisance limits specified in Figures 1 and 2. Record peak particle velocity and frequency in three mutually perpendicular directions.

Furnish data recorded for each construction operation during the 24-hour baseline vibration monitoring to the engineer prior to the next vibration-causing workday. Include the following:

1. Serial number of vibration monitoring instrument used and record of latest calibration.
2. Description of contractor's equipment.
3. Name of qualified observer and interpreter.
4. Distance and direction of recording station from vibration-causing area.
5. Type of ground, from boring log, at recording station and material on which the instrument is sitting.
6. Principal frequency, amplitude and particle velocity in each component direction.
7. Copy of records of seismograph readings, dated and signed by the person approved by engineer to perform vibration monitoring.
8. Contractor documentation of any operational changes necessary to reduce vibration levels below nuisance levels.

Identify the location(s) to begin or continue Daily Vibration Monitoring, and obtain approval from engineer prior to implementation. Complete Daily Vibration Monitoring following the recording and documentation procedure previously described for 24-hour baseline monitoring.

D Measurement

The department will measure 24 Hour Baseline Vibration Monitoring as each individual unit, acceptably completed.

The department will measure Daily Vibration Monitoring, as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV. 0060.0038	24-Hour Baseline Vibration Monitoring	Each
SPV. 0060.0039	Daily Vibration Monitoring	Each

Payment of the item 24-Hour Baseline Vibration Monitoring is full compensation for an approved vibration monitoring plan, monitoring and recording vibrations

Payment of the item Daily Vibration Monitoring is full compensation for monitoring and recording vibrations, and reporting. No payment for daily monitoring will be paid for without 24-hour baseline vibration monitoring approval.

117. Temporary Bus Stop Pad, Item SPV.0060.00040.

A Description

This special provision describes furnishing, maintaining, moving, and removing temporary pavement for Temporary Bus Stop Pads in the median during construction and for Temporary Bus Stop Pads in the terrace, as shown on the plans.

B Materials

Furnish asphaltic surface temporary in accordance to standard spec 465.2 (2) or furnish concrete in accordance to standard spec 602.2.

C Construction

Construct temporary bus stop pads 10 feet long by 8 feet wide (or the width of the terrace) that meet the requirements of the current Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Form the foundation by excavating at least 3 inches. Tamp or compact the foundation to ensure stability.

Place two inches of Asphaltic Surface Temporary in accordance to standard spec 465.3.1 or place three inches of concrete in accordance to standard spec 602.3.2.3, and as shown in the plan.

Separate temporary bus stop pads in the median from construction operations with temporary fencing with a minimum strength and height required to contain livestock, as approved by the engineer. Locate the temporary bus stop pads outside the immediate work area, as directed by the engineer. Connect temporary bus stop pads in the median to crosswalks, existing sidewalks, or permanent sidewalks.

Reconstruct or move temporary bus stop pads if required for utility installation or paving operations.

Temporary bus stop signs and poles will be furnished and installed by Milwaukee County Transit System.

D Measurement

The department will measure Temporary Bus Stop Pad as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0040	Temporary Bus Stop Pad	Each

Payment is full compensation for furnishing and installing all materials; for constructing; for reconstructing or moving; for removing; and for furnishing and installing temporary fence.

118. Exposing Existing Utility, Unpaved Area Item SPV.0060.0043.**A Description**

This work includes exposing existing utilities which are in direct conflict with proposed facilities. The location of existing utilities not in direct conflict with proposed construction is not included and shall be addressed using standard utility location procedures. The work includes exposing existing utilities under unpaved surfaces more than 6 feet outside a paved surface, and providing both lateral and depth measurements for use in determining potential utility conflict solutions.

B Materials**B.1 Granular Backfill**

Furnish granular backfill that conforms to section 209 of the standard specifications.

Slurry

Use aggregates that conform to standard spec 501 for grade A concrete. Weigh aggregates at a batch plant suitable for batching concrete masonry. Mix and deliver to the project site using a truck mixer. Add enough water to enable the mixture to flow readily.

C Construction**C.1 General**

Submit all requests for exposing existing utilities in writing to the engineer for approval prior to performing the work. Coordinate utility exposures with the engineer and notify the utility owner or their agents of this work two working days in advance so that they may be present when the work commences.

C.2 Excavation

Remove all unpaved surfaces at locations where the existing utility is being exposed. Maintain drainage at all times in accordance to standard spec 205.3.3. Take precautions, including temporary shoring, in order to prevent any undermining of the existing roadway. Perform work in accordance to all applicable laws, ordinances, rules, regulations, and OSHA standards.

Expose all utility locations within a given location to a minimum depth of 18-inches below the bottom of each utility. Excavate in a manner that protects the integrity of the utilities and prevents any damage to wrappings or protective coatings such as by any mechanical method or hand digging. Notify the utility owner promptly if damage or interruption of service occurs. Repair all damage caused to such utilities resulting from negligence or carelessness at own expense.

Take all lateral and depth measurements in US feet and tenths thereof. Identify horizontal locations of each exposed utility with a coordinate northing and easting referenced to the Wisconsin County Coordinate System (WCCS), Milwaukee, NAD 83 (2007). Provide vertical elevations for each exposed utility and reference to NAVD 88 (2007).

The utility location shall remain exposed and available for visual inspection until the completion of all work in a given location. If the utility shall remain exposed overnight or for prolonged periods of time, protect the location with traffic-rated steel plating, safety barriers, and all necessary traffic control devices that may be required under applicable standards or as directed by the engineer.

C.3 Backfilling

Upon completion of the utility exposure, restore the location in kind to its original condition. Use granular backfill, conforming to standard spec 209, to backfill the exposed utility locations to the subgrade elevation except for areas located within local streets. All granular material placed to an elevation of 18-inches above each exposed utility shall consist substantially of sand with all particles retained on a one-inch (25.0 mm) sieve removed. The remaining granular material shall conform to the specifications for backfill for trench excavation. In grassy areas, place 6-inches of topsoil, sod or seed and mulch, and fertilizer. Alternate restoration methods may be used upon written approval from the engineer.

C.4 Documentation

Provide documentation to the engineer and include the coordinates, elevations, and sketches of the utility locations tied to known features in the plans. Each utility shall be referenced to a proposed alignment with a station and offset. Where near a ramp, reference the ramp alignment. The size and/or diameter, composition, and a description of each utility shall be documented and the location of the elevation with respect to each utility noted. Supply digital photographs of the uncovered utility to the engineer in .jpeg format for future reference.

D Measurement

The department will measure Exposing Existing Utility, Unpaved Area as a unit for each location, acceptably completed. A location may have multiple utilities located within the same exposure area. An exposure area will include all utilities within 6 lateral feet of each other, and payment will only be made for one unit regardless of the number of utilities exposed. If the distance from the existing ground elevation, located above the existing utility, to a point 18 inches below the exposed utility is between 0 and 6 feet, the department will measure each location as a single unit of work. If the distance from the

existing ground elevation, located above the existing utility, to a point 18 inches below the exposed utility is greater than 6 feet and less than 12 feet, the department will pay for the item as two units of work. Exposures in depth greater than 12 feet are not covered under this item.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0044	Exposing Existing Utility, Unpaved Area	Each

Payment is full compensation for furnishing all excavation; for disposing of all materials; for locating all utilities within each respective location; for providing documentation and photographs of utility locations to the engineer; for furnishing all surveying associated with exposing existing utilities; for furnishing all maintenance of the location during construction; for furnishing all traffic control, safety barriers, and steel plating required; and for temporary shoring.

119. Exposing Existing Utility, Paved Area Item SPV.0060.0044.

A Description

This work includes exposing existing utilities which are in direct conflict with proposed facilities. The location of existing utilities not in direct conflict with proposed construction is not included and shall be addressed using standard utility location procedures. The work includes exposing existing utilities under paved surfaces or within 6 feet of a paved surface, and providing both lateral and depth measurements for use in determining potential utility conflict solutions.

B Materials

B.1 Granular Backfill

Furnish granular backfill that conforms to standard spec 209.

B.2 Backfill Slurry

Use aggregates that conform to standard spec 501 for grade A concrete. Weigh aggregates at a batch plant suitable for batching concrete masonry. Mix and deliver to the project site using a truck mixer. Add enough water to enable the mixture to flow readily.

C Construction

C.1 General

Submit all requests for exposing existing utilities in writing to the engineer for approval prior to performing the work. Coordinate utility exposures with the engineer and notify the utility owner or their agents of this work two working days in advance so that they may be present when the work commences.

C.2 Excavation

Remove all paved surfaces at locations where the existing utility is being exposed. Saw or remove concrete and asphaltic pavements to the nearest joint. Remove all pavement

surfaces in such a way that all existing edges consist of a true line having a perpendicular edge with no unraveling. Maintain drainage at all times in accordance to standard spec 205.3.3. Take precautions, including temporary shoring, in order to prevent any undermining of the existing roadway. Perform work in accordance to all applicable laws, ordinances, rules, regulations, and OSHA standards.

Expose all utility locations within a given location to a minimum depth of 18-inches below the bottom of each utility. Excavate in a manner that protects the integrity of the utilities and prevents any damage to wrappings or protective coatings such as by any mechanical method or hand digging. Notify the utility owner promptly if damage or interruption of service occurs. Repair all damage caused to such utilities resulting from negligence or carelessness at own expense.

Take all lateral and depth measurements in US feet and tenths thereof. Identify horizontal locations of each exposed utility with a coordinate northing and easting referenced to the Wisconsin County Coordinate System (WCCS), Milwaukee County, NAD 83 (2007). Provide vertical elevations for each exposed utility and reference to NAVD 88 (2007).

The utility location shall remain exposed and available for visual inspection until the completion of all work in a given location. If the utility shall remain exposed overnight or for prolonged periods of time, protect the location with traffic-rated steel plating, safety barriers, and all necessary traffic control devices that may be required under applicable standards or as directed by the engineer.

C.3 Backfilling

Upon completion of the utility exposure, restore the location in kind to its original condition. Use granular backfill, conforming to standard spec 209, to backfill the exposed utility locations to the subgrade elevation except for areas located within local streets. All granular material placed to an elevation of 18-inches above each exposed utility shall consist substantially of sand with all particles retained on a one-inch (25.0 mm) sieve removed. The remaining granular material shall conform to the specifications for backfill for trench excavation. When exposed utility locations fall within local streets or city right-of-way, use slurry backfill to fill the entire location to the subgrade elevation.

Restore concrete pavement and concrete base course to the depth found in the existing roadway. Replace all locations that fall within live lanes of any roadway or pedestrian traffic with a high early-strength concrete pavement mix design having a depth equivalent to the existing pavement structure unless directed otherwise by the engineer. Locations that are closed to through traffic may use an approved concrete pavement mix conforming to section 501 of the standard specifications. If directed by the engineer, tie concrete pavement and/or dowel it to the existing pavement according to the standard detail drawing for concrete pavement. All locations requiring asphaltic pavement shall consist of HMA Pavement Type E-3 unless otherwise directed by the engineer. Place the HMA pavement in lifts to a depth as directed by the engineer. Apply tack coat to composite pavement structures and between lifts.

Place base aggregate dense between the subgrade surface and the bottom of the pavement.

C.4 Documentation

Provide documentation to the engineer and include the coordinates, elevations, and sketches of the utility locations tied to known features in the plans. Each utility shall be referenced to a proposed alignment with a station and offset. Where near a ramp, reference the ramp alignment. The size and/or diameter, composition, and a description of each utility shall be documented and the location of the elevation with respect to each utility noted. Supply digital photographs of the uncovered utility to the engineer in .jpeg format for future reference.

D Measurement

The department will measure Exposing Existing Utility, Paved Area as a unit for each location, acceptably completed. A location may have multiple utilities located within the same exposure area. An exposure area will include all utilities within 6 lateral feet of each other and payment will only be made for one unit regardless of the number of utilities exposed. If the distance from the existing ground elevation, located above the existing utility, to a point 18 inches below the exposed utility is between 0 and 6 feet, the department will measure each location as a single unit of work. If the distance from the existing ground elevation, located above the existing utility, to a point 18 inches below the exposed utility is greater than 6 feet and less than 12 feet, the department will pay for the item as two units of work. Exposures in depth greater than 12 feet are not covered under this item.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0044	Exposing Existing Utility, Paved Area	Each

Payment is full compensation for furnishing all excavation; for disposing of all materials; for locating all utilities within each respective location; for providing documentation and photographs of utility locations to the engineer; for furnishing all surveying associated with exposing existing utilities; for furnishing all maintenance of the location during construction; for furnishing all traffic control, safety barriers, and steel plating required; for temporary shoring, and all finishing items including, but not limited to, base aggregate dense, concrete pavement, HMA pavement, curb and gutter, and sidewalk located above the subgrade elevation.

120. Fixed Message Sign Portable Support, Item SPV.0060.0045.

A Description

This special provision describes the construction of portable sign supports for fixed message signs as shown on the plans.

B Materials

Use lumber and hardware conforming to standard spec 507.

C Construction

Construct the fixed message sign portable support in accordance to the detail on the plans.

D Measurement

The department will measure Fixed Message Sign Portable Support as each individual location, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0045	Fixed Message Sign Portable Support	Each

Payment is full compensation for furnishing and installing fixed message sign portable supports; for removing the portable supports at the completion of the work; and for furnishing all labor materials, equipment, tools and incidentals necessary to complete the work.

121. Traffic Control Local Road Lane Closures, Item SPV.0060.0050.**A Description**

Furnish the labor and equipment required for closing and subsequently opening a local road lane or lanes in accordance to standard spec 643, the plans, and as directed by the engineer. Drums, barricades and signs may remain along the roadway when the local road is open to traffic. Make signs invisible to traffic when the local road is open. Drums, barricades, lights, arrow boards and signs will be paid for separately under the various traffic control items.

B (Vacant)**C (Vacant)****D Measurement**

The department will measure Traffic Control Local Road Lane Closures by each individual local road lane or two-lane closure that is set up and subsequently removed in each traffic direction within a 24 hour time period, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.0050	Traffic Control Local Road Lane Closures	Each

Payment is full compensation for closing and subsequently opening a local road lane or lanes; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work in accordance to the contract.

122. Lamp Disposal High Intensity Discharge, Item SPV.0060.1010.

A Description

This special provision describes the packaging and delivering of high intensity discharge (mercury vapor, metal halide, and high-pressure sodium) lamps removed under this contract to the department for disposal as hazardous materials.

B Materials

Lamps turned in to the department will be considered the property of the department for proper future disposal, and the contractor will have no further obligation for their disposal.

C Construction

Pack intact lamps in the packaging of the new lamps used to replace them, or packaging affording the equivalent protection. Place in full, stackable cartons with the name of the contractor written on each carton. Segregate the lamps by type and wattage. Label each carton by the type and wattage contained (do not mix) and the quantity.

Pack broken lamps into thick plastic bags and place inside sturdy cardboard boxes or the equivalent. Mark the outer packaging with the term "broken lamps". Deliver all broken lamps to the department.

The department will not accept lamps improperly packaged or packed in metal containers. The department will reject any lamps not removed as part of this contract as shown on the plans.

Pile cartons no more than two high if palletized and secure them to prevent shifting or falling of the loads.

Deliver the lamps to the department at the South 60th Street office in West Allis. Consolidate all deliveries into a truckload or more, except when all the lamps removed under a contract measure less than a truckload, deliver as one load at one time. Contact Mike Prebish at (414) 266-1170, Monday through Thursday from 8:00 AM to 4:00 PM to set up an appointment for delivery.

D Measurement

The department will measure Lamp Disposal High Intensity Discharge as each individual unit delivered to the department properly packaged and delivered. The department will not measure broken lamps that exceed a total of ten percent of all lamps to be delivered.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1010	Lamp Disposal High Intensity Discharge	Each

Payment is full compensation for handling, packaging, labeling and delivering the lamps; and for labor, tools, equipment and incidentals necessary to complete the work.

Payment will be in addition to payment for the work under which the lamps are removed from service.

123. Salvaging Light Poles Luminares and Arms, Item SPV.0060.1020.

A Description

The work under this item shall consist of removing lighting pole, arm and luminares from the locations shown in the plans, and reinstalling pole at a new location as shown in the plans, in accordance to the applicable provisions of sections 204, 655 and 659 of the standard specifications or delivering the units to a specific location.

B (Vacant)

C Construction

Inspect the pole prior to removing from the existing base. Inform the engineer of any items of concern or potential problems that may interfere with the reuse of the pole, arm or luminaire. Minimize the time between removal from the existing base and reinstallation on the new base. Bases will be paid as a separate item and are not included herein. Replace the existing bulb with a new one of the same type. The existing bulb, if HID, is to be returned to the DOT under Bid Item Lamp Disposal High Intensity Discharge, SPV.0060.1010.

D Measurement

The department will measure Salvaging Light Poles Luminares and Arms by each individual light pole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1020	Salvaging Light Poles Luminares and Arms	Each

Payment is full compensation for furnishing all the work required under this bid item.

124. Pull Boxes Steel 24x36-Inch Grounded, Item SPV.0060.1050.

A Description

This special provision describes pull boxes similar to the standard pull box item of the same size, modified for Grounded Neutral wiring systems.

B Materials

Conform to materials requirements for standard pull box items according to standard spec 653.

C Construction

Conform to construction requirements for standard pull box items. In addition, drive a 5/8-inch x 8-foot copper grounding electrode at the bottom of the pull box. Bond the grounded neutral (“white”) conductors, and the canister, frame and cover grounds to the grounding electrode with #6 AWG and connect with an exothermic weld.

D Measurement

The department will measure Pull Boxes Steel 24x36-Inch Grounded by the method of measurement for standard pull box items according to standard spec 653.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1050	Pull Boxes Steel 24x36-Inch Grounded	Each

Payment will be on the same basis as standard pull box items according to standard spec 653.

125. Pull Boxes Steel 24x42-Inch Grounded, Item SPV.0060.1051.**A Description**

This special provision describes pull boxes similar to the standard pull box item of the same size, modified for Grounded Neutral wiring systems.

B Materials

Conform to materials requirements for standard pull box items according to standard spec 653.

C Construction

Conform to construction requirements for standard pull box items. In addition, drive a 5/8-inch x 8-foot copper grounding electrode at the bottom of the pull box. Bond the grounded neutral (“white”) conductors, and the canister, frame and cover grounds to the grounding electrode with #6 AWG and connect with an exothermic weld.

D Measurement

The department will measure Pull Boxes Steel 24x42-Inch Grounded by the method of measurement for standard pull box items according to standard spec 653.

E. Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1051	Pull Boxes Steel 24x42-Inch Grounded	Each

Payment will be on the same basis as standard pull box items according to standard spec 653.

126. Salvage Distribution Centers, Item SPV.0060.1090.

A Description

The work under this item consists of removing distribution center from existing base at locations shown in the plans, and relocating it to a new base at location shown in plans, in accordance to standard spec 654 and 655. Concrete control cabinet base removal and installation will be measured and paid for under a separate bid items.

B Materials

Provide small parts, fittings, fasteners, connectors, splice kits, and other appurtenances that are needed to complete the installation and are approved by the engineer.

C Construction

Install and connect the distribution center as shown in the plans. Perform work to meet all applicable codes and conform to good electrical construction practices. The work shall include making all connections for a complete and operable lighting system.

Ground the chain link fence if shown in the plans and electrically bond the gates to the fence with flexible copper jumpers whenever fences are crossed by an underground utility high-voltage service lateral, whether existing or installed for this project.

Coordinate all necessary arrangements with the utility for removal of electrical service to old base and providing new secondary service at 240/480 VAC isolated neutral to new base on behalf of the State of Wisconsin, which will be the billing customer. The department will pay all required utility service extension fees. Minimize the time between removal from the existing base and reinstallation on the new base. Concrete base removal and installation will be paid for as a separate items and are not included herein. Work to include connections to power existing lights at the new location as shown in the plans. Provide temporary utility power or generators to maintain illumination on the highway during the transference between locations. Highway lighting shall be maintained during all nightly hours. .

D Measurement

The department will measure Salvage Distribution Centers by each individual relocation acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1090	Salvage Distribution Centers	Each

Payment is full compensation for removing, hauling, removing the original concrete base, temporary power and installing distribution cabinet; for making connections; for providing and installing all parts, fittings, fasteners, connectors, and splice kits, for fence grounding; for restoration of WE Energies rough backfill; for coordination with the utility; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

127. Electrical Service Meter Breaker Pedestal - Lighting, Item SPV.0060.1154.

A Description

This work shall consist of furnishing and installing an electrical service for lighting along with lighting contactor, fused disconnect switches and support structure as shown on the plans and as follows.

A 100 amp, 120/240 volt, single phase, underground electrical service lateral will be furnished and installed by the local utility. The service lateral shall terminate at a meter socket located in a meter pedestal.

WISDOT will submit the application for service and pay the utility service installation fee. The contractor shall coordinate for the electrical power source in the name of WisDOT. The engineer shall be notified when the system is ready for connection to the power mains. WisDOT will pay for energy costs.

B Materials

The contractor shall furnish and install an approved meter pedestal, conduit fittings, and connection (s) and all necessary conductors and equipment required by the State Electrical Code and the utility for a service connection

Utility grade materials as shown on the plans are required. The meter pedestal and support materials shall be in accordance to the latest edition of the WE Energies Electric Service and Metering Manual.

When required by the local utility, a manual bypass meter socket may be required.

Provide a NEMA 3R lighting contactor with a HAND/OFF/AUTOMATIC (HOA) selector switch and a minimum of 4 poles rated 30A. Unit shall be housed in a lockable NEMA 4 or 4X enclosure to prevent unauthorized access to the HOA switch. In AUTOMATIC, the contactor shall be controlled by a photocell.

Fused disconnect switches shall be 2-pole, NEMA 3R units provided with 30A fuses.

C Construction

The contractor shall install the electrical service in accordance to local utility requirements. The contractor shall furnish the utility with a wiring affidavit, certifying that the service has been installed in accordance to the State of Wisconsin electrical code.

The contractor shall be responsible for coordinating the timely installation of the service lateral by the utility.

All wire in a conduit shall be pulled through at the same time. If required to pull wire through an occupied conduit, the existing wire shall first be removed and examined. If defective, the old wire shall be replaced for separate payment. If not defective, the old wire shall be pulled through with the new. Removal, inspection, and re-pulling of old wire is an incidental to the pulling of new wire.

Splices shall be made at the distribution centers, in junction boxes and at pole bases only, unless otherwise approved by the engineer, otherwise shown on the plans, or forming part of work indicated to be temporary. Wire runs shall be continuous between the locations approved for splices.

Damp location splices may be made with Scotchlock or equivalent wire nuts for three #6 AWG wires or smaller or two #4 AWG wires or smaller. Split bolt or crimp splices will be accepted for the above application and are required for larger combinations of wires. Split bolt or crimp splices made in damp locations shall be made for each conductor and shall be appropriately sized. Split-bolt or crimp splices shall be made without irregularities or voids around the fitting and shall be built up with 3M "2200" vinyl mastic pad or approved equal, covered with an approved vinyl insulating tape, and finished with an outer layer of electrical varnish. Damp locations include pole bases, well-drained junction boxes, vented cabinets, approved condulets, and luminaire housings.

Wet location splices shall be made with an approved epoxy insulation kit. Wet locations include direct earth burial, pull boxes, and junction boxes where there is not good drainage.

D Measurement

The department will measure Electrical Service Meter Breaker Pedestal – Lighting by each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.1154	Electrical Service Meter Breaker Pedestal – Lighting	Each

Payment is full compensation for providing the excavation, backfill, conduit, fittings, metering pedestal and meter socket, anchoring, concrete, inspection and incidentals necessary to complete and make operational and with the service completed and energized.

128. Installing Temporary Vehicle Detector Assembly, Item SPV.0060.2001.

A Description

This special provision describes assembling from a combination of state-furnished and contractor furnished materials a temporary vehicle detector assembly and installing, calibrating, and integrating the assembly into the existing system.

B Materials

Materials will include state-furnished materials and contractor furnished materials.

State-furnished materials include the following:

- One Electronic Integrated Systems, Inc. (EIS) Remote Traffic Microwave Sensor (RTMS) with integral 900 MHz serial radio.
- One solar power system consisting of 2-85W panels, 2-120 Amp-Hour batteries, a solar power controller, and one solar power cabinet to house the batteries and controller.

Contractor furnished materials include the following:

- One type 4 or larger wood pole. The wood pole shall be western red cedar in accordance to ANSI standards 05.1. Pressure treatment shall be 5% pentachlorophenol with a minimum of 8 pounds per cubic foot net retention of the oil-borne preservative. Pole shall be shaved the entire length.
- Outdoor rated Power cable between solar power system output and state-furnished RTMS.
- Mounting hardware for solar power system and RTMS detector.

C Construction

RTMS Detector Installation:

Install the wood pole according to industry standards for supplied pole length.

Install the RTMS detector as required in standard spec 675. Additionally, integrate the integral serial communications radio with the radio installed at the field cabinet end. Installation of field cabinet radio is covered with other pay items in this contract.

Solar Power System Installation:

Install the solar panels facing south on the pole with the devices to be powered. If a compass is used, a correction must be made for the difference between magnetic north and true north. Install the solar panels at a tilt angle of approximately 60 degrees. The tilt angle shall be considered the angle from horizontal to the front, or face of the solar panel.

Mount the cabinet to the pole by the two cast aluminum mounting brackets which are already attached to the back of the cabinet. The brackets shall be attached to the pole using stainless steel bands or U-bolts.

Install the cabling, ensuring that cables enter the cabinet only through the bottom, and that strain relief fittings are used to seal cable entrance points. Connect the panel to the charge controller, connecting the white wire to the positive (+) terminal and the black wire to the negative terminal (-).

D Measurement

The department will measure Installing Temporary Vehicle Detector Assembly as each individual unit, with each assembly installed, focused on initial traffic lane configuration, functioning, and accepted in accordance to the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2001	Installing Temporary Vehicle Detector Assembly	Each

Payment is full compensation for providing the contractor furnished materials, assembling the state-furnished and contractor furnished materials, installing the assembly, calibrating the detector, and making the assembly functional; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

129. Installing Portable Video Surveillance System, Item SPV.0060.2002.

A Description

This special provision describes deploying a portable trailer-mounted video surveillance system as shown in the plans to provide continuous video surveillance of the project area during permanent CCTV sites downtime.

B Materials

Materials will be state-furnished and will be an all inclusive unit consisting of a cable erected pole with a direct IP CCTV camera, a solar power system, a wireless Ethernet bridge, and stability outriggers, all mounted on a trailer.

C Construction

Pick up the state-furnished video surveillance system at the department facility at 531 W Newhall Ave, Waukesha, WI.

Deploy the surveillance system in the initial location as shown on the plans and as directed by the engineer following all recommended procedures by the manufacturer.

Integrate the surveillance system with the new and existing communications system through the wireless Ethernet bridge. Installation of the backhaul end of the wireless Ethernet bridge will be compensated for with other pay items in this contract.

D Measurement

The department will measure Installing State-Furnished Portable Video Surveillance System as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2002	Installing Portable Video Surveillance System	Each

Payment is full compensation for picking up the surveillance system in Waukesha; for deploying it in the project area; for making functional; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

130. Relocating Portable Video Surveillance System, Item SPV.0060.2003.**A Description**

This special provision describes moving a previously deployed portable video surveillance system to a new location as directed by the engineer or as made necessary by construction operations in the area.

B Materials

Portable video surveillance system and wireless Ethernet bridge previously deployed through other pay items in this contract.

C Construction

Coordinate all planned down-time of the portable video surveillance system with the STOC at (414) 227-2166. Notify the STOC an amount of time ahead of planned down-time equal to the planned down-time. Examples would be that a 4-hour temporary down-time of the system would require notification 4-hours ahead of time while an 8-hour planned down-time would require 8-hours of advance notification.

Per manufacturer's recommendations, prepare the surveillance system for towing, relocate to the new location, re-deploy, and make functional as directed by the engineer and as made necessary by construction operations.

No payment will be made for this work unless previously approved by the engineer. No payment will be made for this work for relocations made necessary by operations not previously planned with the engineer's approval.

D Measurement

The department will measure Relocating State-Furnished Portable Video Surveillance System by each individual unit, acceptably relocated and operational, including re-integrating the wireless Ethernet bridge as required by the relocation.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2003	Relocating Portable Video Surveillance System	Each

Payment is full compensation for taking the surveillance system down, moving to a new location, and re-deploying in a new location; for re-integrating the wireless Ethernet bridge into the communications system; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

131. Ground Rod, Item SPV.0060.2004.**A Description**

This special provision describes installing a ground rod and ground wire.

B Materials

Ground rod shall be copper clad steel with cladding 13 mils thick. The minimum diameter is 5/8-inch and the minimum length is eight feet. Ground wire shall be AWG # 6 bare, solid copper.

C Construction

Use exothermic welding to connect the ground wire to the rod. Install the rod vertically, or as close to vertical as conditions permit. Select locations with moist soil, if available. Place the rod at least six feet from all other ground rods.

D Measurement

The department will measure Ground Rod by each unit, acceptably installed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2004	Ground Rod	Each

Payment is full compensation for installation of the ground rod and ground wire; welding and connections at both ends of the ground wire; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

132. Refocusing Temporary Vehicle Detector Assembly, Item SPV.0060.2005.**A Description**

This special provision describes refocusing an existing microwave detector for operation with a new lane configuration when relocation of the Temporary Vehicle Detector Assembly (TVDA) pole is not required.

B Materials

Materials include the following items purchased and installed in other contracts:

- One (1) Electronic Integrated Systems, Inc. (EIS) Remote Traffic Microwave Sensor (RTMS) with integral 900 MHz serial radio.
- Mounting hardware for solar power system and RTMS detector.

C Construction

Coordinate all planned down-time of the temporary vehicle detector assembly with the STOC at (414) 227-2166. Notify the STOC an amount of time ahead of planned down-time equal to the planned down-time. Examples would be that a 4-hour temporary down-time of the system would require notification 4-hours ahead of time while an 8-hour planned down-time would require 8-hours of advance notification.

Verify to the satisfaction of the engineer that the existing detector assembly is working properly. Inspect the vehicle detector assembly for damage.

Reinstall the RTMS detector as required in standard spec 675. Additionally, integrate the integral serial communications radio with the radio installed at the base-station field cabinet, and return the TVDA to operation.

D Measurement

The department will measure Refocusing Temporary Vehicle Detector Assembly by each individual unit, acceptably refocused and operational.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2005	Refocusing Temporary Vehicle Detector Assembly	Each

Payment is full compensation for making the detector fully operational with a new lane configuration.

133. Removing Controller Cabinet, Item SPV.0060.2006.

A Description

This special provision describes removing an existing controller cabinet.

B (Vacant)

C Construction

Remove controller cabinets at the locations shown on the plans, or as directed by the engineer. Salvage and store the cabinets and all contents for pick up by the department.

Do not remove the existing ITS control cabinets, or any other associated equipment until necessary, or as directed by the engineer. Carefully remove the existing cabinets from the concrete bases, together with all components in such a manner as to safeguard all parts and wiring from damage or loss. Salvage and store the cabinet and contents for pick up by the department.

Prior to removing the existing ITS control cabinets, remove all cables being terminated in the cabinet. Cut existing cables flush with cabinet base and cap existing conduits. Dispose of the cables properly away from the project area.

D Measurement

The department will measure Removing Controller Cabinet by each individual unit, acceptably removed, salvaged, and stored.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2007	Removing Controller Cabinet	Each

Payment is full compensation for removal and storage of the controller cabinet; disconnecting all associated wires and cables; for capping existing conduits, and for furnishing all labor, tools, equipment, transportation, and incidentals necessary to complete the work.

134. Removing Controller Cabinet Base, Item SPV.0060.2007.

A Description

This special provision describes removing an existing controller cabinet concrete base.

B Materials

Existing controller cabinet base, including concrete masonry, ground rods, masonry anchors, and restoration materials such as topsoil, seeding, mulch, and fertilizer in accordance to the pertinent provisions of standard spec 201, 625, 627, 629, 630, 636, and 640.

C Construction

Remove and dispose of the concrete foundation and all other pertinent materials, and restore the disturbed area by placing 4-inches of topsoil, and fertilize, seed, and mulch all disturbed areas in accordance to the pertinent requirements of the standard specifications.

D Measurement

The department will measure Removing Controller Cabinet Base by each individual unit, removed from the ground, removed from the project site, and the disturbed area restored in accordance to the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2007	Removing Controller Cabinet Base	Each

Payment is full compensation for removing and disposing of a concrete controller cabinet base, including masonry anchors, ground rods, and concrete masonry; for topsoil, fertilizer, seed and mulch; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

135. Removing Electrical Service Meter Breaker Pedestal, Item SPV.0060.2008.**A Description**

This special provision describes removing an existing electrical service meter breaker pedestal, disconnecting all connected power wires, and disposing of the equipment appropriately.

B Materials

Existing electrical service meter breaker pedestal.

C Construction

Coordinate for removal of the existing electrical service meter breaker pedestal with WE Energies.

Disconnect all connected power wires, remove the pedestal and dispose of all materials properly away from the project area.

D Measurement

The department will measure Removing Electrical Service Meter Breaker Pedestal by each individual unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2008	Removing Electrical Service Meter Breaker Pedestal	Each

Payment is full compensation for coordination with WE Energies; for disconnection of wires; for removal and disposal of the pedestal; and for furnishing all labor, tools, equipment, transportation, and incidentals necessary to complete the work.

136. Removing Controller Ramp Meter Processor Assembly, Item SPV.0060.2009.

A Description

This special provision describes removing existing controller ramp meter processor assembly at locations shown on the plan including; all materials needed, rewiring and/or disconnect of wiring in the cabinet and return of removed equipment to WisDOT.

B Materials

Materials include existing ITS cabinets and existing 170 ramp meter processor assemblies.

C Construction

Make all the proper disconnects and wiring changes in the controller cabinet.

Remove the existing controller ramp meter processor assembly as the plans show. Use caution not to damage any existing devices or processor assembly.

The department will pick up the controller ramp meter processor assembly. Contact Kurt Wilm at (414) 940-5570), Wisconsin Department of Transportation, Statewide Traffic Operations Center. Dispose of the cabling and wiring properly away from the project site.

D Measurement

The department will measure Remove Controller Ramp Meter Processor Assembly as each individual unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2009	Remove Controller Ramp Meter Processor Assembly	Each

Payment is full compensation for removing an existing controller ramp meter processor assembly; for disconnecting all necessary cables and wiring; and properly storing the materials.

137. Salvage Hybrid Dynamic Message Sign Assembly, Item SPV.0060.2010.

A Description

This special provision describes salvaging, and storing for reinstallation, an existing hybrid electronic dynamic message sign / fixed message assembly on a side mount sign structure.

B Materials

Existing structure mounted control cabinet and DMS controller.

Existing 900 MHz serial communications radio.

Existing dynamic message sign / fixed message sign hybrid assembly, DMS controller, cabinet, and sign cables.

Each dynamic message sign will be approximately 4-1/2-feet high by 18-feet wide and weigh approximately 1,100-pounds. The signs are Adaptive Microsystems Excite 20-mm sign assemblies.

C Construction

Prior to beginning work, the contractor may request that the sign assembly be tested for functionality and that it be inspected to determine condition. Once removal has started, the contractor shall be responsible for any damage to the sign or associated equipment. It will be the choice of the contractor on how best to disassemble the components and remove them. Replace or repair any damaged components at no additional expense to the department.

Prior to beginning any removal operations, build the associated concrete footings (paid for separately) and underground conduit system to prepare the new site for reinstallation and to minimize downtime of the sign assembly.

Once the new site has been prepared, disconnect power conductors to the sign cabinet.

It is up to the contractor whether to disassemble the sign assembly for relocation and to reassemble on the new footings or whether to move the entire assembly in one piece. However, once work has begun any damage to the sign assembly will be the contractor's responsibility and any damage will be repaired at the contractor's expense with no additional compensation from the department.

Removal of the fixed message portion of the sign assembly will be paid for under other pay items in the contract.

Reinstallation of the sign assembly will be paid for under other pay items in this contract.

D Measurement

The department will measure Salvage Hybrid Dynamic Message Sign Assembly by each individual unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2010	Salvage Hybrid Dynamic Message Sign Assembly	Each

Payment is full compensation for removing the sign assembly, including any necessary wiring disconnections; any necessary restoration; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

138. Install Salvaged Hybrid Dynamic Message Sign Assembly, Item SPV.0060.2011.

A Description

This special provision describes reinstalling a previously salvaged electronic dynamic message sign in a hybrid fixed message / dynamic message assembly on a side mount sign structure.

Installation of the fixed message sign, structural steel, and concrete footings will be paid for under other pay items in this contract.

B Materials

Salvaged dynamic message sign, controller, and 900 MHz serial communications radio.

New state-furnished wireless internet modem.

Flexible or rigid metallic conduit and fittings.

Stainless steel mounting hardware.

C Construction

Mount the dynamic message sign to the new structural steel sign supports with new stainless mounting hardware.

Mount the salvaged structure mount controller cabinet to the new structural steel sign supports.

Connect the cabinet to its power source as shown on the plans.

Connect the sign controller and the new state-furnished wireless internet modem to the power source in the reinstalled cabinet.

Reinstallation of the fixed message portion of the sign assembly will be paid for under other pay items in the contract.

D Measurement

The department will measure Install Salvaged Hybrid Dynamic Message Sign Assembly by each individual unit, acceptably removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2011	Install Salvaged Parking Message Sign Assembly	Each

Payment is full compensation for installing the salvaged sign assembly, including connecting the controller to the new state-furnished wireless internet modem, including any necessary wiring disconnections; any necessary restoration; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

139. Installing Conduit Into Existing Manhole, Item SPV.0060.2012.

A Description

This special provision describes locating existing conduit system manholes and installing new conduit into those manholes at the locations shown on the plans. The contractor shall verify existing conduit manhole locations with the City of Milwaukee, and shall maintain any existing conductors, fibers, and conduit paths without interruption or damage. Repair and restoration of all disturbed areas resulting from the work shall be in accordance to the pertinent provisions of the standard specifications, and as hereinafter provided.

B Materials

Conduit, as provided and paid for under other items in this contract. All materials shall conform to the pertinent provisions of the standard specifications unless otherwise noted.

C Construction

Carefully expose the outside of the existing structure without disturbing any existing conduits or cabling.

Drill the appropriate sized hole for the entering conduit at a location within the structure that will not disturb the existing cabling and will not hinder the installation of new cabling within the installed conduit, or remove existing abandoned conduit from the structure to allow for the installation of the new conduits as indicated on the plans.

Fill any void area between the drilled hole and conduit with an engineer-approved filling material to protect against conduit movement and entry of fill material into the structure.

Carefully tamp backfill into place.

All disturbed areas shall be repaired and restored in kind.

D Measurement

The department will measure Installing Conduit Into Existing Item by each individual unit, acceptably installed. Up to six conduits entering a structure per entry point into the existing structure will be considered a single unit. Conduits in excess of six, or conduits entering at significantly different entry points into the existing manhole will constitute multiple units.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2012	Installing Conduit Into Existing Manhole	Each

Payment is full compensation for drilling holes; removing abandoned conduit; furnishing and installing all materials, including bricks, and coarse aggregate; for excavation, bedding and backfilling, including any sand or other required materials; furnishing and placing topsoil, fertilizer, seed, and mulch in disturbed areas; for disposal of surplus materials; for making inspections; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

140. 4' Diameter Manhole Type TES, Item SPV.0060.2013.**A Description**

The work under this item consists of a 4'-0" round manhole for the City of Milwaukee Underground Conduit Section at locations shown in the plans, in accordance to standard spec 301, 611 and 501, and as hereinafter provided.

B Materials

Concrete and steel reinforcement shall conform to ASTM specification: C478 (latest edition), except that the single cage circumferential reinforcement in all vertical walls shall consist of lines of #6 steel wire spaced 3" horizontally and lines of #10 steel wire spaced 8" vertically located in the center of the wall.

Two lifting inserts for 1-1/2" diameter lifting eyes shall be cast in the wall of the base and all other riser sections except the top cap section.

Up to four 7/8" diameter galvanized steel 1-11/16" pulling-in eyes shall be cast in the wall of the base section directly across from each duct entrance.

Four 5/8" diameter plastic threaded cable rack bolt inserts shall be cast in the wall of the riser section.

A continuous circumferential Butyl Rubber gasket shall be supplied, to be laid on the wall joint of the base and riser section when manhole is being assembled at job site.

The number of pulling-in eyes and/or cable rack bolt inserts may vary.

Additionally, the size, location, shape and number of duct entrances and/or knock-out area may vary. Unit price of manhole shall not vary for number of openings, pulling-in eyes and/or rack bolt inserts.

The city will supply a frame and lid for the manhole. Contractor shall contact Mr. Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frame and lid from the DPW Headquarters at 3850 N. 35th St. Contractor must have the "Casting Requisition Form" which shall be supplied by the city at the Preconstruction Meeting.

For any questions on materials, contact Ms. Karen Rogne at (414) 286-3243.

C Construction

4' Diameter Manholes Type TES shall be installed in accordance to standard spec 611.3.

D Measurement

The department will measure 4' Diameter Manhole Type TES by each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2013	4' Diameter Manhole Type TES	Each

Payment is full compensation for furnishing all excavation work and disposal of material; for, furnishing and installing all materials, including bricks, and coarse aggregate, bedding and backfilling, concrete forms, concrete placement, appurtenances, and backfilling; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

141. Adjusting TES Manhole Cover, Item SPV.0060.2015.

A Description

This special provision describes adjusting the existing chimney of the block, precast, or brick round manholes; furnishing, installing and removing protection of the cables in the manhole during adjustment operations. Perform work in accordance to the standard specifications, the provisions of the article Adjusting Manhole Covers, as shown on the plans, and as hereinafter specified.

B Material

Furnish and install materials that conform to the requirements of standard spec 519. Salvage and reinstall existing covers on the manholes. The city will supply covers designated for replacement. Contractor shall contact Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frames and lids from the DPW Field Headquarters at 3850 N. 35th St. Contractor must have the "Castings Requisitions Form" which shall be supplied by the city at the Preconstruction Meeting to obtain the covers.

C Construction

Report any pre-existing problems to Ms. Karen Rogne of city Underground Conduits Section at (414) 286-3243 three working days in advance of any construction on manholes.

Before removing the pavement around the manhole, the contractor shall place a ¾-inch plywood cover or equal over existing active Street Lighting, Traffic Control, Communication or private vendor electrical cables. This cover shall be properly supported to/at the manhole floor.

Break out and remove pavement around manhole. Remove existing covers and store and secure them properly. Any damaged, lost, or stolen covers shall be the responsibility of the contractor and shall be replaced at contractor's expense.

Remove existing chimney to surface of concrete roof slab. If manhole does not have an existing concrete roof slab, remove sufficient chimney as to provide adequate corbel to fit new cast iron frame and cover.

Adjust manhole cover to proposed grade using bricks or concrete rings as necessary. Remove wedges/shims. Fill voids with grout. Do not back plaster inside walls.

After completion of paving, remove the temporary ¾-inch plywood cover or equal which is over the existing electrical cables in the manhole as mentioned above.

Notify Ms. Rorney three working days in advance of completion of each manhole adjustment, for inspection and acceptance of work performed. The contractor will receive no payment until the above work is approved by city Underground Conduits.

D Measurement

The department will measure Adjusting TES Manhole Cover by each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.2015	Adjusting TES Manhole Cover	Each

Payment is full compensation for furnishing all required materials, exclusive of frames, grates, or lids available and designated for adjusting; for removing, reinstalling and adjusting the covers; and for furnishing all labor, tools, equipment and incidentals necessary for adjusting each cover, complete in accordance to the requirements of the plans and contract. Covers to be adjusted and which are rendered unfit for use by the contractor through the contractor's operations will be replaced by the contractor in kind at the contractor's own cost and expense.

142. Traffic Signal Interconnect Vault, Item SPV.0060.3001.

A Description

This special provision describes furnishing and installing a Traffic Signal Interconnect Vault and 2-piece vault lid.

B Materials

Furnish a communication vault and vault lid constructed of a combination of polymer concrete and fiberglass gray in color. All polymer concrete vaults are not acceptable.

Vault shall have an inside clear opening of 30" x 48" and the overall height shall be 48". Stackable units are not acceptable.

The vault shall consist of a polymer concrete bottom ring with four corrugated fiberglass sidewalls and a polymer concrete top ring. The four corners of the vault shall be encapsulated in polymer concrete. No fiberglass taping of the sidewall panels will be accepted.

Furnish a vault lid with a minimum design load of 15,000 pounds and test load of 22,500 pounds. Testing shall be in accordance to SCTE-77- 2007, tested over a 10" x 10" plate. Tests utilizing a 10" x 20" plate are not acceptable. The vault lid shall consist of two interlocking pieces with each piece approximately 33" x 25.5".

The vault lid shall have a permanent stamp that reads *WISDOT COMMUNICATIONS*. The manufactures name and load rating shall also be stamped on the lid cover. The vault lid shall have two slots measuring ½" x 4" to use as a cover lift out. The lid shall be secured utilizing four ½" stainless steel penta-head bolts with stainless steel washers.

Furnish manufactured gaskets to be placed between the lid and top of vault to resist water from entering the vault.

The vault and cover shall be designed with a field replaceable locking mechanism. The cover shall be able to be removed and the nut in the vault shall be able to be replaced without damaging the vault.

The vault sidewalls shall be manufactured of corrugated fiberglass and the spacing between each corrugation shall measure approximately 8" to facilitate conduit placement. The sidewalls shall have a smooth exterior and be gel-coated.

The vault shall have four ½" bolts embedded on the underside of the top ring to be used for lifting purposes.

Furnish fiber optic cable support assembly consisting of multiple brackets, racks, and rails required to suspend the required surplus cabling and any splice enclosure for a single vault. The support assemblies shall be made from or coated with a weather resistant material to ensure no corrosion.

Furnish self-curing caulking to provide a permanent bond and made of flexible rubber that is not affected by sunlight, water, oils, mild acids, and alkali. Use mildew-resistant and non-flammable, gray caulk.

C Construction

Construct communications vault in accordance to standard spec 611.

Provide a manufacturer-approved knockout punch driver to provide openings in the vault for conduit if not provided. Voids between the conduit and vault shall not exceed ½". Caulk the interior and exterior of the communication vault. Cure caulking according to manufacturer's specifications before backfilling.

Secure vault lid to vault with the manufacturer supplied hardware.

Anchor the support assemblies to the existing vault using stainless steel hardware.

D Measurement

The department will measure Traffic Signal Interconnect Vault as each individual vault complete and accepted in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.3001	Traffic Signal Interconnect Vault	Each

Payment is full compensation for furnishing and installing all materials including vaults, lids, bolts, washers, mounting hardware, and caulking; for excavating, bedding, backfilling and restoration of ground to original condition including sand, aggregate, concrete, or other required materials; for disposing of surplus materials; and for furnishing all labor, tools, equipment and incidentals necessary to complete the contract work.

143. Traffic Polymer Concrete Vault 13-Inch x 24-Inch x 18-Inch, Item SPV.0060.3002; 17-Inch x 30-Inch x 18-Inch , Item SPV.0060.3003.

A Description

This special provision describes furnishing and installing Polymer Concrete Vaults in accordance to current City of Milwaukee methods.

B Materials

Polymer Concrete shall be manufactured from one of the general types and grades defined in polymers in concrete structural applications state of the art report, ACI 548.6R-96 for structural uses. Thermoplastics will not be acceptable.

Enclosure walls shall be made from pattern cut structural fiberglass cloths to assure uniform, pre-measurable fiberglass content on all areas. Chopper gun fiberglass construction is not acceptable.

Binding polymers used in the manufacture of the polymer concrete and the fiber reinforced polyester shall be of the same formulation or from formulations with demonstrated chemical compatibility to assure complete chemical bonding of all components. Fiber reinforced polyester wall sections must be cast integrally into and chemically bonded within the upper polymer concrete casting.

1. Testing

Meet ANSI/SCTE 77 2010 (Tier 15 or greater), ASTM C 857, and WUC 3.6 structural requirements.

Compressive Modulus of Elasticity (fiberglass reinforced polymer): 5.6×10^6 PSI tested in accordance to procedures outlined in ASTM D-695

Comprehensive Strength (fiberglass reinforced polymer): 24,300 PSI tested in accordance to ASTM D-695

Flexural Strength (fiberglass reinforced polymer): 18,700 PSI tested in accordance to ASTM D-790

Tensile Strength (fiberglass reinforced polymer): 12,100 PSI tested in accordance to procedures outlined in ASTM D-638

Tensile Modulus of Elasticity (fiberglass reinforced polymer): 8.6×10^5 PSI tested in accordance to procedures outlined in ASTM D-638

Splitting Tensile Strength (polymer concrete): Tested in accordance to procedures outlined in ASTM C-496

Accelerated Service: Tested in accordance to procedure E outlined in ASTM D-756

Water Absorption: Tested in accordance to ASTM D-570 outlined in sections 6.1 and 6.5

Impact Resistance (fiberglass reinforced polymer concrete): 72 foot pounds in accordance to ASTM D-2444 administered with a "C" tip.

Skid Resistance: 0.60 coefficient of friction in accordance to ASTM C-1028

Flammability Test: Tested in accordance to ASTM D-635

Ultraviolet Exposure: Tested in accordance to ASTM test method G-53

Chemical Resistance

1. Sodium Chloride 5%
2. Sodium Carbonate 0.1 N
3. Hydrochloric Acid 0.2 N
4. Acetic Acid 5%
5. Sulfuric Acid 0.1N
6. Sodium Sulfate 0.1 N
7. Sodium Hydroxide 0.1N
8. Kerosene Oil per ASTM D-543
9. Transformer Oil per ASTM D-543

The street lighting vaults and covers shall be gray in color and shall be flared wall as indicated on the Drawings. Covers shall be provided with two stainless steel bolts. Each cover shall have the words "TRAFFIC" cast into its surface along the longest dimension. The words shall be permanently recessed into the surface.

C Construction

Install rectangular flared wall vaults according to current City of Milwaukee standards. Provisions for inserting conduit into any side or the bottom of the vault shall be included.

D Measurement

The department will measure Polymer Concrete Vault (size) as each individual vault complete and accepted in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.3002	Traffic Polymer Concrete Vault 13-Inch x 24-Inch x 18-Inch	Each
SPV.0060.3003	Traffic Polymer Concrete Vault 17-Inch x 30-Inch x 18-Inch	Each

Payment is full compensation for furnishing labor, equipment, coordination and all materials and incidentals necessary to complete the work.

144. Install Traffic Cabinet Base, Item SPV.0060.3004.

A Description

Install concrete traffic cabinet base furnished by the City of Milwaukee, for traffic signals as shown on the plans.

B Materials

Pre-cast concrete traffic cabinet base will be furnished by the City of Milwaukee.

C Construction

Install concrete traffic cabinet bases in accordance to the plans. Plan changes must be approved by a City of Milwaukee Electric Services Supervisor or Traffic Engineer. The primary contacts are Mr. Al Nichols, Traffic Operations Supervisor (414) 286-3687 office, (414) 708-5148 mobile; or Mr. Joseph Blakeman, Traffic Control Engineer III (414) 286-8070.

D Measurement

The department will measure Install Traffic Cabinet Base as each individual base complete and accepted in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.3004	Install Traffic Cabinet Base	Each

Payment is full compensation for installing all materials; for excavation, backfilling and disposal of surplus material; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

145. Install Traffic Signal Base, Item SPV.0060.3005.**A Description**

Install concrete traffic signal bases furnished by the City of Milwaukee, for traffic signals as shown on the plans.

B Materials

Pre-cast concrete traffic signal bases will be furnished by the City of Milwaukee.

C Construction

Pick up pre-cast concrete traffic signal bases from the City of Milwaukee yard located at 1540 W. Canal Street. Contact traffic signal shop dispatch at (414) 286-3687 to coordinate pick up. Install concrete traffic signal bases in accordance to the plans. Plan changes must be approved by the City of Milwaukee Electric Services Supervisor or Traffic Engineer. The primary contacts are Mr. Al Nichols, Traffic Operations Supervisor (414) 286-3687 office, (414) 708-5148 mobile; or Mr. Joseph Blakeman, Traffic Control Engineer (414) 286-8070.

D Measurement

The department will measure Install Traffic Cabinet Base as each individual base complete and accepted in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.3005	Install Traffic Signal Base	LS

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Payment is full compensation for installing all materials; for excavation, backfilling and disposal of surplus material; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

146. Concrete Bases Type 1 Spread Footing, Item SPV.0060.3006; Concrete Bases Type 2 Spread Footing, Item SPV.0060.3007.

A Description

Work under this specification shall be done in accordance to standard spec 654, contract plan detail, and these special provisions.

B Materials

Materials shall be in accordance to standard spec 654.

C Construction

Construction shall be in accordance to standard spec 654ns.

D Measurement

The department will measure Concrete Bases (Type) Spread Footing as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.3006	Concrete Bases Type 1 Spread Footing	Each
SPV.0060.3007	Concrete Bases Type 2 Spread Footing	Each

Payment is full compensation for providing concrete bases; for embedded conduit and electrical components; for anchor rods, nuts, and washers; for bar steel reinforcement, if required; for excavating, backfilling, and disposing of surplus materials; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

147. Anchor Assemblies Light Poles Structures, Item SPV.0060.4100.

A Description

Furnish and install anchor bolt assemblies for light poles, noise barriers and signal poles that will be installed on bridges and retaining walls as shown on the plans.

B Materials

Anchor bolts shall be of size and spacing as given on the plans and conform to AASHTO M 314 GR 105. Provide heavy hex nuts conforming to AASHTO M 292 and hardened

washers conforming to AASHTO M 293. Provide embedded anchor plates for anchor assemblies as shown on the plans conforming to AASHTO M 223. Provide six nuts and washers per anchor bolt for Anchor Assemblies Light Pole Structures. Provide five nuts and washers per anchor bolt for Anchor Assemblies Noise Barriers Structures. Provide four nuts and washers per anchor bolt for Anchor Assemblies Signal Poles Structures.

Hot dip galvanize the entire anchor assembly. Galvanize embedded anchor plates conforming to AASHTO M 111 and galvanize anchor bolts, nuts and washers conforming to AASHTO M 232. Provide enlarged threads on nuts for proper fit after galvanizing.

C Construction

Install embedded anchor assemblies in concrete structures at locations as shown on the plans. Mount anchor assemblies to formwork or otherwise provide positive support of anchor assembly within formwork as necessary to prevent movement, shifting or misalignment of the anchor assembly during subsequent concrete placement. Protect or clean exposed anchor bolt threads from concrete splatter.

Coordinate location and spacing of anchor assemblies embedded in bridges and retaining walls for mounting noise barriers on bridges and retaining walls with approved noise barrier shop drawings.

D Measurement

The department will measure Anchor Assemblies Light Poles Structures, by each individual anchor assembly, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.4100	Anchor Assemblies Light Poles Structures	Each

Payment is full compensation for furnishing and installing the anchorages; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work.

148. Tieback Anchors, Item SPV.0060.4130;Tieback Anchor Performance Tests, Item SPV.0060.4140.

A Description

A.1 General

- (1) The work under this item consists of permanent, pressure-grouted or post grouted, ground anchors designed, furnished, installed, tested, and stressed in accordance to these special provisions and as shown on the plans.
- (2) Install ground anchors that shall develop the load carrying capacity indicated on the plans in accordance to the testing subsection of these special provisions.

- (3) The contractor has the option to provide an alternate permanent earth anchor system with the approval of the department. The contractor shall then be responsible for selecting the permanent earth anchor type, method of installation, and for determining the bond length and anchor diameter that shall develop the factored design loads indicated on the plans. The analysis, design, construction and testing of the post tiebacks shall conform to the AASHTO LRFD Bridge Design Specifications Fifth Edition with 2010 Interim and the AASHTO LRFD Bridge Construction Specifications. Third Edition with 2010 and 2011 Interims..

A.2 Qualifications of the Contractor

- (1) The contractor performing the work described in these special provisions must have installed ground anchors for excavation retaining walls for a minimum of 5 years. Submit a list containing at least five projects where the contractor has installed ground anchors. Specifically, experience must demonstrate competence in the use of pressure or post grouting. At least one project must show evidence of permanence with a 5-year minimum age. The project experience documentation must include a brief project description, construction methods used during installation, local soil conditions, actual construction time and contact information consisting of an individual's name and current phone number. Contacts must be capable of verifying project participation.
- (2) Submit staff experience records of the engineer, drill operators, and on-site supervisors who will be assigned to the project. The staff records must contain a summary of each individual's experience and it must be complete enough for the engineer to determine whether each individual has satisfied the following qualifications.
- (3) Assign an engineer to supervise the work who has at least four years of experience in the design and construction of anchored earth retaining structures in similar soils. Do not use consultants or manufacturer's representatives in order to meet the requirements of this section. Drill operators and on-site supervisors must have a minimum of one-year experience installing ground anchors with the contractor's organization.
- (4) Submit your qualifications and staff experience records at the preconstruction meeting or 21 calendar days prior to the start of ground anchor installation, whichever date is earlier. The engineer will approve or reject the contractor's qualifications and staff experience records within 14 calendar days after receipt of the submission. Do not start work on any ground anchor installation until approval of the contractor's qualifications and staff experience are given by the engineer. The engineer may suspend the ground anchor work if the contractor substitutes unqualified personnel for approved personnel during construction. If work is suspended due to the substitution of unqualified personnel, the adjustment in contract time resulting from the suspension of work will not be allowed.

A.3 Submittals

- (1) Prepare and submit to the engineer for review and approval working drawings and a design submission describing the ground anchor system or systems intended for use. The working drawings and design submission must be submitted thirty business days before the commencement of the ground anchor work. The working drawing and design submission must include certificates of compliance for the following materials, if used.

The certificates must state that the material or assemblies to be provided will fully comply with the requirements of the contract.

- Prestressing steel or bar;
 - Portland cement;
 - Prestressing hardware;
 - Bearing plates.
- (2) The engineer will approve or reject the contractor's submittals within 30 business days after receipt of the submission.
- (3) Submit to the engineer for review and approval or rejection mill test reports for the prestressing steel and the bearing plate steel. The engineer may require the contractor to provide samples of any ground anchor material intended for use on the project. The engineer will approve or reject the prestressing steel and bearing plate steel within five business days after receipt of the test reports. Do not incorporate the prestressing steel and bearing plates in the work without the engineer's approval.
- (4) Submit to the engineer for review and approval or rejection calibration data for each test jack, pressure gauge and reference pressure gauge to be used. The engineer will approve or reject the calibration data within 5 business days after receipt of the data. Do not commence testing until the engineer has approved the jack, pressure gauge, and reference pressure gauge calibrations.
- (5) Submit to the engineer within 10 calendar days after completion of the ground anchor work, a report containing the following information:
- As-Built plans showing the location and vertical and horizontal orientation of the tiebacks, capacity, tendon type, total length, and unbonded length as installed.
 - Steel tendon, corrosion protection elements and grout certifications and/or mill reports.
 - Grouting records indicating the following:
 - 1. Cement type;
 - 2. Cube test strength results;
 - 3. Grout volume for bonded and unbonded lengths;
 - 4. Grout pressure.
 - Show on the as-built plans the type of testing performed for each post tieback.
 - Tieback tests results (Performance and proof test data with load-anchor elongation curves).
 - Other records as required by section 106 of the standard specifications.

A.4 Definitions

- (1) Anchorage Devices. The anchor head wedges or nuts, which grip the prestressing steel.
- (2) Bearing Plate. The steel plate, which distributes the ground anchor force to the structure.

- (3) **Bond Length.** The length of the ground anchor, which is bonded to the ground and transmits the tensile force to the soil or rock.
- (4) **Factored Design Load.** The factored design load is the maximum anticipated factored load that will be applied to the ground anchor during its service life after stressing and testing have been completed. Design loads and applicable load factors are per AASHTO LRFD Bridge Design Specifications, Fifth Edition with 2010 Interim.
- (5) **Ground Anchor.** A system, referred to as a tieback or an anchor, used to transfer tensile loads to soil or rock. A ground anchor includes all prestressing steel, anchorage devices, bearing plates, grout, coatings, corrosion protection, and sheathings and couplers if used.
- (6) **Minimum Specified Ultimate Tensile Strength.** The minimum breaking strength of the prestressing steel as defined by the specified standard.
- (7) **Tendon Bond Length.** The length of the tendon, which is bonded to the anchor grout.
- (8) **Total Anchor Length.** The unbonded length plus the tendon bond length.
- (9) **Unbonded Length.** The length of the tendon, which is not bonded to the grout. The grout surrounding the unbonded length is a void filler and provides corrosion protection.

B Materials

B.1 References

(1) AASHTO Standards

- M85 Portland Cement
- M183 Structural Steel
- M275 Threadbar Prestressing Steel
- M203 Seven-wire, low relaxation strands
- M222 High-Strength Low-alloy Structural Steel with 50,000 psi Minimum Yield Point to 4 Inches Thick
- M252 Corrugated Polyethylene Drainage Tubing

(2) ASTM Standards

- A-53 Specification for Steel Pipe
- A-252 Specification for Welded and Seamless Steel Pipe Files
- A-500 Specification for Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- A-722 Threadbar Prestressing Steel
- A-779 Compact Seven-wire, low relaxation strands
- D-1248 Specification for Welded and Seamless Steel Pipe Files
- D-1784 Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds
- D-4101 Specification for Propylene Plastic Injection and Extrusion Materials

(3) **Post-Tensioning Institute Standards**

- “Guide Specification for Post-Tensioning Materials,” Post-Tensioning Manual, Post Tensioning Institute, 6th Edition, 2006.
- “Specification for Unbonded Single Strand Tendons,” Post-Tensioning Institute, 2nd Edition, 2003.
- “Recommendations for Prestressed Rock and Soil Anchors,” Post-Tensioning Institute, 4th Edition, 2004.

B.2 Tieback Anchors

- (1) Admixtures that control bleed, improve flowability, reduce water content, and retard set may be used in the grout subject to the approval of the engineer. Expansive admixtures may only be added to the grout used for filling sealed encapsulations, trumpets, and anchorage covers. Accelerators are not permitted. Admixtures, if used, must be compatible with the prestressing steels and mixed in accordance to the manufacturer’s recommendations.
- (2) Fabricate exposed anchorage covers from steel or ductile cast iron with a minimum thickness of 0.10 inches. Securely attach the cover to the anchorage device or bearing plate. If the cover is to be grease filled, then the cover must form a permanent watertight enclosure for the anchorage device.
- (3) Use anchorage devices capable of developing 95 percent of the minimum specified ultimate tensile strength of the prestressing steel tendon. The anchorage devices must conform to the static strength requirements of section 3.1.6 (1) and section 3.1.8 (1) of the PTI “Guide Specification for Post-Tensioning Materials”.
- (4) Fabricate the bearing plate from steel conforming to ASTM A572 Grade 50 or AASHTO M223 Grade 50 specifications.
- (5) Fabricate the bondbreaker from a smooth plastic tube or pipe having the following properties:
 - Resistant to chemical attack from aggressive environments, grout or grease.
 - Resistant to aging by ultra-violet light.
 - Fabricated from material nondetrimental to the tendon or bar.
 - Capable of withstanding abrasion, impact, and bending during handling and installation.
 - Enable the tendon to elongate during testing and stressing.
 - Allow the tendon to remain unbonded after lock-off.
- (6) Use Type I, II, or III Portland cement conforming to AASHTO M85 for grout. The corrosion inhibiting grease must conform to the requirements of section 3.2.5 of the PTI, “Specification for Unbonded Single Strand Tendons”.

- (7) Fabricate heat shrinkable tubes from a radiation crosslinked polyolefin tube internally coated with an adhesive sealant. Before shrinking, the tube must have a nominal wall thickness of 24 mils. The adhesive sealant inside the tube must have a nominal thickness of 20 mils.
- (8) Fabricate ground anchor tendons from a single bar. Additionally, the ground anchor tendons must conform to the following:
- Steel bars conforming to AASHTO M275, or ASTM A722.
 - Seven-wire, low relaxation strands conforming to M203.
- (9) Use steel couplers capable of developing 95 percent of the minimum specified ultimate tensile strength of the tendon.
- (10) Use a sheath as part of the corrosion protection system for the unbonded length portion of the tendon. Fabricate the sheath from one of the following:
- A polyethylene tube pulled or pushed over the prestressing steel. The polyethylene must be Type II, III, or IV as defined by ASTM D-1248 (or approved equal). The tubing must have a minimum wall thickness of 60 mils plus/minus 10 mils.
 - A hot-melt extruded polypropylene tube. The polypropylene must be cell classification PP 210 B5554211 as defined by ASTM D-4101 (or approved equal). The tubing must have a minimum wall thickness of 60 mils plus/minus 10 mils.
 - A hot-melt extruded polyethylene tube. The polyethylene must be high density Type III as defined by ASTM D-3350 and ASTM D1248 (or approved equal). The tubing must have a minimum wall thickness of 60 mils plus/minus 10 mils.
 - Steel tubing conforming to ASTM A-500, minimum wall thickness of 0.20 inches.
 - Steel pipe conforming to ASTM A-53, Schedule 40 minimum.
 - Plastic pipe conforming to ASTM A-1185, Schedule 40 minimum.
 - A corrugated tube conforming to the requirement of the tendon bond length encapsulation.
- (11) Spacers must permit grout to freely flow up the drill hole. Fabricate spacers from plastic, steel, or material that is nondetrimental to the prestressing steel. Do not use wood. A combination centralizer-spacer may be used.
- (12) Fabricate the trumpet used to provide a transition from the anchorage to the unbonded length corrosion protection from a steel pipe or tube conforming to the requirements of ASTM A-53 for pipe or ASTM A-500 for tubing. The trumpet must have a minimum wall thickness of 0.125 inches for diameters up to four inches and 0.20 inches for larger diameters.
- (13) Use potable water for mixing grout.

(14) Fabricate tendons in accordance to the following specifications.

- The tendons may be either shop or field fabricated from prestressing steel and materials conforming to the requirements of the Materials subsection of these special provisions. Fabricate the tendon as shown on the approved working drawings.
- The cement grout cover must provide corrosion protection of the tendon.
- Position spacers so their center-to-center spacing does not exceed ten feet. In addition, locate the upper spacer a maximum of five feet from the top of the tendon bond length, and locate the lower spacer a maximum of five feet from the bottom of the tendon bond length.
- The minimum unbonded length of the bar tendon must be 15 feet or as indicated on the plans or the approved working drawings, whichever is greater. The unbonded length must extend a minimum of 5 feet beyond the critical failure surface measured from the lowest subgrade level from the back of the retaining wall in the soil mass being retained by the wall. If the entire drill hole (tendon bond length and unbonded length) is grouted in one operation, then for the corrosion protection of the unbonded length provide either a sheath completely filled with corrosion inhibiting grease or grout, or a heat shrinkable tube internally coated with an elastic adhesive. If grease is used under the sheath, make provisions to prevent the grease from escaping at the ends of the sheath. The grease must completely coat the tendon, fill the void between the tendon and the sheath, and fill the interstices between the wires of the seven-wire strands. Provide a transition between the bond length and the unbonded length corrosion protection as illustrated in the working drawings. If the sheath is grout filled, a separate bond breaker must be provided. The bond breaker must prevent the tendon from bonding to the grout surrounding the unbonded length. If a grease-filled sheath corrosion protection is provided and the drill hole above the bond length is grouted after the ground anchor has been locked off, then grout the tendon inside a second sheath.
- The total anchor length must not be less than the minimum length indicated on the plans or the approved working drawings.
- Size the bearing plates so that:
 1. The bending stresses in the plate do not exceed the yield strength of the steel when a load equal to 95 percent of the minimum specified ultimate tensile strength of the tendon is applied;
 2. The average bearing stress on the concrete does not exceed that recommended in section 3.1.7 of the PTI, "Guide Specification for Post-Tensioning Materials".
- Weld the trumpet to the bearing plate. The trumpet must have an inside diameter equal to or larger than the hole in the bearing plate. The trumpet must be long enough to accommodate movements of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, the trumpet must be long enough to enable the tendon to make a transition from the diameter of the tendon in the unbonded length to the diameter of the tendon at the

anchorhead without damaging the encapsulation. Trumpets filled with corrosion-inhibiting grease must have a permanent Buna-N synthetic rubber or approved equal seal provided between the trumpet and the unbonded length corrosion protection. Trumpets filled with grout must have a temporary seal provided between the trumpet and the unbonded length corrosion protection or the trumpet must overlap the unbonded length corrosion protection by a minimum of one foot and fit tightly over the unbonded length corrosion protection.

- (15) Damage to the prestressing steel because of abrasions, cuts, nicks, welds and weld splatter will be cause for rejection by the engineer. Protect the prestressing steel if welding is to be performed in the vicinity. Grounding of welding leads to the prestressing steel is forbidden. Protect the prestressing steel from dirt, rust or deleterious substances. If heavy corrosion or pitting is noted, the engineer will reject the affected tendons.
- (16) Use care in handling and storing the tendons at the site. Before inserting a tendon in the drill hole, the contractor and the engineer will examine the tendon for damage to the encapsulation and the sheathing. If, in the opinion of the engineer, the smooth sheathing has been damaged, repair it with ultra high molecular weight polyethylene tape.

C Construction

C.1 Anchor Installation

C.1.1 General

- (1) Unless otherwise directed, select the drilling method, pressure grouting, post grouting, the grouting procedure, and the grouting pressure used for the installation of the ground anchor.

C.1.2 Drilling Method

- (1) Unless otherwise directed, the contractor may choose to utilize rotary drilling with casing, duplex or dual rotary drilling method, rotary drilling with stabilizing fluid, percussion drilling with casing, hollow stem auger drilling or driven casing provided that the anchor hole is maintained in a stable condition at all times, preventing collapse or excessive over-excavation of soils. Pervasive hole caving or ground loss problems must be repaired by grouting at the contractor's expense to prevent damage to the adjacent ground mass and supported structures.
- (2) At the ground surface, locate the drill hole within twelve inches of the location shown on the plans or the approved working drawings. Locate the drill hole so the longitudinal axis of the drill hole and the longitudinal axis of the tendon are parallel. In particular, do not drill the ground anchor hole in a location that requires the tendon to be bent in order to enable the bearing plate to be connected to the supported structure. At the point of entry, the horizontal angle made by the ground anchor and the structure must be within plus/minus three degrees of a line drawn perpendicular to the plane of the structure unless otherwise shown on the plans or approved working drawings. Do not extend the ground anchors beyond the right-of-way or easement limits shown on the plans.

- (3) The tendon must be inserted into the drill hole to the desired depth without difficulty. When the tendon cannot be completely inserted, remove the tendon from the drill hole and clean or redrill the hole to permit insertion. Do not drive or otherwise force partially inserted tendons into the hole.

C.1.3. Grouting Method

- (1) Use a neat cement grout. The cement must not contain lumps or other indications of hydration. Admixtures, if used, must be mixed in accordance to the manufacturer's recommendations.
- (2) Use grouting equipment that produces a grout free of lumps and undispersed cement. Use a positive displacement grout pump. The pump must be equipped with a pressure gauge in order to monitor grout pressures. The pressure gauge must be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used by the contractor whichever is greater. The grouting equipment must be sized to enable the grout to be pumped in one continuous operation. The mixer must be capable of continuously agitating the grout.
- (3) Inject the grout from the lowest point of the drill hole. The grout may be pumped through grout tubes, casing, hollow-stem-augers, or drill rods. The grout may be placed before or after insertion of the tendon. Record the quantity of the grout and record the grout pressures. The grout pressures and grout takes must be controlled to prevent uncontrolled heave or fracturing.
- (4) The grout above the top of the bond length may be placed at the same time as the bond length grout but it may not be placed under pressure. The grout at the top of the drill hole must not contact the back of the structure or the bottom of the trumpet.
- (5) Upon completion of grouting and post grouting, the grout tube may remain in the hole but it shall be filled with grout. Do not load the tendon for a minimum of three days after grouting.

C.2 Installation of Trumpet and Anchorage

- (1) The corrosion protection surrounding the unbonded length of the tendon must extend up beyond the bottom seal of the trumpet or one foot into the trumpet if no trumpet seal is provided. If the protection does not extend beyond the seal or sufficiently far enough into the trumpet, extend the corrosion protection or lengthen the trumpet.
- (2) The corrosion protection surrounding the unbonded length of the tendon must not contact the bearing plate or the anchor head during testing and stressing. If the protection is too long, trim the corrosion protection to prevent contact.
- (3) Completely fill the trumpet with corrosion inhibiting grease or grout. Trumpet grease can be placed any time during construction. Place trumpet grout after the ground anchor has been tested and stressed. Demonstrate to the engineer that the procedures selected for placement of either grease or grout will produce a completely filled trumpet.

- (4) Cover all anchorages permanently exposed to the atmosphere with a corrosion inhibiting grease-filled or grout-filled cover. Demonstrate to the engineer that the procedures selected for placement of either grease or grout will produce a completely filled cover.

C.3 Anchor Testing

C.3.1 General

- (1) Test each ground anchor. Do not apply any load greater than ten percent of the factored design load to the ground anchor prior to testing. The maximum test load must not exceed 80 percent of the minimum specified ultimate tensile strength of the tendon. The test load must be simultaneously applied to the entire tendon. Stressing of single elements of multi-element tendons is not permitted.
- (2) Supply the following testing equipment:
 - A dial gauge or veneer scale capable of measuring to 0.01 inches used to measure the ground anchor movement. The movement-measuring device must have a minimum travel equal to the theoretical elastic elongation of the total anchor length at the maximum test load and it must have adequate travel so the ground anchor movement may be measured without resetting the device.
 - A hydraulic jack and pump used to apply the test load. The jack and a calibrated pressure gauge must be used to measure the applied load. The jack and pressure gauge must be calibrated as a unit by an independent firm. The calibration must have been performed within forty-five business days of the date submitted. Testing cannot commence until the engineer has approved the calibration. The pressure gauge must be graduated in 100-psi increments or less. The ram travel of the jack must not be less than the theoretical elastic elongation of the total anchor length at the maximum test load.
 - A calibrated reference pressure gauge must also be kept at the site. Calibrate the reference gauge with the test jack and pressure gauge.
 - Provide an electrical resistance load cell and readout for use when performing a creep test.
 - Place the stressing equipment over the ground anchor tendon in such a manner that the jack, bearing plates, load cells and stressing anchorage are axially aligned with the tendon and the tendon is centered within the equipment.

C.3.2 Performance Tests

- (1) Install and conduct the performance tests. The anchors for the performance test must be similar to the production anchors shown on the plans, and must be selected as directed by the engineer. Record the encountered soil information through the entire depth of drilling holes. Submit performance test results and soil information to the engineer for approval. If the tested anchor(s) fail(s) to pass the performance tests, at least five workdays shall be allowed for the engineer to evaluate the test anchor(s) and the soil condition. Additional performance tests may be required upon request from the engineer. The additional performance test(s), as required, and time for the engineer to evaluate the test anchor(s), will be included in the work and will not be paid for separately. Do not order material for production anchors until the approval of the performance test results are given.

- (2) Conduct performance tests in accordance to the following procedures on five percent of the ground anchors or a minimum of three ground anchors per wall, whichever is greater. The engineer will select the ground anchors to be performance tested. Test the remaining ground anchors in accordance to the proof test procedures.
- (3) Conduct performance tests by incrementally loading and unloading the ground anchor in accordance to the following schedule. Raise the load from one increment to another immediately after recording the ground anchor movement. Measure and record the ground anchor movement to the nearest 0.01 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. Monitor the load with a pressure gauge. Place the reference pressure gauge in series with the pressure gauge during each performance test. If the load determined by the reference pressure gauge and the load determined by the pressure gauge differ by more than ten percent, recalibrate the jack, pressure gauge and reference pressure gauge at no expense to the department. At load increments other than the maximum test load, hold the load just long enough to obtain the movement reading.

(4) **Performance Test Schedule**

Load
AL
0.20 FDL*
AL
0.20 FDL
0.40 FDL*
AL
0.20 FDL
0.40 FDL
0.60 FDL*
AL
0.20 FDL
0.40 FDL
0.60 FDL
0.75 FDL
AL
0.20 FDL
0.40 FDL
0.60 FDL
0.75 FDL
1.00 FDL*
AL
0.20 FDL
0.40 FDL
0.60 FDL
0.75 FDL
0.90 FDL
1.15 FDL* (Max. test load)
Reduce to lock-off load – 0.60 FDL

Where, AL = Alignment Load

FDL = Factored Design Load for Tieback

* = Graph required

- (5) Hold the maximum test load in a performance test for ten minutes. Repump the jack as necessary in order to maintain a constant load. Start the load-hold period as soon as the maximum test load is applied. Measure and record at 1, 2, 3, 4, 5, 6, and 10 minutes the ground anchor movement with respect to a fixed reference. If the ground anchor movement between one minute and ten minutes exceeds 0.04 inches, hold the maximum test load for an additional 50 minutes. If the load-hold period is extended, record the ground anchor movement at 15, 20, 25, 30, 45 and 60 minutes.

- (6) Plot the ground anchor movement versus load for each load increment marked with an asterisk (*) in the performance test schedule and plot the residual movement of the tendon at each alignment load verses the highest previously applied load.

C.3.3 Proof Tests

- (1) Perform the proof test by incrementally loading the ground anchor in accordance to the following schedule. Raise the load from one increment to another immediately after recording the ground anchor movement. Measure and record the ground anchor movement to the nearest 0.01 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. Monitor the load with a pressure gauge. At load increments other than the maximum test load, hold the load just long enough to obtain the movement reading.
- (2) Hold the maximum test load in a proof test for ten minutes. Repump the jack as necessary in order to maintain a constant load. Start the load-hold period as soon as the maximum test load is applied. Measure and record the ground anchor movement with respect to a fixed reference at 1, 2, 3, 4, 5, 6, and 10 minutes. If the ground anchor movement between one minute and ten minutes exceeds 0.04 inches, hold the maximum test load for an additional 50 minutes. If the load-hold period is extended, record the ground anchor movements at 15, 20, 25, 30, 45 and 60 minutes.

(3) Proof Test Schedule

Load
AL
0.20 FDL
0.40 FDL
0.60 FDL
0.75 FDL
1.00 FDL
1.15 FDL (Max. test load)
Reduce to lock-off load – 0.60 FDL

Where, AL = Alignment Load

FDL = Factored Design Load for Tieback

- (4) Plot the ground anchor movement versus load for each load increment in the proof test.
- (5) Submit proof tests for review by the engineer within 7 days of testing.

C.3.4 Ground Anchor Load Test Acceptance Criteria

- (1) A performance- or proof-tested ground anchor with a 10-minute load-hold period is acceptable if the:
- The tieback resists the maximum test load with less than 0.04-inches of movement between 1 minute and 10 minutes.

- The total elastic movement of the tendon measured at the anchor head obtained from a proof or performance test must exceed 80 percent of the theoretical elastic elongation of the stressing or unbonded length for load increments 0.25 DL and above.
 - The total movement of tendon must not exceed 100 percent of the theoretical elastic elongation of the unsupported length plus 50 percent of the supported length.
- (2) A performance- or proof-tested ground anchor with a 60-minute load-hold period or a creep-tested ground anchor is acceptable if the:
 - Ground anchor carries the maximum test load with a creep rate that does not exceed 0.08 inches/log cycle of time; and
 - Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length.
 - (3) If the total movement of the ground anchors at the maximum test load does not exceed 80 percent of the theoretical elastic elongation of the unbonded length, replace the ground anchor at no additional cost to the department.
 - (4) Ground anchors that have a creep rate greater than 0.08-inches/log cycle of time can be incorporated in the finished work at a load equal to one-half its failure load. The failure load is the load carried by the ground anchor after the load has been allowed to stabilize for ten minutes.
 - (5) When a ground anchor fails, modify the design and/or the construction procedures. These modifications may include, but are not limited to, installing replacement ground anchors, reducing the factored design load by increasing the number of ground anchors, modifying the installation methods, increasing the bond length or changing the ground anchor type. Any modifications of design or construction procedures are at no change in the contract price or contract time, and must be approved by the engineer.
 - (6) Upon completion of the test, reduce the load to the lock-off load indicated on the plans and transfer the load to the anchorage device. The ground anchor may be completely unloaded prior to lock off. After transferring the load and before removing the jack, record a lift-off reading. The lift-off reading must be within ten percent of the specified lock-off load. If the load is not within ten percent of the specified lock-off load, reset the anchorage and record another lift-off reading. Repeat this process until the desired lock-off load is obtained.

D Measurement

- (1) The department will measure Tieback Anchors by each individual tieback anchor acceptably completed that are capable of carrying the load specified on the plans, which includes a proof test of each anchor.
- (2) The department will measure Tieback Anchor Performance Tests by each individual performance test, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.4130	Tieback Anchors	Each
SPV.0060.4140	Tieback Anchor Performance Tests	Each

Payment is full compensation for drilling; grouting; furnishing all steel, bearing plates and corrosion-protection materials required; tensioning; testing; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work.

149. Anchor Slab Inlet Cover Special, Item SPV.0060.4150.**A Description**

This special provision describes specialized inlet grates and frames cast in anchor slabs as detailed on the plans. Conform to standard spec 611, as modified in this special provision.

B (Vacant)**C (Vacant)**

Construct the specialized inlet grates and frames as detailed on the plans.

D Measurement

The department will measure Anchor Slab Inlet Cover Special as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.4150	Anchor Slab Inlet Cover Special	Each

Payment shall conform to standard spec 611.5. Concrete masonry and bar steel reinforcement for the anchor slab will be paid for separately.

150. Adjusting Sanitary Sewer Manhole, Item SPV. 0060.5010.**A Description**

This work includes adjusting sanitary manholes to an elevation as determined by the engineer as well as installing frame and cover, internal frame/chimney seal, in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

Add or remove masonry adjusting rings as needed. This item applies to structures to be lowered less than 6 inches or raised less than 12 inches.

B Materials

B.1 Adjusting Rings

Adjustment rings shall be concrete with steel reinforcement in conformance with ASTM C-478. Precast concrete rings shall have an inside diameter to match the manhole opening, be not less than 2 inches nor more than 6 inches high, and have a wall thickness of 6 inches unless otherwise specified. The rings shall contain a minimum of one No. 2 reinforcing rod centered within the ring. Do not use any cracked or broken rings. The top of precast manhole cones shall be set a maximum of 18 inches lower than established grade in unimproved areas, with the top of the manhole cover being ringed up flush with the existing ground. The minimum number of adjusting rings shall be one 2-inch ring. The maximum height of adjusting rings shall be 8 inches in paved areas. All joints between the adjusting rings shall be filled with grout or mortar, including between the cone and the adjusting ring and the adjusting ring and the frame. Rings shall be grooved to receive a step.

B.2 Manhole

Precast manholes and cones shall conform to ASTM Specifications, C478, latest revision.

B.4 Manhole Seal

Furnish new Cretex, NPC Flexrib, or approved equal internal frame/chimney Seal, as shown in the plans. The seal shall meet the material requirements of section 8.42.3 and the performance requirements of section 8.42.4 of the SSSW.

C Construction

C.1 General

The location of existing sanitary manholes to be adjusted is indicated on the plans. Adjust these items as shown in the plans. Reconstruct manholes as necessary so that the frames and cover when placed will be at the established required grade; remove the existing frame and cover. Install seals in accordance to the manufacturer's recommended installation procedures. Furnish and use Backfill Slurry in the manhole excavation area to existing surface or to appropriate depth for pavement restoration. Salvage the existing frame and cover.

C.2 Surface Preparation

Remove manhole cover and power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A smooth, clean sealing surface is required. Realign the casting if it is offset more than approximately 2 inches from the chimney. Remove all loose and protruding mortar and brick from the upper 7-Inch chimney and clean surface by power wire brushing. Provide a 4-Inch wide sealing surface starting 2 inches down from the bottom of the frame.

All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, use one-component, quick-set, high strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, contact the manufacturer to obtain details to build the required vertical surface.

Use caulk to fill minor irregularities in the bottom sealing surface. The caulk shall be a butyl rubber caulk conforming to AASHTO M-198, Type B. Apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve.

Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

D Measurement

The department will measure Adjusting Sanitary Sewer Manholes as each individual adjustment, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5010	Adjusting Sanitary Sewer Manholes	Each

Payment is full compensation for furnishing and installing all materials including adjusting rings, masonry, and internal frame/chimney seals; for excavating, backfilling, and compacting; for disposing of surplus materials; and for cleaning out and restoring the structure.

151. Sanitary Sewer Drop Manhole, 48-Inch, Precast Concrete, w/ Casting, Item SPV.0060.5020.

A Description

This work includes furnishing and installing a standard 48-Inch diameter sanitary manhole, outside drop made of precast concrete with necessary reinforcement, frames and self-sealing covers, internal frame/chimney seal, outside drop and encasement, materials, proper backfilling, surface replacement and work necessary to the completion of precast manholes including the connection with all incoming and outgoing sewers, all stubs, steps, removing existing manhole and base, and all necessary bypass pumping.

Perform the work in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

B Materials

B.1 General

All materials and work required to install the manhole will conform to the SSSW.

B.2 Manhole

Manhole barrels shall be constructed of pre-cast reinforced concrete sections. Precast manholes and cones shall conform to ASTM Specifications, C478, latest revision.

B.3 Frame and Cover

Frames and covers, salvaged from the manholes to be abandoned in this contract, shall be reused on new manholes. New frames and covers are required on all new sanitary manholes and shall be supplied by the contractor. Sanitary sewer manhole covers shall be self-sealing with an o-ring gasket. Castings shall be non-rocking, Type-B self-sealing lid with concealed pick holes. Neenah R-1661-B or approved equal. They shall have one 1-Inch vent hole which is sealed with a removable flexible plug and two concealed pick holes. Frames for sanitary sewer manholes shall be compatible with the covers.

B.4 Manhole Seal

Furnish and install new Cretex, NPC Flexrib, or approved equal internal frame/chimney seal, as shown in the construction details on the plans. Meet the material requirements of section 8.42.3 and the performance requirements of section 8.42.4 of the SSSW.

B.5 Joints

Joints for precast manholes shall meet the requirements of ASTM C-443, latest revision, except that sealant shall be butyl rubber gasket or butyl rubber rope. Flexible butyl rubber gaskets or rope shall comply with the physical requirements for Type "B" gaskets in AASHTO Designation M-198, or Federal Specification SSS-00210-A, sealing compound, preformed plastic for expansion joints and pipe joints.

B.6 Steps

All manholes shall be provided with steps equally spaced vertically at a maximum of 16 inches on center installed by the manufacturer. Steps shall be embedded into the riser or conical top section of the wall a minimum of 3 inches. Manhole steps shall be made of gray cast iron conforming to the requirements of ASTM Designation A-48 Class No. 30B and shall have a minimum cross sectional dimension of one inch in any direction. Each section of the manhole shall be aligned so the steps create a continuous ladder.

B.7 Outside Drop

All manholes shall meet the material and construction requirements of section 3.5.8.d and Detail File No. 19 of the SSSW.

C Construction

C.1 General

Construct manholes as shown in the plans. Place bedding material the full depth of the excavation under the pipe prior to laying the pipe when a sewer main or lateral enters a manhole any distance above the manhole invert. Any sewer main or lateral entering a

manhole greater than 2 feet above the spring line of the outgoing sewer, the incoming sewer shall be connected to the manhole by means of an outside drop manhole. The drop pipe shall be the same diameter as the incoming sewer. Fill the excavation with Backfill Slurry, to existing surface or to appropriate depth for pavement restoration.

C.2 Inverts

Construct benches up to the crown or top of the outgoing pipe and slope as specified for a sanitary manhole in accordance to File Numbers 11, 12, and 13 of the SSSW.

C.3 Surface Preparation

Remove manhole cover and power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A smooth, clean sealing surface is required. Realign the casting if it is offset more than approximately 2 inches from the chimney. Remove all loose and protruding mortar and brick from the upper 7-Inch chimney and clean surface by power wire brushing. Provide a 4-Inch wide sealing surface starting 2 inches down from the bottom of the frame.

All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, use one-component, quick-set, high strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, contact the manufacturer to obtain details to build the required vertical surface.

Use caulk to fill minor irregularities in the bottom sealing surface. The caulk shall be a butyl rubber caulk conforming to AASHTO M-198, Type B. Apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve.

Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

D Measurement

The department will measure Sanitary Sewer Drop Manhole, 48-Inch, Precast Concrete with Casting as each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5020	Sanitary Sewer Drop Manhole, 48-Inch, Precast Concrete, with Casting	Each

Payment is full compensation for furnishing and installing all materials including pre-cast manhole base, riser, bench, cone section, exterior drop pipe, frames, grates or lids, and chimney adjustment rings; for installing gaskets, joint seals, steps, bedding material, granular backfill material; for furnishing all excavation, dewatering, sheathing and shoring, forming foundation, and masonry work; for making sanitary sewer connections; for making lateral connections: for backfilling including mechanical compaction and compaction testing; for removing sheeting and shoring; for disposal of all surplus or waste material; and for clean-up.

152. Sanitary Sewer Manhole, 48-Inch, Precast Concrete w/ Casting, Item SPV.0060.5030.

A Description

Construct sanitary manholes consisting of pre-cast reinforced concrete, pre-cast concrete adjustment rings, watertight joints, pre-cast concrete base, pre-cast concrete eccentric cone tops, steps, and all excavation and granular backfill in accordance to the plans, standard specifications, Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition and amendments (SSSW) and as hereinafter provided and these special provisions.

B Materials

Provide sanitary manholes with a minimum 48-inch inside diameter pre-cast concrete barrel sections, with eccentric type cone top section with 24-inch minimum opening, and with an 8-inch thick integral pre-cast concrete base. Provide concrete with a compressive strength of 4000 psi and conforming to ASTM C478. Minimum manhole wall thickness shall be 5 inches. Manholes shall conform to Chapter 8.39.0 of the SSSW and construction detail in the plans.

Provide corrosion resistant manhole steps as manufactured by M.A. Industries, Inc. Model PS2-PFS or approved equal with ½-inch diameter Grade 60 steel reinforcement coated with copolymer polypropylene plastic. Install steps 15-inch on center.

Provide manhole barrel joints with rubber ring gasket material or butyl plastic gasket material. Rubber gaskets shall conform to requirements of ASTM C443. Butyl plastic gasket material shall conform to requirements of ASTM C990 and AASHTO M-198.

Provide concrete adjustment rings with steel reinforcement in conformance with ASTM C-478 and a minimum of 4-inch in thickness. A maximum of 10-inch for adjustment will be allowed. Multiple grade rings will not be allowed where one will suffice.

Castings shall be per City of Milwaukee Detail M558A, type 58-A manhole cover with 10" Type MS21 Frame and shall conform to Chapter 8.48.0 of the SSSW. Castings will be furnished by the City of Milwaukee Department of Public Works and installed by the contractor. The contractor shall transport such castings from the city sewer yard at no additional cost. The contractor shall be responsible for the care of the castings, which are furnished by the city for work under this contract, from the time the contractor accepts.

Any material tests required as part of the sewer work shall be performed at a testing laboratory designated by the City of Milwaukee. An independent testing laboratory at the expense of the manufacturer, vendor or contractor shall test all clay pipe (if any) furnished on this contract in accordance to the latest edition of ASTM C301. The test results shall be provided to the construction engineer for approval at the time of delivery.

Salvaged castings become the property of the contractor.

All exterior joints shall be wrapped with Mac-Wrap or approved equal. This shall be considered incidental to the installation of the sanitary sewer manhole.

Provide internal chimney seal made of a rubber-type product, with a minimum thickness of 3/16 inches, a minimum unstretched width of 8 inches and extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. Fabricate the bands used for compressing the sleeve against the manhole from stainless steel conforming to ASTM A240, Type 304, for sheet and ASTM A479, Type 304, for rods. Any screws, bolts, or nuts used on these bands are to be stainless steel conforming to ASTM F593 and F594, Type 304. The internal seal or its appurtenances are not to extend far enough into the manhole opening to restrict entry into or exit from the manhole.

Provide sanitary sewer pipe to pre-cast manhole wall connection with flexible, watertight boot or cast-in seal. Boots shall have stainless steel clamps and stainless steel hardware. Seal shall be Press-Seal PSX or pre-approved equal.

Perform a vacuum test on each new sanitary manhole as part of this contract in accordance to section 3.7.3 of the SSSW.

C Construction

Excavate to provide a smooth, compacted flat bottom. Place a minimum 6-inch depth of bedding material conforming to the requirements of the SSSW and compact prior to setting manhole base and riser section.

Construct concrete bench in the interior bottom of the sanitary manhole which are precast or poured-in-place. The bench shall extend to the top of the pipe. Construct the bench invert to provide a smooth flow line and conform to the curvature of the pipe.

Install external manhole joint seal on all manhole barrel section joints in addition to joint gasket seal.

Final rim elevations shall be ¼" to ½" below final grade in asphalt pavement and at final grade in concrete pavement and in grass. Adjustment rings shall not exceed 7.5 inches.

Verify existing lateral size, depth, material and location and provide connection to new manhole 417D059. Use a Fernco or approved equal adapter if PVC pipe is used. If the

distance from the cut piece of pipe to bell or spigot is less than three feet, connect to the next nearest bell or spigot. Match existing flow line of existing sewer lateral. If extra strength clay pipe is used, contractor to provide concrete collar a minimum 12" from outside edge of sewer and 24" in length.

D Measurement

The department will measure Sanitary Sewer Manhole, 48-Inch, Precast Concrete w/ Casting as each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5030	Sanitary Sewer Manhole, 48-Inch, Precast Concrete w/ Casting	Each

Payment is full compensation for furnishing and installing all materials including pre-cast manhole base, riser, bench, cone section, and chimney adjustment rings; for installing frames, grates or lids, gaskets, joint seals, steps, bedding material, granular backfill material; for furnishing all excavation, dewatering, sheathing and shoring, forming foundation, and masonry work; for making sanitary sewer connections; for making lateral connections; for backfilling including mechanical compaction and compaction testing; for removing sheeting and shoring; for disposal of all surplus or waste material; and for clean-up. Vacuum Testing will be paid at a separate unit price.

153. Greywolf Sanitary Sewer Manhole 48-inch Precast Concrete W/Casting, Item SPV.0060.5035.

A Description

Construct sanitary manholes consisting of pre-cast reinforced concrete, pre-cast concrete adjustment rings, watertight joints, pre-cast concrete base, pre-cast concrete eccentric cone tops, steps, and all excavation and granular backfill in accordance to the plans, standard specifications, Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition and amendments (SSSW) and as hereinafter provided and these special provisions.

B Materials

Provide sanitary manholes with a minimum 48-inch inside diameter pre-cast concrete barrel sections, with eccentric type cone top section with 24-inch minimum opening, and with an 8-inch thick integral pre-cast concrete base. Provide concrete with a compressive strength of 4000 psi and conforming to ASTM C478. Minimum manhole wall thickness shall be 5 inches. Manholes shall conform to Chapter 8.39.0 of the SSSW and construction detail in the plans.

Provide corrosion resistant manhole steps as manufactured by M.A. Industries, Inc. Model PS2-PFS or approved equal with ½-inch diameter Grade 60 steel reinforcement coated with copolymer polypropylene plastic. Install steps 15-inch on center.

Provide manhole barrel joints with rubber ring gasket material or butyl plastic gasket material. Rubber gaskets shall conform to requirements of ASTM C443. Butyl plastic gasket material shall conform to requirements of ASTM C990 and AASHTO M-198.

Provide concrete adjustment rings with steel reinforcement in conformance with ASTM C-478 and a minimum of 4-inch in thickness. A maximum of 10-inch for adjustment will be allowed. Multiple grade rings will not be allowed where one will suffice.

Castings shall be per City of Milwaukee Detail M558A, type 58-A manhole cover with 10" Type MS21 Frame and shall conform to Chapter 8.48.0 of the SSSW. Castings will be furnished by the City of Milwaukee Department of Public Works and installed by the contractor. The contractor shall transport such castings from the city sewer yard at no additional cost. The contractor shall be responsible for the care of the castings, which are furnished by the city for work under this contract, from the time the contractor accepts.

Any material tests required as part of the sewer work shall be performed at a testing laboratory designated by the City of Milwaukee. An independent testing laboratory at the expense of the manufacturer, vendor or contractor shall test all clay pipe (if any) furnished on this contract in accordance to the latest edition of ASTM C301. The test results shall be provided to the construction engineer for approval at the time of delivery.

Salvaged castings become the property of the contractor.

All exterior joints shall be wrapped with Mac-Wrap or approved equal. This shall be considered incidental to the installation of the sanitary sewer manhole.

Provide internal chimney seal made of a rubber-type product, with a minimum thickness of 3/16 inches, a minimum unstretched width of 8 inches and extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. Fabricate the bands used for compressing the sleeve against the manhole from stainless steel conforming to ASTM A240, Type 304, for sheet and ASTM A479, Type 304, for rods. Any screws, bolts, or nuts used on these bands are to be stainless steel conforming to ASTM F593 and F594, Type 304. The internal seal or its appurtenances are not to extend far enough into the manhole opening to restrict entry into or exit from the manhole.

Provide sanitary sewer pipe to pre-cast manhole wall connection with flexible, watertight boot or cast-in seal. Boots shall have stainless steel clamps and stainless steel hardware. Seal shall be Press-Seal PSX or pre-approved equal.

Perform a vacuum test on each new sanitary manhole as part of this contract in accordance to section 3.7.3 of the SSSW.

C Construction

Excavate to provide a smooth, compacted flat bottom. Place a minimum 6-inch depth of bedding material conforming to the requirements of the SSSW and compact prior to setting manhole base and riser section.

Construct concrete bench in the interior bottom of the sanitary manhole which are precast or poured-in-place. The bench shall extend to the top of the pipe. Construct the bench invert to provide a smooth flow line and conform to the curvature of the pipe.

Install external manhole joint seal on all manhole barrel section joints in addition to joint gasket seal.

Final rim elevations shall be ¼" to ½" below final grade in asphalt pavement and at final grade in concrete pavement and in grass. Adjustment rings shall not exceed 7.5 inches.

Verify existing lateral size, depth, material and location and provide connection to new manhole 417D059. Use a Fernco or approved equal adapter if PVC pipe is used. If the distance from the cut piece of pipe to bell or spigot is less than three feet, connect to the next nearest bell or spigot. Match existing flow line of existing sewer lateral. If extra strength clay pipe is used, contractor to provide concrete collar a minimum 12" from outside edge of sewer and 24" in length.

D Measurement

The department will measure Greywolf Sanitary Sewer Manhole 48-inch Precast Concrete W/Casting as each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5035	Greywolf Sanitary Sewer Manhole 48-inch Precast Concrete W/Casting	Each

Payment is full compensation for furnishing and installing all materials including pre-cast manhole base, riser, bench, cone section, and chimney adjustment rings; for installing frames, grates or lids, gaskets, joint seals, steps, bedding material, granular backfill material; for furnishing all excavation, dewatering, sheathing and shoring, forming foundation, and masonry work; for making sanitary sewer connections; for making lateral connections; for backfilling including mechanical compaction and compaction testing; for removing sheeting and shoring; for disposal of all surplus or waste material; and for clean-up. Vacuum Testing will be paid at a separate unit price.

154. MMSD Sanitary Sewer Manhole 48-Inch, Precast Concrete w/ Casting, Item SPV.0060.5040.

A Description

This work includes furnishing and installing a standard 48-Inch diameter sanitary manhole made of precast concrete with necessary reinforcement, frames and self-sealing covers, internal frame/chimney seal, materials, proper backfilling, surface replacement and work necessary to the completion of precast manholes including the connection with all incoming and outgoing sewers, all stubs, steps, removing existing manhole and base, and all necessary bypass pumping. Notify Larry Anderson (MMSD), 414-225-2241, of the commencement of construction at least 3 days in advance.

Perform the work in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

B Materials

B.1 General

All materials and work required to install the manhole will conform to the SSSW.

B.2 Manhole

Manhole barrels shall be constructed of pre-cast reinforced concrete sections. Precast manholes and cones shall conform to ASTM Specifications, C478, latest revision.

B.3 Frame and Cover

Frames and covers, salvaged from the manholes to be abandoned in this contract, shall be reused on new manholes. If new frames and covers are required, they shall be supplied by the contractor. Sanitary sewer manhole covers shall be self-sealing with an o-ring gasket. Castings shall be non-rocking, Type-B self-sealing lid with concealed pick holes. Neenah Foundry component Number 0000-0095 and Neenah Foundry Component No. 0000-1736. They shall have no vent holes and two concealed pick holes. Frames for sanitary sewer manholes shall be compatible with the covers. Contact Linda Resch, with Veolia Water at (414) 747-3838 for purchase.

B.4 Manhole Seal

Furnish and install new Cretex, NPC Flexrib, or approved equal internal frame/chimney seal, as shown in the construction details on the plans. Meet the material requirements of section 8.42.3 and the performance requirements of section 8.42.4 of the SSSW.

B.5 Joints

Joints for precast manholes shall meet the requirements of ASTM C-443, latest revision, except that sealant shall be butyl rubber gasket or butyl rubber rope. Flexible butyl rubber gaskets or rope shall comply with the physical requirements for Type "B" gaskets in AASHTO Designation M-198, or Federal Specification SSS-00210-A, sealing compound, preformed plastic for expansion joints and pipe joints.

B.6 Steps

All manholes shall be provided with steps equally spaced vertically on center installed by the manufacturer as shown on the standard detail sheet. Steps shall be embedded into the riser or conical top section of the wall a minimum of 3 inches. Manhole steps shall be Type PS2-PFS as manufactured by M.A. Industries, Peachtree City, GA 30269; or equal with ½-inch diameter Grade 60 steel reinforcement coated with copolymer polypropylene plastic. Install steps 15-inch on center. Provide certified test data that the steps are capable of withstanding an 800-pound vertical load without sustaining more than a 3/8-inch permanent set when tested in accordance to Section 10 of ASTM C 497.

B.7 Sewer Pipe

Provide sanitary sewer pipe to pre-cast manhole wall connection with flexible, watertight boot or cast-in seal. Boots shall have stainless steel clamps and stainless steel hardware. Seal shall be Press-Seal PSX or pre-approved equal.

Perform a vacuum test on each new sanitary manhole as part of this contract in accordance to section 3.7.3 of the "SWS".

C Construction

Construct manholes as shown in the plans. Fill the excavation with Backfill Slurry, to existing surface or to appropriate depth for pavement restoration.

C.1 Inverts

Construct benches up to the crown or top of the outgoing pipe and slope as specified for a sanitary manhole in accordance to File Numbers 11, 12, and 13 of the SSSW.

C.2 Surface Preparation

Remove manhole cover and power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A smooth, clean sealing surface is required. Realign the casting if it is offset more than approximately 2 inches from the chimney. Remove all loose and protruding mortar and brick from the upper 7-Inch chimney and clean surface by power wire brushing. Provide a 4-Inch wide sealing surface starting 2 inches down from the bottom of the frame.

All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, use one-component, quick-set, high strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, contact the manufacturer to obtain details to build the required vertical surface.

Use caulk to fill minor irregularities in the bottom sealing surface. The caulk shall be a butyl rubber caulk conforming to AASHTO M-198, Type B. Apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve.

Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

Verify depth and location of existing 12" vitrified clay blind connection and provide new RCP class V pipe from existing City of Milwaukee manhole to the new MMSD manhole. Contractor to provide concrete encasement, steel reinforcement, and bentonite waterstops required to complete connections to existing pipe and structures.

D Measurement

The department will measure MMSD Sanitary Sewer Manhole, 48-Inch, Precast Concrete with Casting as a unit for each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5040	MMSD Sanitary Sewer Manhole, 48-Inch, Precast Concrete, with Casting	Each

Payment is full compensation for furnishing and installing all materials including pre-cast manhole base, riser, bench, cone section, frames, grates or lids, and chimney adjustment rings; for installing gaskets, joint seals, steps, bedding material, granular backfill material; for furnishing all excavation, dewatering, sheathing and shoring, forming foundation, and masonry work; for making sanitary sewer connections; for sawcutting, boots, seals, reinforcement, concrete encasement, waterstops, adapters; and for providing PVC and RCP pipe required to make connections, for making lateral connections: for backfilling including mechanical compaction and compaction testing; for removing sheeting and shoring; for disposal of all surplus or waste material; and for clean-up. Vacuum Testing will be paid at a separate unit price.

155. Sanitary Manhole Vacuum Test, Item SPV.0060.5050.

A Description

Work under this item shall be in accordance to the plans, standard specifications, Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition and amendments, (SSSW) and as hereinafter provided and these special provisions. Sanitary sewer manhole vacuum test in accordance to requirements of Section 3.7.6 of the SSWS.

B Materials

Provide vacuum test equipment, meters, gauges, plugs, and other equipment, materials and facilities necessary to make specified tests. Provide bulkheads, blocking, bracing or other temporary sectionalizing devices that may be required.

C Construction

Manholes shall be tested after installation with all connections in place. Test shall include testing of the seal between the frame and the concrete cone, slab or grade rings.

Isolate the manhole to be tested by plugging the inlet and outlet pipes with an inflatable stopper or other approved plug. Plug lift holes with non-shrink grout.

Vacuum test equipment shall be place at the inside top cone section, in accordance to the manufacturers recommendations, Inflate the seal to 40 psi to effect a seal between the base and manhole. Run vacuum pump until a vacuum of 10 inches of mercury is obtained.

With Vacuum pump shut off and the valve on the vacuum line of the test head closed, measure the time for the vacuum to drop to 9 inches of mercury. The manhole test is acceptable if the time exceeds the value as listed in table 6a section 3.7.6 of the SSWS.

If a manhole fails the vacuum test, the manhole shall be repaired with a non-shrinkable grout or other material or method approved by the City of Milwaukee. The manhole surfaces shall be properly prepared prior to any repairs. Once the repair material has cured according to the manufacturer's recommendations the vacuum test shall be repeated. This process shall continue until a satisfactory test is obtained.

D Measurement

The department will measure Sanitary Manhole Vacuum Test by each individual unit, acceptably tested.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5050	Sanitary Manhole Vacuum Test	Each

Payment is full compensation for completing full vacuum test, including furnishing and installing all testing equipment, including meters, gauges, and material required to complete the test.

156. Adjust Water Boxes, Item SPV.0060.5060.

A Description

This special provision describes adjusting, protecting, and maintaining accessibility, for the duration of the paving project, to all city water service boxes and water gate valve boxes located within the project limits.

B Materials

All material for the adjustment of these facilities must meet City of Milwaukee specifications and will be provided by the City of Milwaukee by contacting Gil Taylor,

Milwaukee Water Works, at (414) 708-9005 (or Dave Goldapp, Milwaukee Water Works at (414) 286-6301). If there is contractor damage, the materials must still be provided by the City of Milwaukee, however, in this case, the contractor will be charged for all materials. Materials furnished by the City of Milwaukee and not used on the project shall be delivered back to DPW Field Headquarters- Infrastructure, Operations, Water Works at 3850 N. 35th St. Materials being returned must be accompanied with a "surplus material" form completed by the Public Works Inspector assigned to the project.

C Construction

All water service boxes, water gate valve boxes within the project limits shall be adjusted to proposed elevations by the contractor using materials meeting city specifications.

The city will locate, mark, inspect and repair all water service boxes and water gate valve boxes within the limits of the project prior to commencement of work on the project.

Throughout the duration of the project, the contractor must ensure that all water service boxes and water gate valve boxes are adequately located and identified by blue paint, and that at all times, all water appurtenances remain accessible for operation by city forces. Exercise caution working adjacent to water facilities to avoid damage and ensure accessibility.

Upon completion of the contract, the city will inspect all water facilities to ensure the water valves are clean, properly aligned, and accessible. The contractor shall be responsible to make identified repairs and adjustments, and if any repairs or adjustments are made by the city, the cost will be charged to the contractor.

D Measurement

The department will measure Adjusting Water Boxes as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5060	Adjusting Water Boxes	Each

Payment is full compensation for furnishing all excavation, backfilling, disposal of surplus materials, water box, and restoration of the work site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

157. Abandoning Sanitary Manholes, Item SPV. 0060.5080.

A Description

This work includes abandoning existing sanitary structures in place, in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition. Notify Larry Anderson (MMSD), (414) 225-2241, of the commencement of construction at least 3 days in advance.

B Materials

B.1 General

Furnish Backfill Slurry in accordance to the pertinent requirements of standard spec 209 except as hereinafter modified. Use aggregates that conform to standard spec 501 for Grade A Concrete. Weigh aggregates at a batch plant suitable for batching concrete masonry. Mix and deliver to the project site using a truck mixer. Add enough water to enable the mixture to flow readily.

C Construction

Clean manhole thoroughly. Bulkhead the existing pipe with an 8-inch brick or concrete wall. Remove the walls of the structure to a depth of 3 feet below grade or to the base if directed by the engineer. Fill the excavation with Backfill Slurry, to existing surface or to appropriate depth for pavement restoration.

All City of Milwaukee frames and covers become the property of the contractor.

Salvage all MMSD frames and covers which become the property of the Milwaukee Metropolitan Sewerage District. Contact Linda Resch, with Veolia Water at (414) 747-3838 for pick up.

D Measurement

The department will measure Abandon Sanitary Manhole as a unit for each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5080	Abandoning Sanitary Manholes	Each

Payment is full compensation for furnishing and installing all materials; for providing positive drainage of the area to be backfilled; for bulk heading; for furnishing and placing Backfill Slurry; and for disposing of materials.

158. Extend MMSD Manhole, Item SPV.0060.5100.

A Description

This work includes extending a sanitary manhole to an elevation as determined by the engineer, in accordance to the Standard Specifications for Sewer and Water Construction in Wisconsin, and as hereinafter provided. This work will be performed as shown in the plans. Contact Larry Anderson, MMSD, at (414) 225-2241 or (414) 617-1429 at least 3 business days prior to performing this work.

B Materials

B.1 Manhole

Manhole risers shall be cast in place reinforced concrete sections.

B.2 Concrete

Design strength shall have a minimum compressive strength at 28 days of 4000 psi.

All concrete shall be ready-mixed concrete meeting the requirements of these Specifications.

The Engineer reserves the right to take samples of concrete whenever he deems necessary.

B.3 Cement

Portland cement Type I or Type II as supplied by St. Marys Wisconsin Cement, Milwaukee, WI.; Huron Cement, Milwaukee, WI.; or equal; conforming to ASTM C 150, except that the Tricalcium Aluminate (C3A) content shall not exceed 12 percent for Type I cement. Type II cement or Type I cement in combination with pozzolan (flyash) as hereinafter specified shall be used in all hydraulic structures.

B.4 Water

A public water supply shall be used whenever possible. Where a public supply is not available, clean water which is free from oil, acid, alkali, organic matter, or other deleterious substances shall be used.

B.5 Concrete Aggregates

B.5.1 General

Natural aggregates, free from deleterious coatings, conforming to ASTM C 33, together with all referenced ASTM Standard Specifications, except as modified herein. Aggregates shall not be potentially reactive as defined in Appendix XI of ASTM C 33. Aggregates shall be thoroughly and uniformly washed before use.

B.5.2 Fine Aggregates

Fine aggregate shall consist of sand composed of clean, hard, tough, durable grains of approved inert materials from natural deposits, and shall conform to the following grading requirements:

Sieve Size	Percent Passing By Weight
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10

B.5.3 Coarse Aggregates

Coarse aggregates shall consist of clean, hard, tough, durable crushed rock, crushed gravel or gravel free from adherent coatings, soft, flat or elongated particles and free from vegetation or other deleterious substances, and shall meet the following grading requirements:

Sieve Size	Percent Passing By Weight

SIZE NO. 1

1-inch	100
3/4-inch	90 - 100
3/8-inch	20 - 55
No. 4	0 - 10
No. 8	0 - 5

SIZE NO. 2

2-inch	100
1-1/2-inch	90 - 100
1-inch	20 - 55
3/4-inch	0 - 15
1/2-inch	0 - 5

B.6 Concrete Admixtures

B.6.1 Air-Entraining Admixture

Admixture shall conform to ASTM C 260, except it shall contain no chlorides. Furnish manufacturer's compliance statement for these requirements. [A: Air entrained cement may be used in lieu of air-entraining admixtures.]

B.6.2 Water-Reducing Admixture

Admixture shall conform to ASTM C 494, Type A, Type D or Type E, except it shall contain no chlorides and shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations. Furnish a compliance statement that the admixture used satisfies all requirements of this Specification.

B.6.3 Pozzolan Admixture

Pozzolan used with Type I cement shall be Class C or Class F flyash conforming to ASTM C 618-78 including Table 1A of that Specification and the following additional requirements:

Carbon Content by weight (max.)	3.0 percent
Loss on ignition (max.)	3.0 percent
CaO % - 5% ----- (max.) Fe ₂ O ₃ %	1.5
Water Requirements, max. as a percent of control	100 percent
Fineness, percent retained on a No. 325 Sieve. (max.)	25 percent

In lieu of the chemical ratio listed above, the Contractor and/or supplier shall test the flyash and furnish test data confirming that the flyash in combination with the cement to be used meets all strength requirements, is compatible with air-entraining agents and other additives, and provides increased sulfate resistance equivalent to or better than Type II cement.

The amount of flyash shall not be less than 15 percent nor more than 25 percent of the weight of cement plus the weight of the flyash.

Flyash used on this project shall be tested in accordance with ASTM C 311-77 except that four pound samples shall be taken from at least each two hundred tons of flyash supplied. The flyash shall conform to the requirements above. The tests shall be conducted by a testing laboratory approved by the Engineer. Certified copies of the test results shall be forwarded to the engineer no later than 2 days after the tests are performed.

When truck mixer or truck agitator is used for transporting concrete, concrete shall be delivered to site of the work and discharge shall be completed within one and one-half hours after introduction of mixing water to cement and aggregates, unless longer time is specifically authorized by the engineer.

B.7 Bentonite Waterstops

The bentonite waterstop material shall be the 1-inch by 3/4 inch size flexible strip of bentonite waterproofing compound with an adhesive surface on one side of the strip, and it shall be the waterstop Type RX, as manufactured by the American colloid Company, Arlington Heights, IL, or approved equal.

B.8 Plastic Waterstops

Center bulb type, as shown on Plans, extruded from an elastomeric plastic compound, the basic resin of which shall be polyvinyl chloride (PVC). The size shall be as shown. Specific gravity shall be approximately 1.37 and the shore durometer Type A hardness,

approximately 80. No reclaimed PVC shall be used in the compound. Meet the performance requirements of the Corps of Engineers Specification CRD-C 572.

Waterstop shall have a constant thickness from the edge of the bulb to the outside edge. All waterstops shall have a number of parallel ribs or protrusions on each side of the center of the strip. Corrugated type or tapered waterstops are not acceptable. The minimum weight per foot for waterstop shall be 0.75 pound for 3/16-inch by 4-inch, 1.35 pounds for 3/8-inch by 6-inch, and 2.05 pounds for 3/8-inch by 9-inch. See Plans for standard waterstop geometry.

B.9 Bonding Agent

Bonding agent for installing waterstops in grooves cut into existing concrete shall be Sikastix 391, Sikadur Hi-Mod Gel; Horn Co. Epoxite Grout 2388, or equal. Bonding agent for use on existing concrete surfaces shall be Sikastix 370, Sikadur Hi-Mod; Horn Co. Epoxite Binder 2385; or equal.

B.10 Cast-In-Place Manhole Riser Construction Joints and Steel Reinforcement

Conform to the construction detail shown in the plans..

B.11 Steps

All manholes shall be provided with steps equally spaced vertically on center as shown on the construction detail. Steps shall be embedded into the cast in place manhole sections or conical top section of the wall a minimum of 5 3/4 inches. Manhole steps shall be Type PS-2-BG as manufactured by M.A. Industries, Peachtree City, GA 30269; or equal. Provide certified test data that the steps are capable of withstanding an 800-pound vertical load without sustaining more than a 3/8-inch permanent set when tested in accordance with Section 10 of ASTM C 497.

B.12 Manhole Wrap

Provide a manhole wrap that completely encases the perimeter of the manhole and separates the manhole from the surrounding soil. The manhole wrap shall be Yellow Jacket (Foundation Technologies, Inc) and will be utilized to reduce or eliminate down drag loads on manholes from fill soil. Submit proposed manhole wrap product data sheets and installation requirements to the engineer for acceptance, prior to installation.

C Construction

C.1 Cast-In-Place

Extend all manholes to conform to the construction detail and the locations shown in the plans.

C.2 Manhole Risers

Manhole risers shall be formed and placed as shown on the Plans. Metal forms shall be used to form the inside face of the manhole. Place concrete so that there is no segregation of the aggregate and vibrate all concrete placed. Do not place concrete when the ambient temperature is below 40 degrees F without special protection.

Concrete placement for cast-in-place manhole risers shall terminate with a construction

joint at locations specified. Vertical lifts shall not exceed 15 feet. Each lift shall terminate with a waterstop in the joint as specified. Backfill to no closer than 18 inches below the construction joint as specified hereinafter after each lift is sufficiently cured to withstand the load and has been approved by the Engineer.

C.3 Manhole Riser Tolerance

Departure from and return to true vertical from the established manhole center shall not exceed 1/2 inch per 10 vertical feet or 2 inches for the total manhole depth, whichever is less.

C.4 Steel Reinforcement

Deformed billet-steel bars conforming to ASTM A 615, or axle-steel deformed bars conforming to ASTM A 617, Grade 60

C.5 Backfill

Remove all form materials and trash from the excavation before placing any backfill. Backfill around manholes only after the concrete has attained 2/3 of the specified compressive strength. Obtain the Engineer's approval of concrete work and attained strength prior to backfilling. Backfill shall be brought up uniformly around manholes and structures to prevent unbalanced lateral loading.

C.6 Manhole Wrap

After the cast in place manhole section has been constructed, install the manhole wrap around the entire manhole section prior to placing and compacting the embankment fill adjacent to the manholes. The wrap material must be provided in sheets and installed with a minimum 2-inch overlap both on the vertical and horizontal seams. Use nominal 2-inch wide duct tape to fasten sheets together on all seams. The entire manhole section perimeter must be completely wrapped. Place the wrap around the manhole in accordance with the manhole wrap manufacturer's installation requirements and recommendations.

Once each manhole section has been appropriately wrapped, embankment fill can be placed. Compaction must be performed in accordance with the modified QMP Subgrade specification. Driven sheepsfoot or drum compaction equipment must maintain a minimum separation distance of 24 inches from the manhole wrap. Compaction of embankment material within 24 inches of the manhole wrap must be performed using lightweight vibratory compaction equipment such as a Wacker Neuson Model DPU 5545 plate compactor or equivalent equipment as approved by the engineer. Any damage to manhole wrap material or manholes must be corrected prior to placing any additional embankment fill. Continue construction of additional manhole sections and placement of manhole wrap after fill reaches the top of the previously constructed manhole. This work shall be done in accordance with these specifications.

D Measurement

The department will measure Extend MMSD Manhole by each individual manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.5100	Extend MMSD Manhole	Each

Payment for Extend MMSD Manhole is full compensation for providing all required materials, including masonry and fittings: for salvaging and reinstalling existing covers, including frames, grates or lids; elastometric waterproofing sealer; manhole wrap; for all necessary excavation, backfilling, disposing of surplus material, and for cleaning out and restoring the work site.

159. Inlet Covers Type 57, Item SPV.0060.8004; Inlet Covers Type R Special, Item SPV.0060.8006.

A Description

The work under these items shall be in accordance to the requirements of standard spec 611 and the details as shown on the plans.

B (Vacant)**C (Vacant)****D Measurement**

The department will measure Inlet Cover (Types) as each individual unit in place, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8004	Inlet Covers Type 57	Each
SPV.0060.8006	Inlet Covers Type R Special	Each

Payment shall conform to standard spec 611.5.

160. Reconnect Storm Sewer Laterals, Item SPV.0060.8007.

A Description

This special provision describes reconnecting existing storm sewer laterals to new structures or new pipe.

B (Vacant)

C Construction

Identify all private laterals in existing structures prior to that structure's removal. Remove existing lateral pipes to the next good joint and replace in-kind. Verify that positive drainage is achieved when connecting to the new inlet or curb outlet structure. The contractor will be allowed to salvage any structurally sound pipe that was removed with prior approval by the engineer. Connect the existing pipes to the new pipes with the appropriate coupling, concrete collar or by means approved by the engineer. Concrete masonry for concrete collar shall be in accordance to standard spec 501. Any additional pipe or materials required to reconnect the storm sewer laterals shall be considered incidental to this bid item.

D Measurement

The department will measure Reconnect Storm Sewer Laterals by each individual lateral connected and approved in the field.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8007	Reconnect Storm Sewer Laterals	Each

Payment is full compensation for performing all work; furnishing and installing all materials, couplings, concrete collars, and pipe; and for furnishing all labor, tools, equipment, and incidentals required to complete the work.

161. Cover Plates Left In Place, Item SPV.0060.8009.

A Description

Furnish and install a steel plate to cover and support construction, backfill material, and traffic loading at storm sewer structures as shown on the plans, in accordance to the pertinent provisions of standard spec 611, and as hereinafter provided.

Cover plates left in place becomes the property of the department after final acceptance by the engineer.

B Materials

Provide a 0.5-inch minimum thickness steel plate that extends to the outside edge of the existing masonry.

C Construction

Clean out all soil, debris, other accumulated matter, and materials deposited or lodged due to the contractor's operations from the structure prior to placing the cover plate left in place on the structure. Place cover plate over portion of storm sewer structure which is below the proposed flow line elevation. Do not extend covers above the proposed flow line to prevent flow bypass of the inlet.

Place cover plates as shown on the plans.

D Measurement

The department will measure Cover Plates Left In Place as each individual cover plate left in place, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8009	Cover Plates Left In Place	Each

Payment is full compensation for furnishing and installing the cover plate; leaving cover plate in place; for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

162. Pipe Connection to Existing Structure, Item SPV.0060.8015.

A Description

This special provision describes connecting new storm sewer pipe to existing structure.

B Materials

Conform to standard spec 608.2 and 611.2

C Construction

Conform to standard spec 607.3 and 611.3

D Measurement

The department will measure Pipe Connection to Existing Structure by each individual lateral connected and approved in the field.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8015	Pipe Connection to Existing Structure	Each

Payment is full compensation for performing all work; excavation, backfilling, furnishing, masonry and fittings; disposing of surplus material, coring holes in existing structure to connect new pipe; and installing all materials, couplings, concrete collars, and pipe; and for furnishing all labor, tools, equipment, and incidentals required to complete the work.

163. Sedimentation Basin, Item SPV.0060.8017.

A Description

Design, supply and maintain a sedimentation basin used to de-water the storm sewer or culvert pipes.

B (Vacant)

C Construction

Design a sedimentation basin that is able to filter the contaminated water prior to discharging it back into the adjacent drainage way conforming to Wisconsin DNR technical standard guidelines for sedimentation basin design. Submit sedimentation basin design to the engineer for approval prior to its construction. Maintain the sedimentation basin at regular intervals or as directed by the engineer.

D Measurement

The department will measure Sedimentation Basin as each individual basin installed in accordance to the contract and accepted.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8017	Sedimentation Basin	Each

Payment is full compensation for design and approval; furnishing and maintaining each basin; for any polymers required to achieve performance standards; for removal of the basin; and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

164. Storm Sewer Structure TL219, Item SPV.0060.8050; Storm Sewer Structure TL220, Item SPV.0060.8051.

A Description

This work shall consist of design and construction of either a cast-in-place or precast storm sewer structure made of concrete with necessary reinforcement, metal frames, grates and lids, including required excavating and backfilling.

B Materials

Conform to standard spec 611.2.

C Construction

Conform to standard spec 611.3.

D Measurement

The department will measure Storm Sewer Structure (type) by each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8050	Storm Sewer Structure TL219	Each
SPV.0060.8051	Storm Sewer Structure TL220	Each

Payment is full compensation for providing all materials, including all masonry, for Grade "A" concrete adjustments and monolithic concrete shimming; conduit and sewer connections, steps, and other fittings; for providing and installing butyl rubber joints; for all excavating, backfilling, disposing of surplus material, and for cleaning out and restoring the work site; except that the department will pay for covers, including frames, grates and lids separately.

The department will apply contract unit prices without adjustments to the quantities of manholes constructed to depths not greater than one foot above or below the elevations shown on the plans. Manholes that the engineer orders constructed to a depth greater than one foot above or below elevations shown on the plans will be specified for extra work and paid for in accordance to standard spec 109.4.

165. Removing Welds from Storm Sewer Covers, Item SPV.0060.8052.**A Description**

This work includes removing welds from storm sewer covers at locations as shown on the plan.

B (Vacant)**C Construction**

Carefully remove all welds from storm sewer covers. Do not damage storm sewer cover. Replace damaged cover and no additional payment will be made for replacing damaged cover.

D Measurement

The department will measure Removing Welds from Storm Sewer Covers as each individual item, acceptably completed. The measurement is based on each cover and not as each weld removed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8052	Removing Welds from Storm Sewer Covers	Each

Payment is full compensation for cleaning covers, removing welds, replacing damaged covers; for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

166. Remove and Cap Existing Drainage Storm Sewer Structure, Item SPV.0060.8061.

A Description

This item describes remove and cap existing drainage Storm Sewer Structure with concrete and necessary reinforcement, including required excavating and backfilling in accordance to construction details shown on plan, the standard specifications, and as hereinafter provided.

B Materials

Furnish materials conforming to standard spec 501 for concrete, standard spec 505 for reinforcement, and standard spec 506 for structural steel and miscellaneous metals.

Furnish grade A concrete with Type II cement conforming to standard spec 501.2. Furnish ASTM 617 Grade 60 reinforcing steel.

Furnish plastic waterstop conforming to standard spec 502.3.6.4.

Furnish support assemblies conforming to standard spec 611.2.2.

C Construction

Excavate and backfill as specified for excavation for Storm Sewer Structures in section 206, except do not backfill concrete brick until at least 3 days after completing the unit. Use granular backfill material for backfilling.

Construct concrete as specified in standard spec 501, and as specified for culverts and retaining walls in standard spec 504.

Construct concrete brick as specified in standard spec 519.

Construct structural steel and miscellaneous metals as specified for steel bridges in standard spec 506.

Cure the concrete by one of the methods specified in standard spec 502.3.8 for curing concrete in subStorm Sewer Structure units.

Construct the masonry and install waterstop material to provide a watertight joint between new masonry cap and existing manhole.

Clean and remove all materials and debris deposited or lodged in the manhole due to the contractor's operations during construction.

D Measurement

The department will measure Remove and Cap Existing Drainage Storm Sewer Structure as each individual unit of work, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8061	Remove and Cap Existing Drainage Storm Sewer Structure	Each

Payment for the Remove and Cap Existing Drainage Storm Sewer Structure is full compensation for providing all materials, including all masonry; for furnishing all excavating; for sheeting and shoring; for backfilling; for providing granular backfill material; for control of water; for temporary support and protection of existing utilities to construction; for removing sheeting and shoring; disposing of surplus material, and for cleaning out and restoring the work site. Granular backfill material required for backfilling is incidental to the work.

167. Welding Storm Sewer Covers, Item SPV.0060.8075.**A Description**

This work includes welding storm sewer covers at locations as shown on the plan.

B (Vacant)**C Construction**

Prior to welding clean out all soil, debris, other accumulated matter, and materials deposited or lodged on the storm sewer structure cover.

Conform to AWA 1.1 "Structural Welding Code – Steel".

All welding shall be done by skilled, experienced, qualified and state certified operators

Provide welding in such a manner that welding can be grounded off for future access.

D Measurement

The department will measure Welding Storm Sewer Covers as each individual item, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.8075	Welding Storm Sewer Covers	Each

Payment is full compensation for cleaning covers, welding including welding materials; for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

168. Apron Endwalls for Culvert Pipe Reinforced Concrete 96-Inch, Item SPV.0060.8100.

A Description

Furnish and install apron endwalls for culvert pipe reinforced concrete.

B Materials

Conform to standard spec 522.2.4.

C Construction

Construct in accordance to the plans and standard spec 22.3.

D Measurement

The department will measure Apron Endwalls for Culvert Pipe Reinforced Concrete 96-Inch by each individual unit acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.8100	Apron Endwalls for Culvert Pipe Reinforced Concrete 96-Inch	Each

Payment will be as per standard spec 522.5.

169. Seeding Mixture Native Seed Butterfly Mix, Item SPV.0085.0010.

A Description

This special provision describes preparing seed beds and furnishing and sowing the required seed on slopes, appurtenances, and other areas, and on borrow pits and material disposal sites as shown on the plans.

B Materials

This work shall be in accordance to the pertinent provisions of standard spec 630.2 and as hereinafter provided.

Amend table of Native Seed Mixtures in standard spec 630.2.1.5.1.1.1 with the following:

Common Name	Botanical Name	Mixture %
Forbs		
Butterfly Weed	<i>Asclepias tuberosa</i>	7
Common Milkweed	<i>Asclepias syriaca</i>	10
New England Aster	<i>Aster novae-angliae</i>	2
Rough Blazingstar	<i>Liatris aspera</i>	2
Showy Goldenrod	<i>Solidago speciosa</i>	2
Wild White Indigo *	<i>Baptisia leucantha</i>	2
Pale Purple Coneflower	<i>Echinacea pallida</i>	2
Common Boneset	<i>Eupatorium perfolium</i>	2
Showy Tick Trefoil *	<i>Desmodium Canadense</i>	3
Purple Prairie Clover *	<i>Dalea purpurea</i>	3
<i>Total</i>		35%
Grasses		
Sideoats Gramma	<i>Bouteloua curtipendula</i>	16
Canada Wildrye	<i>Elymus Canadensis</i>	16
Little Bluestem	<i>Schizachyrium scoparium</i>	16
Indiangrass	<i>Sorghastrum nutans</i>	17
<i>Total</i>		65%
*Legumes		

Amend standard spec 630.2.1.5.1.3 with the following:

If seeding bare soil with Seeding Mixture Native Seed Butterfly Mix plant a seeding nurse crop as specified in standard spec 630.2.1.5.1.4.

C Construction

This work shall be in accordance to the pertinent provisions of standard spec 630.3, as shown on the plans, and as hereinafter provided.

Amend standard spec 630.3.3.5.1 with the following:

Seed Mixture Native Seed Butterfly Mix at 0.4 pounds

Amend standard spec 630.3.3.6 (1) with the following:

During the first two growing seasons after plating Seeding Mixture Native Seed Butterfly Mix, mow as the engineer directs.

(2) During the first two growing season after planting Seeding Mixture Native Seed Butterfly Mix, eradicate the following species:

Phragmites or Common Reed

Phragmites australis

(3) Inspect the site to determine if any existing unwanted species are present and mark the areas of plant eradication. Areas marked by the contractor will be inspected by the department. Make adjustments as directed by the engineer. Eradicate the invasive species within all areas defined by the engineer.

Seeded areas shall be kept free of unwanted species until the nurse crop has germinated and reached a minimum height of 4 inches.

D Measurement

The department will measure Seeding Mixture Native Seed Butterfly Mix by the pound acceptably completed. The department will measure quantities based on net weights of seed shipments, or on quantities weighed on department-approved scales the contractor furnishes. The department will make deductions for all quantities wasted or not actually incorporated in the work according to the contract. The department will determine the equivalent pounds of seed furnished and applied by dividing the actual pounds of seed applied by the sum of the unadjusted and adjusted percentages of the various species in the seed mixture sown. The department will use the unadjusted and adjusted percentages determined in standard spec 630.3.3.5.1.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0085.0010	Seeding Mixture Native Seed Butterfly Mix	LB

Payment is full compensation for providing, handling, and storing all seed; for providing the required culture and inoculating seed as specified; and for preparing the seed bed, sowing, covering and firming the seed.

170. Bar Steel Reinforcement HS Stainless Bridges, Item SPV.0085.4300.

A Description

This work consists of furnishing and placing stainless steel reinforcing bars as shown in the plans and as hereinafter provided.

B Materials

B.1 General

Conform to standard spec 505.2 except as modified in this special provision.

B.2 Grade and Type

The material shall conform to ASTM A 955 and to one of the following Unified Numbering System (UNS) designations: S31653, S31803, S32205, or S32304.

Supply Grade 60 bars, all of the same UNS designation.

B.3 Evaluation of Corrosion Resistance

Prior to fabrication, supply test results from an independent testing agency certifying that stainless steel reinforcement from the selected UNS designation meets the requirements of Annex A1 of ASTM A955. Corrosion performance for the selected UNS designation shall be redemonstrated if the processing method is significantly altered. Removal of mill scale or pickling processes used for stainless steel reinforcement supplied under this contract shall be the same as those used to prepare the samples tested per Annex A1 of ASTM A955.

B.4 Chemical Composition

Material shall conform to that specified in ASTM A276, Table 1, Chemical Requirements, for the given UNS designation.

B.5 Heat Treatment

Bars may be furnished in one of the heat treatment conditions listed in ASTM A955, and as needed to meet the requirements of this specification.

B.6 Finish

Supply bars that are free of dirt, mill scale, oil and debris by pickling to a bright or uniform light finish. Bars supplied with a tarnished or mottled finish are sufficient cause for rejection. Fabricate and bend bars using equipment that has been thoroughly cleaned or otherwise modified to prohibit contamination of the stainless steel from fragments of carbon steel or other contaminants.

Bars displaying rust/oxidation, questionable blemishes, or lack of a bright or uniform pickled surface are subject to rejection.

B.7 Bending and Cutting

Bend bars in accordance to standard spec 505.3.2 and ASTM A955. Use fabrication equipment and tools that will not contaminate the stainless steel with black iron particles. To prevent such contamination, equipment and tools used for fabrication, including bending and cutting, shall be solely used for working with stainless steel. Do not use carbon steel tools, chains, slings, etc. when fabricating or handling stainless steel reinforcing bars.

B.8 Control of Material

All reinforcement bars or bar bundles delivered to the project site shall be clearly identified with tags bearing the identification symbols used in the Plans. The tags shall also include the UNS designation, heat treat condition, heat number, grade (corresponding to minimum yield strength level), and sufficient identification to track each bar bundle to the appropriate Mill Test Report.

Provide samples for department testing and acceptance in accordance to the CMM requirements for Concrete Masonry Reinforcement – Bar Steel (Uncoated).

Provide Mill Test Reports (MTR) for the project that:

1. Are from the supplying mill verifying that the stainless reinforcement provided has been sampled and tested and the test results meet ASTM A 955, ASTM A 276, Table 1 and the Contract requirements;
2. Include a copy of the chemical analysis of the steel provided, with the UNS designation, the heat lot identification, and the source of the metal if obtained as ingots from another mill;
3. Include a copy of tensile strength, yield strength and elongation tests per ASTM A955 on each of the sizes of stainless steel reinforcement provided;
4. Permit positive determination that the reinforcement provided is that which the test results cover;
5. Include a statement certifying that the materials meet standard spec 106 regarding material being melted and manufactured in the United States; and
6. Certify that the bars have been pickled to a bright or uniform light finish.

C Construction

C.1 General

Conform to the construction methods in standard spec 505.3 except as modified in this special provision:

Ship, handle, store, and place the stainless steel reinforcing bars according to the applicable provisions with the following additions and exceptions:

1. Prior to shipping, ensure that all chains and steel bands will not come into direct contact with the stainless steel reinforcing bars. Place wood or other soft materials (i.e., thick cardboard) under the tie-downs. Alternatively, use nylon or polypropylene straps to secure the stainless steel reinforcing bars.
2. When bundles of reinforcing steel and stainless steel reinforcing bars must be shipped one on top of the other, load the stainless steel reinforcing bars on top. Use wooden spacers to separate the two materials. Space supports sufficiently close to prevent sags in the bundles.
3. Outside storage of stainless steel reinforcing bars is acceptable. Cover the stainless steel reinforcing bars with tarpaulins.

4. Store stainless steel reinforcing bars off the ground or shop floor on wooden supports and separately from carbon steel reinforcement. Space supports sufficiently close to prevent sags in the bundles.
5. Do not use carbon steel tools, chains, slings, etc. when fabricating or handling stainless steel reinforcing bars. Only use nylon or polypropylene slings. Protect from contamination during construction operations including any cutting, grinding, or welding above or in the vicinity of the stainless steel bars. Flame cutting or welding of stainless steel reinforcing bars is prohibited.
6. Place all stainless steel reinforcing bars on bar chairs that are solid plastic or stainless steel. Fabricate stainless steel metal chairs and continuous metal stainless steel supports from stainless steel conforming to the same requirements and UNS designations as stainless steel reinforcing bar as listed in Section B, "Materials". Use stainless steel chairs with plastic-coated feet above steel beams.
7. Use stainless steel tie wires to tie stainless steel reinforcing bars. Tie wires shall conform to the same requirements and UNS designations as stainless steel reinforcing bars as listed in Section B, "Materials", dead soft annealed, annealed at size. The tie wire does not need to be of the same UNS designation as the bar reinforcement.

Do not tie stainless steel reinforcing bars to, or allow contact with uncoated reinforcing bars, galvanized forming hardware or attachments, or galvanized conduits. Direct contact with these materials is not acceptable. When stainless steel reinforcing bars or dowels must be near uncoated steel reinforcing bars, galvanized forming hardware, or other galvanized metals, maintain a minimum 1-inch clearance between the two metals. Where insufficient space exists to maintain this minimum, sleeve the bars with a continuous 1/8-inch minimum thickness polyethylene or nylon tube extending at least 1 inch in each direction past the point of closest contact between the two dissimilar bars and bind them with nylon or polypropylene cable ties. Sleeves are not required between stainless steel reinforcing bars and welded girder shear studs. Stainless steel reinforcing bars are allowed to be in direct contact with undamaged epoxy-coated reinforcing bars.

Uncoated fasteners (such as used for static safety lines on beams), anchors, lifting loops, etc., that extend from the top flange of prestressed concrete beams into the bridge deck shall be completely removed or cut off flush with the top flange of the beam prior to casting the deck.

C.2 Splices

Splices shall be as shown in the plans. Substitution of stainless steel mechanical splices in lieu of lap slices shown on the plans may be permitted in certain situations subject to written approval by the engineer. Provide mechanical splices for stainless steel reinforcing bars made of stainless steel conforming to one of the UNS designations listed in section B, "Materials" and meeting the minimum capacity, certification, proof testing and written approval requirements of standard spec 550.3.3.4.

If it is necessary or the contractor elects to increase or alter the number or type of bar splices from those indicated in the plans, provide copies of plan sheets to the engineer showing the revised reinforcement layout, type, length and location of revised bar splices and revised bar lengths. The engineer must approve the location of new lap splices or substitution of mechanical bar couplers in lieu of bar lap splices prior to fabrication. New lap splices must be at least as long as those shown in the plans.

D Measurement

The department will measure Bar Steel Reinforcement HS Stainless Bridges by the pound, acceptably completed. The department will compute the stainless steel bar weight using the standard weight per foot of equivalent size carbon steel reinforcing bars (ASTM A615) regardless of which stainless steel alloy is provided.

If the contractor is permitted to alter the reinforcement layout per C.2, no adjustment to the reinforcement bar quantity will be made for such alterations. Mechanical bar couplers that are provided but not shown in the plans are included in the item Bar Steel Reinforcement HS Stainless Bridges and will not be measured separately.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0085.4300	Bar Steel Reinforcement HS Stainless Bridges	LB

Payment is full compensation for providing, transporting and placing the stainless steel reinforcing bars with all component materials as described above.

If the contractor is permitted to alter the reinforcement layout per C.2, no additional compensation will be made for such alterations. Mechanical bar couplers that are provided, but not shown in the plans are included in the item Bar Steel Reinforcement HS Stainless Bridges and will not be paid for separately.

171. Pavement Marking Grooved Preformed Thermoplastic Stop Line 18-Inch, Item SPV.0090.0010; Pavement Marking Grooved Preformed Thermoplastic Crosswalk 6-Inch, Item SPV.0090.0011.

A Description

This special provision describes grooving the pavement surface, and furnishing and installing preformed thermoplastic pavement marking as shown on the plans, in accordance to standard spec 647, and as hereinafter provided.

B Materials

Furnish preformed thermoplastic pavement marking and sealant material, if required, from the department's approved products list.

C Construction

C.1 General

For quality assurance, provide the engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of preformed thermoplastic pavement marking.

Plane the grooved lines in accordance to the plan details. Use grooving equipment with a free-floating, independent cutting or grinding head. Plane a minimum number of passes to create a smooth groove.

C.2 Groove Depth

Cut the groove to a depth of 120 mils ± 10 mils deeper than the thermoplastic thickness, from the pavement surface or, if tined, from the high point of the tined surface. Measure depth using a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Linear Markings

Cut the groove 1-inch wider than the width of the thermoplastic.

C.4 Groove Position

Position the groove edge in accordance to the plan details.

C.4.1 Linear Marking

Groove at a minimum of 4-inches, but not greater than, 12-inches from both ends of the line segment. Achieve straight alignment with the grooving equipment.

C.4.2 Special Marking

Groove a box around the special marking up to 4 inches from the perimeter of the special marking.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, after removal of excess water, and prior to pavement marking application. Clean and dry the groove for proper application of the sealant, and placement of the pavement marking. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement 10 or more days after paving. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

C.5.4 Asphalt

Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.6 Preformed Thermoplastic Application

Preheat the surface if necessary based on manufacturer's recommendation.

Application of the preformed thermoplastic in the groove without sealant will be as follows:

- May 1 to September 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- June 1 to August 31 – the Southwest Region, and the Northeast, North Central, and Northwest Regions except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

Application of the preformed thermoplastic in the groove with sealant materials will be as follows:

- October 1 to April 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- September 1 to May 31, both dates inclusive – the Southwest Region and the Northeast, North Central, and Northwest Regions, except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

The sealant must be wet.

D Measurement

The department will not measure Pavement Marking Grooved Preformed Thermoplastic (Type). The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0010	Pavement Marking Grooved Preformed Thermoplastic Stop Line 18-Inch	LF
SPV.0090.0011	Pavement Marking Grooved Preformed Thermoplastic Crosswalk 6-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface, furnishing and installing the material; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

172. Concrete Barrier Temporary Precast Left In Place, Item SPV.0090.0012.

A Description

This special provision describes leaving in place temporary precast reinforced concrete barrier conforming to the shape, dimensions, and details the plans show and in accordance to the pertinent provisions of standard spec 603, these special provisions, and as hereinafter provided.

Concrete Barrier Temporary Precast Contractor Left In Place becomes property of the department after final acceptance by the engineer.

B (Vacant)

C (Vacant)

D Measurement

The department will not measure Concrete Barrier Temporary Precast Left in Place. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0012	Concrete Barrier Temporary Precast Left in Place	LF

Payment is full compensation for leaving Concrete Barrier Temporary Precast on the project site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Initial delivery, subsequent deliveries, installations and reinstallations including transitions between temporary and permanent barriers, and anchoring will be paid for separately under the bid items provided for in the contract.

173. Removing Pavement Markings Water Blasting, Item SPV.0090.0013.

A Description

Remove pavement markings using ultra-high pressure water. Remove pavement markings from locations shown on the plans or as the engineer directs.

B (Vacant)

C Construction

Provide a truck or vehicle mounted ultra high pressure pump and water tank capable of delivering a minimum of 30,000 psi and up to 40,000 psi to waterjet nozzles. Furnish a water blaster with a vacuum recovery system to provide a clean, almost dry surface, without the use of a secondary cleanup process.

Remove pavement markings through means of water blasting. Do not damage the pavement during removal process.

Furnish equipment with a storage system that allows for the storage of the wastewater while retaining the debris.

D Measurement

The department will measure Removing Pavement Markings Water Blasting by the linear foot of 4-inch wide line, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0013	Removing Pavement Markings Water Blasting	LF

Payment for Removing Pavement Markings Water Blasting is full compensation for removal, repairing associated damage, and disposal of residue.

174. Fence Temporary Left In Place, Item SPV.0090.0014.

A Description

This special provision describes furnishing, erecting and maintaining temporary chain link fence including gates, as shown on the plans and as directed by the engineer, in accordance to standard spec 616, and as hereinafter provided. The intent of this specification is to provide a secure enclosure.

B Materials

Fencing parts furnished do not have to be new materials. Used, re-rolled and open seam materials will be permitted. Gates shall be a minimum of 12 feet wide.

No specific metallic coating will be required for the chain link fencing materials. Materials furnished do not have to be of the same type. Fence height shall be a minimum of 6 feet.

The engineer may reject fencing materials which, in the engineer's opinion, are too damaged or misaligned to provide acceptable closure.

C Construction

Fence posts may be driven into the ground or set in augered holes, backfilled and compacted. Minimum embedment shall be 4 feet. In paved areas fence posts shall be fastened to either temporary concrete barrier or the pavement by methods ensuring a secure enclosure. Where fence is installed in areas that are not to be disturbed by subsequent construction activities, the disturbed area shall be restored in kind at no additional cost to the department.

D Measurement

The department will not measure Fence Temporary Left In Place. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0014	Fence Temporary Left In Place	LF

Payment is full compensation for furnishing all materials; erecting posts, gates and fence; maintaining fencing; removing and disposing of fencing; restoring disturbed areas; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work in accordance to the contract.

Work under this item shall include maintenance and removal of the temporary fence.

175. Coconut Fiber Roll Delivered, Item SPV.0090.0015 and Coconut Fiber Roll Installed, Item SPV.0090.0016.

A Description

Furnish, deliver, and place Coconut Fiber Roll(s) at the locations shown on the plans, or as directed by the engineer.

B Materials

Obtain approval from the engineer for the coconut fiber roll material prior to use.

C Method

Deliver and install coconut fiber rolls in accordance to the plan details. Securely anchor coconut fiber rolls by burying the bottom one-third of the roll and fastening them to stakes.

D Measurement

The department will measure Coconut Fiber Roll Delivered and Coconut Fiber Roll Installed by the linear foot, in place for each roll, complete and accepted in accordance to the terms of the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0015	Coconut Fiber Roll Delivered	LF
SPV.0090.0016	Coconut Fiber Roll Installed	LF

Payment is full compensation for furnishing and installing, transporting, placing, and anchoring the coconut fiber rolls; for supplying fastening materials; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

176. Pavement Marking Grooved Preformed Thermoplastic Stop Line 24-Inch, Item SPV.0090.0017; Crosswalk 12-Inch, Item SPV.0090.0018.

A Description

This special provision describes grooving the pavement surface, and furnishing and installing preformed thermoplastic pavement marking as shown on the plans, in accordance to standard spec 647, and as hereinafter provided.

B Materials

Furnish preformed thermoplastic pavement marking and sealant material, if required, from the department's approved products list.

C Construction

C.1 General

For quality assurance, provide the engineer and the region's Marking Section evidence of manufacturer training in the proper placement and installation of preformed thermoplastic pavement marking.

Plane the grooved lines in accordance to the plan details. Use grooving equipment with a free-floating, independent cutting or grinding head. Plane a minimum number of passes to create a smooth groove.

C.2 Groove Depth

Cut the groove to a depth of 120 mils $\pm$ 10 mils deeper than the thermoplastic thickness, from the pavement surface or, if tined, from the high point of the tined surface. Measure depth using a straightedge placed perpendicular to the groove. The department may periodically check groove depths.

C.3 Groove Width – Linear Markings

Cut the groove 1-inch wider than the width of the thermoplastic.

C.4 Groove Position

Position the groove edge in accordance to the plan details.

C.4.1 Linear Marking

Groove at a minimum of 4-inches, but not greater than, 12-inches from both ends of the line segment. Achieve straight alignment with the grooving equipment.

C.4.2 Special Marking

Groove a box around the special marking up to 4 inches from the perimeter of the special marking.

C.5 Groove Cleaning

C.5.1 Concrete

Cooling the cutting head with water may be necessary for some applications and equipment. If cooling water is necessary, flush the groove immediately with water after cutting to remove any build-up of cement dust and water slurry. If this is not done, the slurry may harden in the groove.

If water is used in the grooving process, allow the groove to dry a minimum of 24 hours after groove cleaning, after removal of excess water, and prior to pavement marking application. Clean and dry the groove for proper application of the sealant, and placement of the pavement marking. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove; use of the air blower does not decrease the amount of time required for the groove to dry.

C.5.2 New Asphalt

Groove pavement 5 or more days after paving. Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.5.3 Existing Asphalt

Check for structural integrity in supporting grooving operations. If the structural integrity of the asphalt pavement is inadequate to support grooving operations, immediately notify the engineer.

C.5.2 Asphalt

Use a high-pressure air blower with at least 185 ft³/min air flow and 90 psi air pressure to clean the groove.

C.6 Preformed Thermoplastic Application

Preheat the surface if necessary based on manufacturer's recommendation.

Application of the preformed thermoplastic in the groove without sealant will be as follows:

- May 1 to September 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- June 1 to August 31 – the Southwest Region, and the Northeast, North Central, and Northwest Regions except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

Application of the preformed thermoplastic in the groove with sealant materials will be as follows:

- October 1 to April 30, both dates inclusive – the Southeast Region and the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.
- September 1 to May 31, both dates inclusive – the Southwest Region and the Northeast, North Central, and Northwest Regions, except for the ozone non-attainment or maintenance Northeast Region counties of Sheboygan, Manitowoc, Kewaunee, and Door.

The sealant must be wet.

D Measurement

The department will not measure Pavement Marking Grooved Preformed Thermoplastic (Type). The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0017	Pavement Marking Grooved Preformed Thermoplastic Stop Line 24-Inch	LF
SPV.0090.0018	Pavement Marking Grooved Preformed Thermoplastic Crosswalk 12-Inch	LF

Payment is full compensation for cleaning and preparing the pavement surface, furnishing and installing the material; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

177. Concrete Gutter Special, Item SPV.0090.0020.

A Description

Perform this work in accordance to the pertinent requirements of standard spec 601 and conform to the construction detail shown in the plans.

B Materials

Use materials as described in the construction detail shown in the plans and as described in standard spec 601.2.

C Construction

Perform work including placing expansion joints in accordance to standard spec 601.3. Warp gutter slope to match at inlet cover locations.

D Measurement

The department will measure Concrete Gutter Special by the linear foot, acceptably completed, measured along the flow line of the gutter.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.0020	Concrete Gutter Special	LF

Payment is full compensation for preparing the foundation; all special construction required at swales behind retaining walls; for providing all materials, including concrete, expansion joints, expansion material between gutter and coping of the retaining wall; for placing, finishing, protecting, and curing concrete; for forming joints; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

178. 4-Duct Conduit Cement Encased, 4-Inch Conduit DB-60, Item SPV.0090.2001; 2-Duct Conduit Cement Encased, 4-Inch Conduit DB-60, Item SPV.0090.2002.

A Description

This work consists of furnishing and installing cement encased multiple duct conduit packages below grade in accordance to the applicable sections of the standard specifications, as shown on the plans and as hereinafter described.

B Materials

Conduit: The contractor shall furnish DB-60 polyvinyl chloride (PVC) conduit.

PVC conduit and fittings shall conform to the requirements of Standard Specifications for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation, ASTM Designation: F512 (latest edition).

Concrete: The type of concrete to be used to encase the ducts will be:

Class of Concrete	Type of Cement	Min. Cement Content Sacks per Cubic Yard	Sizes of Coarse Aggregate
G	Standard Portland Cement Type 1A or 1SA	4.0	Sharp Torpedo Sand only

Slurry Backfill: Aggregate slurry backfill consists of No. 1 concrete aggregate Class ‘C’ concrete mix with the cement deleted.

Fly Ash (Class C)	75 lbs.
Concrete Sand (Damp)	1830 lbs.
No. 1 Concrete Aggregate	1830 lbs.

The material shall be mixed with water to inundate the aggregate sufficiently to provide an approximate 3 inch slump. The mix shall be deposited in the trench directly from a concrete transit mix truck.

Pull Rope: Pull rope specifications will be:

- Flat construction (7/16” to 5/8” wide)
- 100% woven aramid fiber (may include tracer wire)
- 1500 lbs. Minimum pull strength prelubricated
- sequential footage markings for location

For any questions on materials, contact Ms. Karen Rogne at (414) 286-3243.

C Construction

Excavation: The excavation shall have the minimum or maximum dimensions shown on the plans and as follows:

No. of Ducts Wide	Minimum	Maximum
2	14 1/8”	16 5/8”
3	19 3/4”	22 1/4”
4	25 3/8”	27 7/8”

These minimum and maximum trench widths apply to standard 4 inch PVC electrical duct only. When required, the excavation may be widened for the handling and placing of materials.

Open-cut trenches shall be sheathed and braced as required by code and as necessary to maintain safety. The cost of furnishing, placing and removing of sheathing and bracing shall be included in the unit bid for the work.

The dimensions of the excavation will be governed by the number, configuration and the grade (cover) to which the conduit is to be installed as shown on the plan. The walls of the excavation shall be clean and true.

Previous to excavating trenches, the contractor shall expose the existing manhole and conduit lines. The object of this is to permit adjustments in line and grade to avoid special construction methods. The exposed manhole and conduit shall be protected from damage.

The conduit shall be laid at a depth so that sufficient protection from damage is provided. Allowable covers shall be as follows:

The standard cover for mainline conduit is 39 inches and the minimum cover acceptable shall be 28 inches.

The standard cover shall be maintained wherever possible and any deviation less than the minimum may be allowed only with specific approval of the engineer.

The trench shall be graded so that it will have a minimum pitch of three inches per 100 feet. When an obstruction is encountered in the trench and it is necessary to excavate a deeper trench than would otherwise be required, in order to obtain drainage, refer the matter to the Inspector to determine whether the extra excavation should be made.

In grading a trench for mainline conduit, there are three general practices for direction of pitch.

- (a) When grading a trench in a street with a level grade, the high point of the trench bottom should ordinarily be centered between manholes and pitched downward equally toward each manhole.
- (b) Where the street slopes in one direction, locate the high point of the trench bottom approximately 30 feet from the end wall of the higher manhole and grade toward both manholes.
- (c) Where a steep grade is encountered, grade the trench at the minimum pitch from the end wall of the higher manhole to a point 20 feet plus or minus toward the lower manhole. From this point, follow the street grade at the standard cover to a point 20 feet plus or minimum away from the end wall of the lower manhole. From this point, the remainder of the section shall be laid at the normal pitch.

After the rough excavation is completed, the bottom of the trench shall be prepared to receive the conduit. The duct bed shall be brought to the final grade and graded uniformly from the high point to the low or drainage points. Stone chips or limestone screenings shall be used for grading the trench.

Placing of Duct: Placing of the duct is to proceed as soon as the duct bed has been completed. All ducts shall be inspected before placing to see that the bores are clean and free from mud, sand, etc. Only ducts with a smooth bore, free from burrs, rough projections etc. shall be used. Where burrs or other rough areas likely to damage cable are found in the duct, they shall be smoothed off by rasping or scraping.

The duct shall be placed (as shown on the detail) with the ends staggered so no two couplings are adjacent. This may be accomplished by the use of the short lengths in stock or cutting back full length sections to the desired lengths. If cut pieces are used, the cut end shall be placed at the manhole.

Full length pieces shall be used for the balance of the conduit line.

Formations of two ducts or more in height are to be carried forward in full formation, that is, as each tier of twenty foot lengths is laid on base spacers, the next higher tier of ducts shall then be placed on the intermediate spacers. These spacers shall be two feet from each duct end and one in the middle. The intermediate spacers and ducts shall be placed for the remaining tiers. Each length shall be glued into the adjoining coupling. A twist and push on the duct being placed will suffice for a water tight joint. Caution must be exercised in the driving operation, so that neither the coupling nor duct will be split or damaged in any way. After the full formation has been completed, wood trench and duct bracing shall be placed on the ducts to prevent shifting or floating while the concrete envelope is being placed and during driving operation.

This procedure shall be followed with succeeding lengths, providing spacers (as shown on the detail) at the proper intervals, until sufficient trench footage of completed formation has been placed and is ready to receive concrete encasement.

The terminating point for mainline conduit will be the inside manhole wall, inside abutment wall, or inside wall of bridge house. A standard end bell fitting shall be installed on all duct access points into manholes.

A #10 copper tracer wire shall be installed along and above the centerline of the duct for encasement in the concrete. The wire shall be 2 feet longer than the run of conduit and extend beyond the end of the grout encasement.

Concreting: After sufficient conduit has been laid and the trench and duct have been inspected, concreting is to begin. The minimum concrete encasement of the ducts shall be 3 inches on the top, 2 inches on the sides, and 3 inches on the bottom (as shown on the detail).

After placing, the concrete shall be puddled with a splicing bar or similar tool so that complete duct encasement is accomplished. Wood braces used to keep the conduit from floating shall be removed before the concrete sets completely and the resultant encasement voids filled with concrete.

Concrete encasement shall be allowed sufficient time to set before backfilling is commenced.

Slurry Backfill: The backfilling of the conduit shall commence immediately after the duct has been inspected, approved and has had sufficient time to set to withstand the load.

An aggregate slurry as specified shall be used to backfill all concrete encased conduit. The trench shall be slurry backfilled to the proposed or existing subgrade. The mix shall be deposited in the trench directly from a concrete transit mix truck.

D Measurement

The department will measure (X)-Duct Conduit Cement Encased 4-Inch Conduit DB-60, by the linear foot, acceptably installed. The linear feet of encased duct will be measured along the centerline of duct between ends of conduit.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.2001	4-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.2002	2-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF

Payment is full compensation for furnishing the conduit, conduit bodies, conduit fittings, conduit spacers, end caps, pull ropes and trace wires; for excavating, bedding, encasement and backfilling including any concrete, stone, aggregate slurry, bracing, or other related materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

179. Conduit Subduct, 1-Inch, Item SPV.0090.2003.

A Description

This special provision is to furnish and install 1-Inch conduit to be used as subduct for fiber optic cable installation.

B Material

Furnish 1-Inch PVC Carlon riser-gard with pull tape, Part number Carlon DF4X1C-2700 or approved equal.

C Construction

Install Conduit Subduct 1-Inch where shown on the plans within the communication conduit prior to fiber optic cable installation. Install the conduit as per the manufacturer's instructions.

D Measurement

The department will measure Conduit Subduct 1-Inch by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.2003	Conduit Subduct 1-Inch	LF

Payment is full compensation for furnishing and installing conduit subduct and for furnishing all labor, tools, equipment and incidentals necessary for installation, complete in accordance to the requirements of the plans and contract.

180. Cable Type UF 2-14 AWG, Item SPV.0090.3001.**A Description**

This work shall consist of furnishing and installing cable for confirmation lights and making all connections as shown on the plans and as hereinafter provided.

B Materials

Section 655 of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, latest edition is revised with the following:

Supplement standard spec 655.3.4 with the following:

When lighting is installed in conjunction with traffic signals, conductors from the traffic signal control cabinet to the confirmation light(s) shall be Cable Type UF, 2 conductor without ground, solid copper conductor, size No. 14.

C Construction

Furnish and install Cable Type UF 2-14 AWG for traffic signals.

D Measurement

The department will measure Cable Type UF 2-14 AWG by the linear foot of cable, acceptably completed in place.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.3001	Cable Type UF 2-14 AWG	LF

Payment shall be full compensation for furnishing and installing cable; for making all connections; for furnishing and installing all connectors, including wire nuts, splice kits, tape, insulating varnish or sealant and ground lug fasteners, for testing; and for all labor, tools, equipment, and incidentals necessary to complete the work.

181. Fence Decorative Bridge, Item SPV.0090.4400.

A Description

Fabricate, galvanize, paint, deliver and install decorative fencing on bridge superstructures and retaining walls.

B Materials

B.1 General

All materials shall meet the requirements as shown on the plans and the applicable provisions of the standard specifications as follows:

- Structural Steel: standard spec 506.2.2
- Steel Mesh: standard spec 505.2.5
- Painting: standard spec 517.2 and 517.3

Prior to fabrication, steel shall be blast cleaned per SSPC-SP 6 and galvanized according to ASTM A 123. All bolts, nuts and washers shall be supplied as factory galvanized according to ASTM A 153. Repair zinc coating damaged during fabrication as specified in standard spec 635.3.4. Grind the welded joints to a smooth finish where shown in the plans.

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 all evident steel defects exposed in accordance to AASHTO M 160 prior to blast cleaning.

The decorative silhouette inset plates shown on the plans shall be fabricated as indicated in the plans. The decorative silhouette shall be electro galvanized in accordance to ASTM A 591-01 (0.08 oz/square foot/surface) and then painted with an approved tie and topcoat as given in this special provision. The top coat shall be painted the same color as the rest of the decorative fencing. Electronic files of the decorative silhouette patterns are available from Wisconsin Department of Transportation, Jeff Bohen, P.E., 141 NW Barstow Street, Waukesha, Wisconsin 53187, (414) 750-2928.

The fence fabric shall consist of 8 GA. 2 inch by 2 inch welded wire mesh galvanized to ASTM A 123 and then painted with a pre-approved tie and top coat as given in this special provision. The vertical wires of the mesh shall be placed on the inside (Pedestrian/Traffic side) face of the fence.

B.2 Painting

All galvanizing 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.

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 shall 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. The various decorative fence components shall be painted with the tie and top coats before final assembly of the fence panels. Exercise care so as not to damage the painted surface during panel assembly or fence installation.

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	NA
Carboline 350 Hanley Industrial St. Louis, MO 63144 (314) 644-1000	Tie	Rustbond Penetrating Sealer FC	1	36
	Top	Carboline 133 LH	4	NA
Wasser Corporation 4118 B Place NW Suite B Auburn, WA 98001	Tie	MC-Ferrox B 100	3.0 to 5.0	8
	Top	MC-Luster 100	2.0 to 4.0	NA

B.2 Color

The finished color for coating system for decorative fencing shall match Federal Color 37038 – Black

C Construction

Provide shop drawings in accordance to the requirements of standard spec 506.3.2. Shop drawings shall contain material sizes and types, weld sizes and locations, and all

necessary details, dimensions, and information to allow fabrication of the fence in conformance with the requirements of the contract. Do not begin fabrication prior to shop drawing review and acceptance.

Provide a full sized painted 6-foot by 10-foot test panel for the fence. The test panel shall be 10 feet long. The test panel shall be delivered to the job site within 60 days of the award of the contract. Unload and set up test panel in an area designated by the engineer. Do not begin fabrication of fences prior to the test panel acceptance.

During construction and at the time of delivery the engineer will inspect the frame components. The engineer will accept the product after the delivery is unloaded on the site. After the product is unloaded, the installation contractor shall signify in writing that the fence was received in acceptable condition per the engineer's inspection. Any damage to the fence panels after the acceptable delivery will be the responsibility of the installation contractor.

All welding shall conform to the applicable requirements of standard spec 506. No field welding, field cutting, or drilling shall be permitted without the approval of the engineer.

Take special care during construction to minimize the number and size of touch-up spots. Follow the manufacturer's recommendations for damaged area repairs. The engineer must approve the field paint appearance prior to final acceptance.

Provide the engineer with the name, address, and phone number of a representative of the fence fabricator for future coordination.

During handling, protect finish coating from damage. If damaged during handling, the fencing may be rejected by the engineer or engineer may direct fabricator that the finish shall be repaired in accordance to the manufacturer's recommendations.

D Measurement

The department will not measure Fence Decorative Bridge. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4400	Fence Decorative Bridge	LF

Payment is full compensation for fabricating painting, galvanizing and delivering test panel to site; fabricating, furnishing, delivering and unloading fence panels, lighting access panels, posts; installing fence posts and panels and hardware; for preparing shop drawings, painting, galvanizing metal fence components and for furnishing all labor, equipment, tools and incidentals necessary to complete the work.

182. Foundation Drilling, Item SPV.0090.4420.

A Description

Work under this item consists of drilling or otherwise excavating holes for the subsequent installation of soldier piles and construction of concrete masonry soldier pile footings. Perform work in accordance to pertinent parts of the standard specifications, the plans, and these special provisions.

B (Vacant)

C Construction

The contractor is responsible for drilling or excavating and maintaining a stable open hole for subsequent installation of soldier piles and construction of concrete masonry soldier pile footings. The subsurface conditions vary across the project site and are not necessarily the same along the length of each retaining wall in the project. Anticipate the possibility of encountering randomly interlaced seams of loose, permeable sand or gravel of substantial thickness situated within glacial clays and till deposits; saturated soils; ground water; isolated cobbles or boulders; and nested cobbles and boulders at any concrete masonry soldier pile footing location when selecting equipment and methods for constructing the holes. Partial or full depth temporary casing, slurry or a combination thereof, may be required to maintain the stability of the excavated drill hole prior to placement of the soldier pile in the hole and filling the hole with concrete.

The contractor is strongly advised to obtain and review the Geotechnical Exploration and Foundation Evaluation Reports for the applicable retaining wall structure for which concrete masonry soldier pile footings are being constructed. See article "Geotechnical Investigation Information" in these special provisions for information on obtaining geotechnical reports

Determine the proper means, methods, and procedure for accomplishing the work as specified herein and on the plans. Submit the proposed method for foundation drilling before beginning construction. Perform all work in accordance to the rules and regulations of the local, state, and federal governing authorities having jurisdiction over the project site.

Bore or otherwise excavate holes to the diameter and depth as shown on the plans. If necessary, use temporary casing, slurry or alternative methods during drilling methods to maintain a stable open hole. Do not leave excavated, uncased holes open overnight prior to filling with concrete. If bentonite or equivalent slurry is used to maintain an open hole, prevent spillage of the slurry onto adjacent roadways or into adjacent waterways. Locate the soldier pile holes to within the following tolerances:

Horizontal Location	3 inch
Vertical Location	1 inch
Vertical Alignment	1/8 inch/ft
Hole Diameter	30 inch; -0 inch; +2 inch

Provide equipment for checking the dimensions and alignment of each shaft. Remove loose material from the bottom of the shaft. For holes drilled or excavated without slurry, no more than 3 inches of standing water is permitted in the bottom of the drilled hole prior to beginning solid pile installation and immediately prior to placing concrete masonry in the hole around the solid pile.

D Measurement

The department will not measure Foundation Drilling. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4420	Foundation Drilling	LF

Payment is full compensation for Foundation Drilling; for drilling or otherwise excavating holes, for furnishing temporary casings, slurry or alternative hole stabilization methods, for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

183. Piling Sleeves, Item SPV.0090.4430.

A Description

The work under this item consists of furnishing and installing a corrugated steel piling sleeve or pile wrap in the reinforced earth zone of mechanically stabilized earth (MSE) retaining walls and other locations shown in the plans. Perform work in accordance to pertinent portions of standard spec 520 and 521, the plans, and as herein after provided

B Materials

B.1 Pipe Sleeves

The piling sleeve must meet the requirements of standard spec 521.2.2 for corrugated steel pipe.

B.2 PileWrap

As an alternative to pipe sleeves and if accepted by the engineer, provide a pile wrap that completely encases the perimeter of the pile and separates the pile from the surrounding soil. The provided pile wrap product shall be specifically intended to reduce or eliminate down drag loads on driven piles. Submit proposed pile wrap product data sheets and installation requirements to the engineer for acceptance.

C Construction

Set the piling sleeve within 1 inch of the required position indicated on the plans prior to placing the reinforced earth. Brace sleeve to maintain position within 2 inches of required position as backfilling proceeds. Place soil reinforcing mats around sleeve.

Is using pile wrap in lieu of pipe sleeves, install the pile wrap on the top portion of the piles that will be in the MSE soil reinforced zone or other limits shown on the plans prior placing the reinforced earth backfill around the piles. Install the pile wrap and place backfill around the wrapped pile in accordance to the pile wrap manufacturer's installation requirements and recommendations.

Any damage that would hinder the installation of a HP pile must be corrected prior to placing any additional reinforced earth.

After completion of pile installation inside a piling sleeve, backfill the void space around the pile within the sleeve with sand or other approved materials.

D Measurement

The department will measure Piling Sleeves by the linear foot, acceptably installed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4430	Piling Sleeves	LF

Payment is full compensation for furnishing and installing the piling sleeve or pile wrap; for furnishing and placing backfill inside the sleeve after pile installation; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

184. Culvert Pipe Reinforced Concrete Class V 120-Inch, Item SPV.0090.4440.

A Description

This section describes furnishing and installing culvert pipe.

B Materials

Conform to materials as per standard spec 520.2(1).

Provide pipe culvert conforming to the AASTHO LRFD Bridge Design Specifications for Reinforced Concrete Pipe using the Indirect Design Method and Concrete D-Load Pipe ASTM C 655 specifications. The design strength of the pipe shall be the D-load to produce the 0.01-inch crack for the controlling loading condition of the proposed or future earth load and HL-93 live load as noted on the plans. The pipe shall be designed for the bedding and installation conditions shown on the plans.

The culvert pipe design shall be responsibility of the contractor and shall be designed by a professional engineer, registered in the State of Wisconsin, with knowledge of the specific site conditions and requirements. Submit one copy of the culvert pipe design, signed and sealed, to the engineer for incorporation into the permanent project record.

The culvert pipe shall have rubber gasketed joints.

C Construction

Construct in accordance to the plans and standard spec 520.3.

The alignment for the culvert pipe contains horizontal transitions on each of the four pipes. The contractor has the option of using deflected straight pipe sections, radius pipe, or special fabricated bend sections to achieve the transitions. If the contractor chooses the deflected pipe option, the contractor shall be limited to using 75% of the manufacturer's recommended maximum deflection angle for Class V 120-inch culvert pipe. The contractor shall provide the engineer a pipe laying schedule prior to laying pipe. At a minimum, the pipe laying schedule shall include the method used to achieve the transitions, the construction sequence for laying the pipe, and a plan view with dimensions, angles, and any special pipe or bends identified to show the proposed layout.

D Measurement

The department will measure Culvert Pipe Reinforced Concrete Class V 120-inch bid item by the linear foot, acceptably completed. The measured quantity equals the number of linear feet of pipe measured along the centerline of the pipe.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4440	Culvert Pipe Reinforced Concrete Class V 120-Inch	LF

Payment will conform to standard spec 520.5. Payment for culvert pipe also includes full compensation for contractor design of the culvert pipe and full compensation for providing horizontal pipe transitions.

185. Tunneling Reinforced Concrete Pipe Class V 120-Inch, Item SPV.0090.4450.

A Description

This section includes the requirements for tunnel excavation using a one-pass system, utilizing an open face tunnel shield or a tunnel boring machine (TBM) followed by a jacked reinforced concrete pipe.

A.1 Contractor's Qualifications

The contractor hired to perform the tunneling operations shall have a successful record with similar construction for a minimum of 5 years and a minimum of five similar projects (i.e., tunnel bores in soil with an outside diameter of 10 feet or larger and a total tunnel length of more than 250 feet per project or longer) and a demonstrated ability and capacity to perform the work under this contract to the satisfaction of the engineer.

The contractor shall provide personnel meeting the qualification requirements as stated below. The engineer may suspend work at no additional compensation or schedule extension, if the contractor substitutes unqualified personnel for accepted personnel during construction. If work is suspended due to the substitution of unqualified personnel, the adjustment in contract time resulting from the suspension of work will not be allowed.

Site Engineer: The contractor must assign an engineer to supervise the work who has at least 5 years of experience in similar sized projects. The assigned engineer's project experience must include at least one project completed by the same tunneling method as used in this project and in soil and groundwater conditions similar to those anticipated for this project. The contractor may not use consultants or manufacturer's representatives in order to meet the requirements of this section.

Superintendent: Each shift shall be supervised by at least one person with previous experience of the Work. The superintendent must have at least 5 years and 1,000 feet of experience in similar-sized projects (minimum three projects).

Operator: System operators shall be experienced personnel with prior knowledge and ability in the proper operation of the systems being employed. Operators must have at least 5 years experience and have completed at least 1,000 feet of tunnel with similar equipment on at least three projects.

Surveyor: The contractor's surveyor responsible for line-and-grade control shall be a Licensed Surveyor registered in the State of Wisconsin who has prior experience in similar projects.

The contractor shall provide evidence of OSHA certification for site safety representative and personnel responsible for air quality monitoring.

B Materials

The contractor is responsible to determine materials required to meet these specifications.

In the event that the provisions of other specification clauses cause ambiguity or conflict with these special provisions, these special provisions shall take precedence unless otherwise accepted by the engineer. Hand tunneling without protective shield is not acceptable and shall not be considered.

B.1 Lubricant

Only bentonite or polymers shall be used as pipe lubricant. Oil based lubricant is prohibited.

Bentonite: Bentonite shall be high swelling montmorillonite clay or other product as approved by the engineer.

Polymers: Polymers used as pipe lubricant or additive to bentonite shall be non-toxic.

B.2 Reinforced Concrete Pipe Class V 120-Inch

Pipe class and diameter of the jacked pipes shall be as per Plans, and shall conform to Section 522.2.2 and ASCE 27-00 - Standard Practice for Direct Design of Precast Concrete Pipe for Jacking in Trenchless Construction. In case of conflict between section 522.2 and ASCE 27-00, the more stringent requirement will apply.

Concrete pipe shall not be coated internally or externally with any substance unless otherwise specified herein or approved by the engineer.

Pipe to be jacked into place shall have minimum concrete compressive strength of 6,000 psi and have flush joints. No pipe to be jacked into place shall be delivered to the jobsite until the concrete strength has reached 6,000 psi as determined by core samples taken and tested in accordance to AASHTO T 22 or manufacturer's certificate.

Each piece of pipe shall have one grout hole at the crown and one grout hole at each springline for pressure grouting. Grout holes shall be 2 inch minimum diameter with plugs cast into the pipe at the time of manufacturer.

C Construction

C.1 Submittals

C.1.1 General

Prepare and submit documentation of contractor's qualifications, shop drawings, design calculations and tunnel work plan at the preconstruction meeting or at least 21 calendar days prior to beginning tunnel construction, whichever date is earlier. The engineer will accept the submittal as submitted or return the submittal with requested revisions. Do not start any work until the engineer provides acceptance of the required submittals. Acceptance of the submittals does not relieve the contractor of responsibility for successful installation of the reinforced concrete pipes using a tunnel installation method.

C.1.2 Subsurface Conditions

Geotechnical baseline conditions for the tunneled pipe portion of Structure C-40-101 is presented in a separate report included in the contract documents titled "*Geotechnical Baseline Report, Zoo Interchange Reconstruction, Structure C-40-101 (Honey Creek Reconfiguration)*."

Subsurface and geotechnical data for the tunneled pipe portion of Structure C-40-101 is presented in a separate report included in the contract documents titled "*Geotechnical Data Report, Zoo Interchange Reconstruction, Structure C-40-101 (Honey Creek Reconfiguration)*."

C.1.3 Submittals for Approval

Documentation of Contractor's Qualifications: The contractor shall submit the project experience documentation and resumes of site engineers, superintendents, shifters, operators, and all other key personnel, meeting the qualifications delineated in the Article of contractor's qualifications. The project experience documentation for each project must include a brief project description, detail the size and length of the tunnels,

tunneling methods used during installation, local soil conditions, actual construction time and contact information consisting of an individual's name and current phone number. Contacts must be capable of verifying project participation. The resumes must contain a summary of each individual's experience and it must be complete enough for the engineer to determine whether each individual has satisfied the qualifications.

Shop Drawings and Calculations: The contractor shall prepare and submit detailed shop drawings and pertinent descriptions, data and calculations for all items to be incorporated into the finished work. The drawings and calculations shall show compliance to specified requirements and applicable codes and shall bear the seal, signature and date of a professional engineer registered in the State of Wisconsin. As a minimum, include the following:

- a. A tunnel cross-section showing the theoretical excavation perimeter, based on the proposed tunneling equipment, and the proposed pipe inside and outside perimeters.
- b. Pipe drawings which include reinforcement details, joint details, joint cushion materials, and fabrication tolerances.
- c. Design calculations demonstrating that the pipe is capable of sustaining the maximum stresses to be imposed during jacking in accordance to ASCE 27, Standard Practice for Direct Design of Precast Concrete Pipe for Jacking in Trenchless Construction. The axial strength of the selected pipe shall be designed based on a factor of safety of 2.5 or more against failure under the maximum anticipated jacking force. The calculations shall take into account maximum anticipated ground loads (earth, groundwater and surcharge pressure), live loads, jacking forces, eccentric forces due to steering, external loads such as traffic, and any other loads that may be reasonably anticipated. All loads shall be shown and described. Use the maximum allowable bearing stress criteria specified in this section.
- d. Calculations showing the hydraulic pressure that is required to develop the maximum allowable jacking capacity for main jacks and intermediate jacking stations. A description of controls to ensure that the maximum allowable hydraulic pressure will not be exceeded during jacking operations. Calculations demonstrating that the soils behind the backstop (or thrust wall) will sustain the maximum forces developed by the main jacks.
- e. Calculations showing anticipated face pressure and side resistance for tunnel shield/TBM and pipe string. Calculations demonstrating the quantities of intermediate jacking stations per tunnel drive.
- f. Details of intermediate jacking station and connection between the intermediate jacking station and the pipe.
- g. Details of main jacking station.
- h. A site plan for each portal site indicating utilities, use of access roads, site grading and site development details for the excavation and all work areas, and the proposed limits of disturbance surrounding each excavation.

- i. Portal plans indicating support installed to maintain ground support system integrity and stability of the excavation when commencing tunneling and when holing through. Provide details of the portal bracing, seal and ground improvement (if used) needed for face stability and tunnel launching.
- j. Shop drawings and design calculations showing assumed loading conditions, estimated ground movements, system component design, arrangement of supports and construction sequence for proposed support system(s) at portal sites. Show the elevation of struts, braces, or other supports as related to the depth of excavation at intermediate stages of construction. Provide details of bottom slab, drains, and sump construction. Indicate sizes, shapes, and material specifications for all support elements including lagging, if used. Calculations shall include estimates of likely deflections or deformations of the support system and maximum tolerable values. Calculations shall also show the shaft wall is able to sustain the maximum jacking forces transferred from the thrust block during pipe jacking.

Tunnel Work Plan: Prior to the start of work, the contractor shall submit a detailed work plan to the engineer. The work plan shall include descriptions indicating the proposed locations of workshafts, facilities, and equipment to be utilized and describing the methods of construction. Items shall include, but are not limited to:

- a. Tunneling Equipment:
 - i. A detailed description of the methods and equipment to be used in completing the tunnel drive. Include a description of how the proposed equipment and operations will prevent loss of ground and surface heave during operations. This description should include procedures to handle face stability and groundwater inflow and should also include a plan for inspection of the ground conditions and removal of obstructions. Clearly state the maximum size of boulder or rock fragment that can be excavated and removed by the proposed tunnel shield or TBM and for the procedure and equipment to be used to fracture-split and excavate of any boulders or rock blocks encountered. The plan should provide details of proposed methods and procedures for excavating the tunnels, hauling and disposing of muck, ventilation, and illumination.
 - ii. Submit manufacturer's literature describing the tunneling system including the tunneling and all ancillary equipment. Provide model number, shield and machine controls, shield dimensions and cut diameter, specifications, and operating procedures. Provide descriptions of projects on which this system has been successfully used including names, addresses, and telephone numbers of owner's representatives for these projects as well as length, diameter, and pipe material used and the encountered ground condition. If a used or refurbished tunneling shield or TBM is proposed, list previous usage, modifications made and dates of modifications and detailed description of the extent and dates of refurbishment.

- iii. Shop drawings showing propulsion system, safety systems, steering provisions, provisions for ground improvement, arrangement and function of the breasting method, muck removal system and trailing components including muck conveyors. Include a description of how the breasting system functions and the methods to be used to maintain face pressure. Also include description of procedures for ensuring the support of the tunnel face if tunneling operations are interrupted.
 - iv. Hoisting plant (crane) for placement of tunneling shield or TBM, jacking equipment and pipe, and for muck removal.
 - v. Submit samples of automated or manual tunneling records to be provided during tunneling. Samples shall include electronic data and any necessary programs to interpret data, and the manual logs or records to be used.
 - vi. Maintenance procedures and a list of spare parts to be maintained onsite.
 - vii. Description of procedures for tunneling shield demobilization and removal from the tunnel.
 - viii. A description of the alignment control systems including manufacturer's literature and drawings showing setup, support provisions, and other details for the laser guidance system. Submit a description of surveying methods to be used to set laser guidance system positions and a description of procedures to check and reset or realign guidance system during construction. Confirm that these systems can achieve the required pipeline line and grade within the specified tolerances.
 - ix. Details of spoil handling, transport, and disposal equipment and procedures including details of spoil additives, and the location of permanent spoil disposal sites. Confirm that spoils shall be contained at all times and shall not be stockpiled or dumped on site. Provide manufacturers description for any spoil additives and Material Safety Data Sheets (MSDS's). Provide written documentation from the disposal site(s) indicating that they will accept the spoil and are in compliance with applicable regulations.
- b. Tunneling sequence plan.
 - c. Shaft Layout Drawings: The contractor shall submit shaft layout drawings detailing dimensions and locations of all equipment, including overall work area boundaries. Layout drawings will be required for tunnel launch and retrieval locations and shall be to scale, or show correct dimensions. The contractor's layout drawings shall show that all equipment and operations shall be completely contained within the allowable work areas shown on the drawings.
 - d. Safety Plan: The contractor shall prepare a Safety Plan for the tunneling operations. Plan shall be project-specific in nature and shall include air monitoring equipment and procedures, and provisions for lighting, ventilation, and electrical system safeguards. Plan shall include incident response and tunnel/shaft rescue plan; hazard recognition; site safety analysis; tunnel and

shaft access; flooding controls; and fire and explosion prevention. Plan shall also address ground support, communication, handling of materials and equipment, pressurized fluids and noise.

- e. Contingency Plans: The following list includes problem scenarios that may be encountered during the tunneling operations. The contractor shall submit contingency plans for dealing with each problem scenario while satisfying the Specifications. These plans shall include the observations and measurements required to clearly identify the cause of the problems.
 - i. TBM machine unable to advance: Possible obstructions (including boulders, rock blocks, old foundations, metallic debris, or reinforced concrete).
 - ii. Excavator or face support element (breasting) problems.
 - iii. Loss of TBM cutter tools during tunnel drive.
 - iv. Strong hydrocarbon smell is detected in the spoils or in the shaft.
 - v. Laser distorted by heat, humidity, or physical disturbance.
 - vi. Settlement and subsidence.
 - vii. Steering difficulties result in line and grade tolerances being exceeded.
 - viii. Control is lost. Cannot monitor position, thrust, or other performance parameters.
 - ix. Large volumes of water are encountered threatening face stability.

Water Control Plan: Water control plan shall be coordinated with requirements of Special Provisions: Shaft Excavation and Support, Tunnel Excavation, and Geotechnical Instrumentation. The following items shall be included in the water control plan, as a minimum.

- a. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; installation; standby equipment and power supply, pollution control facilities including silt removal facilities, discharge locations to be utilized; removal of water control systems; provisions for immediate temporary water supply as required by this section.
- b. The contractor shall submit shop drawings showing locations, dimensions, and relationships of elements of each water control system. The submittal shall include design calculations demonstrating adequacy of proposed water control or isolation systems and their components. The contractor shall provide manufacturer's literature describing installation, operation, and maintenance procedures for all components of the water control system.
- c. Design calculations demonstrating adequacy of proposed water control systems and components. The contractor may be required to demonstrate the systems proposed in the water control plan and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times required.
- d. Monitoring plans including measurement of: pumping rates at shafts and wells, reading of piezometers, and water quality sampling of discharge.
- e. Method(s) to measure discharge quantities.
- f. If system is modified during installation or operation, revise or amend and resubmit Water Control Plan.

C.1.4 Information Submittals

Prior to Each Tunnel Drive: Submit the results and field notes of line and grade survey to the engineer at least 24 hours prior to the start of each drive to ensure that the thrust block, jacking frame, guide rails, entry and exit eyes are installed properly.

Tunnel Daily Records: Submit the following daily records to the engineer by noon on the day following the shift for which the data or records were taken.

- a. Tunneling Records: The contractor shall provide complete tunneling records to the engineer. These records shall include, at a minimum: date, time, name of operator, tunnel drive identification, installed ground support element number and corresponding tunnel length, rate of advance, jacking forces, excavated muck rates and volumes, total muck volume to date, changed face conditions encountered, lubrications, steering jack positions, line and grade offsets, any movement of the guidance system, shield inclination and roll, problems encountered with the tunneling shield or other components or equipment, and durations and reasons for delays. Computer-recorded data if used should be referenced to time and distance and should be recorded at time intervals of 1 minute. Manually recorded observations should be made at intervals of not less than once per ground support element, as conditions change, and as directed by the engineer.
- b. Survey Measurements: Survey measurements of tunnel alignment and all surface and subsurface settlement monitoring points.

C.1.5 Acceptance

The department will evaluate the submittals for conformance with the requirements of these special provisions. Within 14 calendar days after receipt of the submittal package the engineer will notify the contractor of the acceptance of the submittal package, or if additional information and/or changes are required. Any unacceptable part of the submittal package will require resubmission. The contractor must resubmit the submittal for evaluation and review with the necessary changes or additional information provided. The engineer will provide a written notice of acceptance or rejection of contractor's resubmitted submittals within 14 calendar days after its receipt.

After the engineer's acceptance of the submittal package, no changes can be made without written consent of the engineer.

All information submittals should be submitted to the engineer. The engineer will not accept submittals which do not provided required detail as specified herein. The contractor shall resubmit the rejected submittals within 7 days.

C.3 General Excavation Requirements

The contractor is responsible to determine equipment required to meet these specifications.

In the event that the provisions of other specification clauses cause ambiguity or conflict with these special provisions, these special provisions shall take precedence unless otherwise accepted by engineer. Hand tunneling without a protective shield is not acceptable and shall not be considered.

Construct pipeline by one-pass tunneling methods that provide jacked reinforced concrete pipe, or other type of lining as permitted by engineer, subject to the restrictions on methods stated elsewhere in this special provision. The acceptable tunneling methods shall be open face shield tunneling or tunnel excavation using a tunnel boring Machine (TBM). Blasting is not permitted anywhere on the Project.

The contractor shall complete shield tunneling or tunnel excavation by TBM in accordance to approved submittals and all applicable permit conditions, and provide all temporary electrical, water, telephone, and other facilities required to complete the tunnel. Detailed construction sequencing shall be the responsibility of contractor, consistent with the requirements of this special provision.

The contractor's selection of means and methods for excavation is integral to the planning and execution of the work of the project as specified. The selection of means and methods is the responsibility of the contractor and the selected means and methods shall be capable of coping with subsurface conditions encountered. Excavation shall include removal of excavated material to the ground surface. Loading, conveying, dumping, and disposal of excavated materials from the workshafts and tunnel off the construction site shall be as specified herein.

Tunneling excavation by the tunnel shield or the TBM method shall not begin until the following tasks have been completed:

- a. All required submittals have been provided, reviewed, and approved.
- b. Shaft excavation, stabilization and shoring have been satisfactorily completed in accordance to this special provision.
- c. Groundwater control has been implemented as per this special provision,
- d. Survey control has been established for the tunnel.
- e. All required geotechnical instrumentation had been properly installed and baseline readings taken, as per Special Provision Tunnel Instrumentation.
- f. A startup inspection of all mechanical and hydraulic systems associated with the tunneling operations has been completed. The system shall be tested on the surface to ensure that the machine and supporting equipment is functioning properly. Notify the engineer at least 72 hours prior to the start-up inspection. Key machine performance data will be measured and recorded by the contractor during this inspection, including face support components, functionality of main and steering jacks, laser and target, and other components. The records of the start-up inspection will be submitted to the engineer within 24 hours of the completed inspection.

- g. Site safety representative has prepared a code of safe practices and an emergency plan in accordance to OSHA and other applicable requirements. Provide the engineer with a copy of each prior to starting tunneling. Hold safety meetings and provide safety instruction for new employees as required by OSHA. Conduct a preconstruction safety meeting in accordance to OSHA requirements. Inform the engineer of the time and place of the preconstruction safety meeting at least 7 days in advance.

Perform tunnel excavation in a manner that will minimize the movement of the ground in front of and surrounding the excavation, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the excavation. Support the ground in a manner to prevent loss of ground and keep the perimeters and faces of the tunnel, passages, and bottoms of work shafts stable. Support the face of the excavation by positive means during all shut down periods exceeding 30 minutes in duration.

Excavation shall be to the lines, grades, and dimensions shown on the Plans and Shop Drawings. Excavation shall not extend beyond the theoretical excavation line shown on the Shop Drawings. Methods shall be used and precautions shall be taken to minimize removal of loosening, and reaving of material beyond the minimum excavation necessary to satisfy all criteria. The contractor shall provide means to accurately measure the quantity of ground removed from the tunnel. After each tunnel drive, fill the annular space outside the pipe with grout as per special provision, Contact Grouting.

Do not advance the tunnel shield or the TBM at any time when the tunnel guidance system is out of order. Validate line and grade continually with survey control by the qualified surveyor. Line and grade shall be validated at the frequency no less than once per installation of each pipe segment. Do not exceed tunnel horizontal and vertical tolerances of plus-or-minus 3 inches. When a variation from specified line or grade occurs, immediately take action to return the excavation within the specified design line and grade.

Completely contain, transport, and dispose of all excavated materials and additives away from the construction site. Space for stockpiling is limited and may not be available at the work site. All spoils must be contained in trucks, tanks, or other containers at all times. Dumping of spoil on the ground, discharge into sewers or ditches, or discharge into the shafts is not permitted. Only use the disposal sites identified in approved submittals for muck and spoil disposal.

Spare parts, should be available for delivery to the site within 5 days in the event that replacement is necessary.

C.3 Control of Water

C.3.1 General

The contractor shall continuously control, handle, treat and dispose water at all times during the course of construction, and provide adequate backup systems to accomplish control of water in conformance with this special provision to obtain satisfactory working

conditions and to maintain the progress of the work. Water to be controlled includes groundwater, contaminated groundwater; surface water (precipitation and run-off); and wastewater from the existing combined storm sewers or related facilities.

All required drainage, pumping, treatment, and disposal shall be done without damage to adjacent property or structures and without interference with the operations of other contractors, or the rights of public and private owners, or pedestrian and vehicular traffic.

The contractor shall modify the water control system at his/her own expense if, after installation and while in operation, it causes or threatens to cause damage to adjacent property or to existing buildings, structures, or utilities.

C.3.2 Regulatory Requirements

Storm water discharge to storm sewers, watercourses, lakes, and wetlands shall conform to the requirements of local, state, and Federal regulations. Water from excavations shall be kept separate from storm water discharge associated with surface construction.

In the event that contaminated waters are encountered, the contractor is required to notify the department prior to discharging contaminated water. Comply with WDNR regulations regarding disposal of contaminated groundwater. Obtain additional permits, if required. Notify the Milwaukee Metropolitan Sewerage District for any discharge of contaminated water into the sewer system, and provide laboratory test results documenting contaminant concentrations.

C.3.3 Surface Water Control

Intercept and divert surface drainage away from the work sites by the use of dikes, curbswalls, ditches, sumps, or other means. Design surface drainage systems so that they do not cause erosion on or off the site. Control surface runoff to prevent entry of surface water into excavations and to prevent erosion on or off the site. Remove drainage systems when no longer needed.

C.3.4 Excavation Water Control

Use water control methods that are appropriate, as determined by the contractor, permit requirements, ground conditions, construction operations, and requirements of the plans and special provisions. The methods shall involve removal of water accumulating within excavations from precipitation and groundwater infiltration, and may involve removal of water outside excavations by means such as the use of dewatering or pressure relief wells.

Water control measures shall minimize adverse effects of elevated or reduced water pressure on the work, the surrounding ground and adjacent facilities and structures. Design and operate the water control measures to prevent removal of in-situ materials (development of lost ground), or loosening or softening of subgrade soils within excavations.

The water control methods shall be of such capacity that they will lower and maintain the free water and piezometric levels, to an elevation at least 2 feet below all tunnel excavation invert, shaft bottoms and excavation surfaces. The methods shall have sufficient capacity to accomplish this desired result allowing for normal variations in precipitation and soil and aquifer properties.

Control groundwater and surface water such that the construction of tunnels, shafts, open-cut excavations, trenches and other structures can be performed without adverse effects of water on the facilities being constructed, including prevention of hydrostatic uplift pressures on the new facilities until construction has been adequately completed. If soil stratification is such that the water level cannot be maintained at the specified levels, contractor shall, at no additional cost to the department, control seepage of groundwater by whatever means are necessary to assure that there is no loss of ground by erosion or piping of fines with seepage through shoring or lagging into shafts or tunnels and no instability of slopes due to seepage. Control water during periods when excavating, installing ground support systems, installing subgrade protection measures, placing concrete (except tremie concrete), placing pipe, and at such other times as is necessary for efficient and safe execution of the work.

Should water enter the excavation in amounts that could adversely affect the performance of the work or that has the potential to cause loss or damage to adjacent property or structures, take immediate steps to control the water inflow.

Provide standby pumps and standby power supply where disruption of water control systems could allow water inflows to threaten the work or the safety of personnel.

C.3.5 Groundwater Monitoring

Monitor groundwater levels as necessary to evaluate the sufficiency of the control of water system. A system of construction piezometers is required to monitor free water surface elevations and piezometric elevations to evaluate the effectiveness of the water control system in fulfilling the requirements specified herein. Piezometers shall be of adequate numbers and in suitable arrangements and depths for determining the free water surface elevations and piezometric elevation over the area. A minimum of one piezometer per four dewatering wells or one per excavation location shall be installed with the dewatering system at locations and depths proposed by the contractor.

Drilling method utilized for piezometer installation shall be direct rotary with drilling fluid that does not impact the development of the piezometer and shall conform to ASTM D5783. During the drilling, soil sampling at intervals of 2.5 feet or less using standard penetration tests shall be formed in accordance to ASTM D1586. The contractor shall install and develop piezometers in accordance to ASTM D5092. Develop each installation a minimum of 24 hours after completion. The contractor's engineer will determine the depth of the sensing zone for each piezometer installed based upon observations of retained soil samples.

The contractor shall make a minimum of one reading at each piezometer, per 24-hour period, 5 days per week during the period of dewatering activities (including dewatering by pumping seepage from sumps within open-cuts, shafts, and tunnels) and one reading at each piezometer per week until the end of construction during periods of no dewatering.

C.3.6 Dewatering Wells

Obtain a site-specific dewatering discharge or construction site storm water discharge permit if the WDNR has specific concerns that are not addressed by other permits that might otherwise apply.

Obtain a WDNR permit for operation of any well or well system that has a combined pumping capacity of 70 gallons per minute or more (a high capacity extraction system). For purposes of permitting, a well is defined as any opening made in the ground where the depth of the opening is greater than its largest surface dimension and extends more than 10 feet below ground surface. The permit will require that wells be constructed, operated, and abandoned in accordance to Chapter NR 812, Wis. Adm. Code.

Keep dewatering influence zone to the minimum necessary for execution of the work. Obtain any additional geotechnical information necessary for design of a dewatering well system, including performing pump tests, grain size analyses, groundwater chemical analyses, and subsurface investigations. Design and operate wells so as to prevent removal of fine soils with seepage through backpack material and screens. Provide means by which water discharge from each well can be measured and flow rates adjusted. Construct and operate wells in accordance to WDNR requirements. Monitor the rate of discharge from each well on a daily basis with an accuracy of at least 2 percent of the flow.

The wells shall be designed, installed and operated in a manner that will preclude removal of materials from the foundation by the pumping operation (hereafter referred to as "piping of fines"). After installation, each well shall be individually pump-tested at maximum design flow to verify acceptability with respect to piping of fines (sediment mostly consisting of silt and sand) as measured using a centrifugal tester. Any well or wellpoint segment found to be causing piping of fines at a rate exceeding 2 parts per million (ppm) by volume during the individual pump-test at the maximum design flow shall be replaced in a manner acceptable to engineer, and at no additional cost to the department. Each well shall be checked for sediment piping using a centrifugal tester immediately after installation and at least once per month during operation. Measure the sediment content of the total dewatering effluent using a centrifugal tester at least every 30 days. If the sediment content of the total effluent is greater than 1 ppm, contractor shall identify and abandon wells that are producing excessive sand and replace them if necessary. All sediment content tests shall be performed in the presence of the engineer.

C.3.7 Ground Loss from Removal or Disturbance of Groundwater

Immediately support any structure including, but not limited to, buildings, bridges, freeway surfaces, streets, and utilities, or portions of such structure, including footings, foundations, basements, walls or concrete driveways that become unstable or vulnerable to settlement due to removal or disturbance of groundwater. Cease excavation and other construction operations that result or have the potential to result in further settlement until corrective measures are implemented. Support shall include but not be limited to shoring; sheeting; bracing; underpinning; compaction grouting; driving piles; excavating, backfilling, and placing new structural concrete beneath or adjacent to the unstable structure; or other means necessary to rectify the particular problem involved.

The contractor shall bear the costs of all loss or damage arising from removal or disturbance of groundwater including, but not limited to claims for subsidence and loss of structure support that may occur in the prosecution of the work. If the contractor fails to correct the damage resulting from his operations, the engineer may deem the work to be unacceptable work as defined in standard spec 105.3.2.2.

C.3.8 Treatment and Disposal of Water

Discharge all water removed from the construction site through pipes or hoses. Do not convey water in open ditches or trenches. Discharge water in a manner that will not cause soil erosion at the discharge point. Discharge shall not cause sediment accumulation or flooding in any stream, storm sewer, or on adjacent properties.

Treat all water to remove suspended solids, oils, cement, bentonite, and other contaminants by use of settling basins, on-site treatment plant, or other means selected by the contractor. Design the treatment systems for the maximum discharge rates. Treatment systems shall be capable of expansion if greater capacity becomes necessary during the course of the work. At the request of the engineer, the contractor shall provide copies of all records required by the WDNR.

Obtain permission to use storm sewers or drains for water disposal purposes from the authority having jurisdiction. Protection of storm sewers and drains shall be in conformance with the Wisconsin Construction Site Best Management Practices Handbook, latest revision and the requirements by authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the contractor. Do not cause flooding by overloading or blocking the flow in the drainage facilities, and leave the facilities unrestricted and as clean as originally found. Document the condition of the drainage facilities prior to and subsequent to their use. The engineer may independently verify the condition of such facilities. Repair or restore any damage to facilities as a result of the contractor's operations as directed by the authority having jurisdiction, at the contractor's expense.

Should requirements of any permit be different than requirements herein, the more stringent requirements shall control.

Ventilate enclosures around wells and water discharge points to prevent the accumulation of combustible gas that may escape from solution in groundwater.

On completing the work, clean out and dispose of all sediments and residues in settling basins, treatment facilities, and the like. Dispose of sediments and residues in accordance to applicable regulations.

C.3.9 Abandonment of Piezometers and Dewatering Wells

Abandon the design phase piezometers (as shown in the Geotechnical Baseline Report – Honey Creek Culvert Reconfiguration and the Geotechnical Exploration and Culvert Design Report) and all piezometers and dewatering wells installed during construction in accordance to standard spec 204.3.3.3 and in accordance to NR 812 Wis. Adm. Code, whichever is more stringent.

C.4 General Shaft or Portal Construction Requirements

C4.1 General

Excavation support systems for shafts shall consist of drilled-in soldier piles and lagging, liner plates, driven interlocked steel sheetpiles, or comparable systems that satisfy the requirements of the contract.

The contractor shall design and install shaft ground support systems in accordance to the contract documents and approved submittals. The contractor shall furnish materials for installing, monitoring, maintaining, and removing ground support systems. The contractor's engineer shall maintain involvement and responsibility from design through installation, performance and abandonment or removal of ground support systems.

The contractor shall implement groundwater control measures, as specified hereinafter. Installation of excavation support systems shall not be done without groundwater control measures.

Whenever necessary to prevent caving during excavation to protect adjacent structures, property, workmen, and the public, adequately sheet and brace excavations. All sheeting, shoring, and bracing of excavations shall conform to the safety requirements of the Federal, State, or local public agency having jurisdiction over such matters. The most stringent of these requirements shall apply.

The contractor shall install support systems to permit the safe execution of the work, and to ensure that no ground loading or other loading will be placed on the new work prior to completion and until design strength of the structure being constructed has been reached. During periods of shutdown, fully support the walls of excavations to prevent lost ground. The contractor shall install excavation support systems to minimize loss of soil into the excavations; minimize ground movements outside of the excavations; maintain stability of the excavations; preserve the in situ strength of surrounding soils; to limit construction included vibration. Control vibrations from boulder splitting or installation and removal of driven sheetpiles for initial support systems to prevent damage to the

work and adjacent property. Ground movement and vibration shall be monitored as per special provision, Tunnel Instrumentation.

An overcut excavation resulting in voids over 1 inch wide, the contractor shall promptly complete contact grouting as specified in the special provision, Contact Grouting. Contact grouting shall be performed to control ground movement into the excavation, and to provide firm and uniform contact between the support system and the ground. Grout holes shall be located as necessary to accomplish the work.

C.4.2 Driven Steel Sheetpiles

Before positioning sheetpiles for driving, the contractor shall clean the sheetpiles and inspect for defects and proper interlock dimensions. Position sheetpiles using temporary guide support to form rigid structures during the sheetpile setting and driving operation. Allow sufficient clearance in the interlocks to slide, under sheetpile's own weight, in the interlock of the sheetpile previously placed until the top of existing ground is reached by the tip of the sliding sheetpile. Do not use vibratory or drive hammer to force the interlocking of sheetpiles.

Before driving is started, the contractor shall check sheetpiles for position and alignment. Sheetpile top should be located within 2 inches of the planned location. Drive sheetpiles in rotating stages such that the tip of any sheetpile is not more than 5 feet below the tip of any adjacent sheetpile no more than 8 feet below the tip of any other sheetpile in the same shaft, except as required by the final tip elevations shown. Drive sheetpiles to the approved tip elevations. Drive down piles that are raised during the process of driving adjacent piles. If refusal is reached before driving to the specified tip elevation, an impact hammer or controlled jetting may be used. Perform jetting on both sides of sheetpile simultaneously with driving.

The driving tolerance shall not be more than 1 percent from the vertical in all directions. Centroid of sheetpile at cutoff elevation shall not vary from design position shown by more than 3 inches after driving. The contractor shall remove and replace sheetpile driven out of interlock at no additional cost to the department.

Extend to required grade by welding on additional full length sheetpiles driven below grade, and sheetpiles with damaged heads which have been cut off to permit further driving. Butt weld, making full penetration of the web. Sheetpiles adjoining spliced sheetpiles shall be full length.

C.4.3 Drilled-in Soldier Pile and Lagging Wall

The contractor shall install soldier piles through pre-drilled holes and fill in with concrete. Driven soldier piles are prohibited.

The soldier piles shall be installed within 2 inches from the planned location. The contractor shall replace soldier piles not located within tolerance or damaged due to any cause at no additional cost to the department.

Based on the design of contractor's engineer, soldier piles shall be secured against horizontal or vertical movements or distortion. Laggings shall be assembled true to the lines and grades presented on the approved shop drawings.

Install laggings in conformance with the manufacture's recommendations, and in a manner that will not deform or overstress the soldier piles. The contractor shall prevent laggings from deflecting more than contractor's design deflection.

Contact between the ground and the soldier pile and lagging system is to be maintained by the contractor's selected means, such as blocking, cribbing, wedging, grouting, or such other means compatible with the design of contractor's engineer. If skin tight lagging is necessary to support the ground, all voids between the lagging and the ground shall be filled with grout conforming to the Special Provision, Contact Grouting. Voids wider than ½ inch between the ground and the laggings shall always be filled with grout.

Prior to allowing excavation to stand overnight, advance the laggings to 1 foot above the excavation line and contact grout.

C.4.4 Bracing System

The contractor shall install bracing system consist of walers, struts or tie-back anchors in the sequence as specified by the contractor's engineer.

Install steel supports true to the line and grades as per approved shop drawings. The contractor shall install steel plates to ensure firm contact between walers (if used) and the sheetpiles or soldier piles.

If tie-back anchors is used, the requirements herein shall be followed:

Tolerance: The tie-back anchors shall be positioned plus or minus 6 inches from the theoretical elevation shown in the Shop Drawings. At the point of entry, the anchor shall be installed within plus or minus 3 degrees of the inclination from horizontal shown in the Shop Drawings, and the anchor shall be within plus or minus 3 degrees of a line drawn perpendicular to the face of the wall unless otherwise shown in the shop drawings. Minimum grout cover for tendons shall be ½ inch. Tie-back anchors which do not satisfy the specified tolerances, due to the contractor's installation methods, will be replaced at no additional cost.

Anchor hole drilling: Anchor holes shall be drilled at the specified locations, angles, lengths and minimum diameters shown on the drawings. Overdrilling of holes shall be utilized only if described in approved work plan. The contractor shall check orientation of anchor hole prior to and during drilling. Only use drilling mud or foam to not impact ground anchor load transfer, and specified by the contractor's engineer.

Anchor tendon Installation: Immediately prior to tendon installation, flush hole with water to provide saturated soil and concrete surfaces, remove standing water in bottom of hole, and sound hole for compliance with required depth. Tendons shall be free of dirt,

loose rust, grease, or other deleterious substances and placed in accordance to approved Shop Drawings. The contractor shall provide with rigid and adequate support during placement of grout. The tendon bars shall be continuous, without splices or welds

Grouting of anchor: The contractor shall place a separate bondbreaker if a corrugated sheath is used or if recommended by the manufacture. Pump into bottom of hole through clean and leak-free grout pipes. If grout inside the sheath is not pre-manufactured, the contractor shall grout area outside and inside the sheath simultaneously and maintain grout at the same level both inside and outside of the sheath. Measure amount being pumped to avoid overfilling hole. Continuously sound the grout surface by positive measuring rod through the holes in tendon baseplate to verify that grout is at correct elevation and is not higher than shown or approved. Keep grout pipe below grout surface to avoid entrapping air. After grout operation is complete, allow tendon to remain undisturbed until grout has cured for the time required to reach minimum specified strength, as determined by ASTM C942. If top elevation of grout exceeds specified elevation by 1 foot or more, perform following remedial action:

- a. Remove tendon, flush hole, and redrill if necessary or remove grout to the required elevation.
- b. Replace tendon with new tendon if damaged.

Tendon Stressing: Do not tension tendon before grout have cured for minimum specified time and grout strength, required by contractor's design and as shown on approved Shop Drawings or in calculations, has been verified by testing laboratory when cured at appropriate temperatures. Tension tendon by means of equipment required and furnished by tendon manufacturer.

C.4.5 Removal of Excavation Support Systems

The contractor shall remove all elements of excavation support systems within 6 feet below the existing or the proposed ground surface, whichever is lower. Repair any settlement or damage to the work or to adjacent property as a result of removing excavation support systems. Excavation support systems that cannot be safely removed and without causing settlement or damage to the work or adjacent property shall be left in place, at no additional cost to the department.

If backfill material is loosened to an extent that it settles more than one inch as a result of attempts to remove sheeting or other ground support members, the contractor shall be responsible for remedial measures to re-compact or consolidate the loosened backfill. The contractor's engineer shall be responsible for determining if ground support system can be safely removed. Excavation support system elements that are left in place shall be at the contractor's expense. Restoration of any damage and the cost of remediating disturbed backfill or adjacent property damage caused by removal of ground support systems shall be at the contractor's expense.

C.5 Open Face Shield Tunneling

C.5.1 Open-Face Tunnel Shield

The tunnel shield shall include the following features, as a minimum:

- a. An open face shield equipped with full face hydraulically operated steel plate breasting capability or other mechanical face plates shall be used for all tunneling work required for this Project. The tunnel shield shall be manufactured by a company that specializes in the design and fabrication of this type of equipment. The shield shall be capable of fully supporting the face during both excavation and shutdown periods.
- b. Tunneling equipment selected for the project shall be suitable for and capable of efficiently advancing through the geologic conditions described in the Geotechnical Baseline Report.
- c. The shield shall be steerable in both the vertical and horizontal directions to allow the operator to maintain line and grade within the specified tolerances. The guidance system shall be designed to function at the maximum required drive length without loss of accuracy or reliability of function. A display showing the position of the shield in relation to design line-and-grade shall be provided to allow the operator to continuously monitor line and grade deviations.
- d. The shield shall be a continuous full circle (360-degree) device suitable for the work, conforming to the size of the tunnel, having a uniform exterior surface from the leading edge to the trailing edge, and free of projections, except beads, that will produce over excavation or voids.
- e. Total overcut around the jacked pipe, defined as the difference between the excavated diameter at the heading and the jacked pipe outside diameter shall not be greater than 1.5 inches on radius.
- f. Equip the tunnel shield with a continuous monitoring system for noxious and explosive gases. Include audible and visual alarms at the end of the shield that will be triggered if threshold levels, as specified by OSHA, are reached at any point along the shield. The tunneling shield shall have an emergency shut-off switch or control in case noxious or explosive gasses are detected.
- g. The shield shall be equipped with fire suppression capabilities in accordance to the Tunnel Safety Orders. Fire resistant hydraulic oils shall be used.
- h. The machine shall be designed to allow for access to the open face while maintaining a stable and safe working environment.

C.5.2 Open Face Shield Excavation

The contractor should use his/her judgment to determine the need of benches (sand shelves) at the face of the tunnel shield.

During forward movement of the shield, control the removal of material at the face using appropriate procedures and methods to only remove the materials that will be displaced by the shield in order to minimize loss of ground and surface settlement.

If unstable face conditions, unacceptable lost ground or groundwater inflows develop at the heading, initiate prompt action to mitigate these conditions. Contractor actions might include immediate suspension of mining with temporary full breasting of the face followed by void filling and face stabilization using methods such as dewatering, installation of spilling or other advance ground reinforcement, permeation grouting, jet grouting, compensation grouting, or other measures. Do not resume mining until appropriate face stabilization measures have been satisfactorily implemented.

The contractor shall use manual or computerized data acquisition for collecting information for the jacking record. The engineer shall have access to all areas of the work, including the operator's controls and the shafts, for inspection and collection of data, measurements, and observations at all times, without restriction.

C.6 Tunnel Excavation by TBM

C.6.1 TBM

The TBM shall include the following features, as a minimum:

- a. The TBM used for the work specified shall be a fully mechanized machine, equipped with a full face cutter wheel and pick or disk cutters and adjustable face openings (doors, guillotine, and the like). The adjustable face openings shall be mechanically operated. The TBM shall be capable of fully supporting the face during both excavation and shutdown periods.
- b. Tunneling equipment selected for the project shall be suitable for and capable of efficiently advancing through the geologic conditions described in the Geotechnical Baseline Report.
- c. The TBM shall be a fully shielded TBM between the cutterhead and the jacked pipe.
- d. The TBM should have interchangeable cutters.
- e. The TBM shall be steerable in both the vertical and horizontal directions to allow the operator to maintain line and grade within the specified tolerances.
- f. Design the guidance system to provide continuous TBM location, position, and attitude (yaw, tilt and roll) data in real time including comparison between design tunnel centerline and driven tunnel centerline. The real time comparison shall be graphically displayed to the machine operator at all times on an electronic display terminal. The system shall operate unattended and shall record all data electronically to a database.
- g. Total overcut around the jacked pipe, defined as the difference between the excavated diameter at the heading and the jacked pipe outside diameter shall not be greater than 1.5 inches on radius.
- h. The cutterhead rotation shall be reversible.
- i. Equip the TBM with a fire suppression system in accordance to the Tunnel Safety Orders. Fire resistant hydraulic oils shall be used.
- j. Equip the TBM with a continuous monitoring system for noxious and explosive gases. Include audible and visual alarms at each end of the TBM that will be triggered if threshold levels, as specified by OSHA, are reached at any point along the TBM. The TBM shall have an emergency shut-off switch or control in case noxious or explosive gasses are detected.

- k. Provide electronic TBM performance monitoring and data storage system. Required data display shall be in TBM real-time. The displayed read-outs and the recorded data shall include as a minimum: TBM excavation status (on, off, standby), location (distance), thrust, torque, cutterhead rotation rate and direction, number of operating cutterhead drive motors, cutterhead power, instantaneous penetration rate, penetration rate, and gas monitoring readings.
- l. All of the various components and systems shall be new or refurbished to be like new.

C.6.2 TBM Excavation

The contractor shall observe the ground condition during tunnel excavation and adjust the face opening at the cutterhead to appropriate size which will allow holding the spoil ahead of the cutterhead effectively and removing the excavated material boulders efficiently. The contractors shall take actions if unstable face condition is encountered during tunnel excavation. Contractor actions to stabilize the face may include, but not limited to, the methods described in the paragraph of Open Face Shield Tunneling.

When the boulders cannot be split or broken boulders into smaller size rock fragments by the cutterhead that may pass through the cutterhead doors and the muck handling system, the contractor shall be prepared to provide other methods of removing the boulders.

At the end of each tunnel drive, the contractor shall examine the wear-and-tear condition of each cutter tools equipped on the cutterhead. The contractor shall promptly change the damage and severely worn cutter tool at the end of each tunnel drive to prevent changing cutter tools during the tunnel drive.

C.7 Pipe Jacking

The contractor may select the direction of pipe jacking to minimize the loss of lubricant or soil into the shaft at the pipe penetration.

Set the pipe to be jacked on properly braced and supported pipe guide rails. The axial forces from the thrust jacks shall be distributed to the pipe uniformly through cushion material to prevent damage to the ends of the pipe. Control the advance rate and the volume of material excavated to avoid over-excavation and heave.

Total jacking capacity, provided by the main jack, if used, shall have a minimum factor of safety of 1.5 against the jacking force. Control jacking pressures so as not to exceed to the maximum allowable jacking capacity and the maximum jacking pressure of pipe.

Intermediate jacking stations shall be of the type that allows jacks to be removed and the pipe to be fully closed within the casing of the intermediate jacking system. Casing for intermediate jacking stations shall be equipped with seals to prevent soil and lubrication intrusion into the tunnel. Casing for intermediate jacking stations shall provide corrosion protection that is at least equal to that provided by pipe. The outside diameter of the intermediate jacking station shall be as close as possible to pipe diameter but less than the tunnel shield or TBM diameter.

Each pipe section shall be jacked as the excavation progresses in such a way that leaves no length of tunnel exposed at any time. Use anti-reverse thrust restraints to prevent pipe movement into launching shaft when jacking retracted for placement of a new pipe.

Pipes shall be jacked into place without damaging the pipe. In the event a section of pipe is damaged during the jacking operation, the pipe shall be jacked through to the receiving shaft and removed. Other methods of repairing the damaged pipe may be used, subject to approval by the engineer.

The thrust block at the launching shaft shall be properly designed and constructed to provide a minimum factor of safety of 1.5 against the maximum possible thrust by the main jacks. The thrust block shall be aligned with the proposed pipe alignment and shall be designed to withstand the maximum allowable jacking pressure to be used, without excessive deflection or displacement.

C.8 Lubrication

Apply lubrication to the external surface of the pipe to reduce skin friction and the annular space created by the overcut shall be filled with a lubricant suitable for the particular soil conditions to be tunneled.

Provide a lubrication system to inject an approved lubricant at the rear of the tunnel shield or TBM and as required along the pipe length to lower the friction developed on the sides of the pipe during jacking. The lubrication system shall be such that it can automatically be controlled from the operator's cabin and controlled volumes of lubricant can be injected by the shield operator at selected locations along the tunnel. Such volumes of lubricant pumped, including the location of injection, shall also be automatically recorded.

Monitor at all times both the volumes, pressures, and location of grout/lubrication injection points to ensure that the annulus around the pipe is completely filled with approved lubricant.

C.9 Obstructions

Obstructions are defined as per the specified conditions described in the Geotechnical Baseline Report. There will be no separate payment for obstruction removal. The baseline obstructions as defined in the Geotechnical Baseline Report shall be included in the item Tunneling Reinforced Concrete Pipe Class V 120-Inch

Should the tunneling operations encounter a condition that impedes the forward progress of the shield or TBM, the contractor shall notify the engineer immediately in writing. The contractor shall remove, treat, clear or otherwise make it possible for the shield or TBM and jacked pipes to advance past any and all obstructions that impede forward progress of the machine. The contractor shall immediately proceed with removal of the obstruction by the approved contingency plan.

If the contractor has exhausted all means of clearing the obstruction, as delineated in the contingency plan, the contractor shall submit a correction plan to correct the condition. Upon the written notification of The engineer, the contractor shall immediately proceed with the obstruction by the approved correction plan.

C.10 Air Quality

Perform all workshaft and tunnel excavation operations by methods and with equipment which will reduce or eliminate any dust, fumes, vapors, gases, fibers, fogs, mists or other atmospheric impurities. Conform to regulations promulgated by OSHA and other regulatory authorities regarding air quality and ventilation in excavations. Provide appropriate instruments for testing the quality of the tunnel atmosphere and take samples under working conditions, all in accordance to OSHA, District of Columbia, or other jurisdictional requirements.

Continuous gas monitoring shall be conducted at all times personnel are underground. Air testing shall be required for the specific conditions to ensure the gas concentration requirements as per OSHA 29 CFR 1926.55 are met.

C.11 Tunnel Ventilations

As a minimum, when the excavations are occupied by workmen, the main ventilation system should deliver fresh air to the face at a volumetric flow rate equal to 60 feet per minute times the full area of the excavated face. A higher volumetric flow rate should be provided if necessary to conform to OSHA requirements. Operate the tunnel main ventilation system 24 hours per day, 7 days per week, continuously, until hole-through. During extended periods of inactivity when excavations are unoccupied, such as over weekends or holidays, the volumetric flow rate may be reduced to the OSHA minimums.

C.12 Tunnel and Workshaft Illumination

Light in all areas where work is in progress shall be adequate to permit proper observation of operations by the contractor and the engineer at all times. Lighting intensity shall be as required by applicable regulations for tunnel and shaft construction operations. Lighting intensity shall be increased as required by the engineer for concrete placement and inspection and for final cleanup.

Open flame lights shall not be used. Flashlights shall be explosion-proof. Both power and lighting circuits shall be separated and thoroughly insulated. The voltage shall not exceed 115 volts. All lights shall be placed in porcelain light fixtures in vapor tight enclosures and metal guards. Lighting installation shall conform to National Electric Code NFPA 70.

Maintain underground illumination in place throughout the life of the Contract including the substantial completion inspection or until permission to remove illumination is received in writing from the engineer.

C.13 Emergency Measures

Whenever there is a condition which is likely to endanger the stability of the excavation or adjacent structures, the contractor shall operate with a full crew for 24 hours a day including weekends and holidays without intermission until those conditions no longer jeopardize the stability of the work and adjacent facilities.

Emergency electric power supply shall be provided by the contractor and shall be independent of the primary electric supply. The emergency power system shall be capable of powering the excavation lighting, ventilation and water control systems and, if used, the low pressure compressed air system.

C.14 Cleanup

After completion of tunneling and pipeline installation, all construction debris, spoils, oil, grease, and other materials will be removed from the tunneled pipe, launch and retrieval shafts, and all contractor work areas. Cleaning shall be incidental to the construction. No separate payment shall be made for cleanup.

D Measurement

The department will not measure Tunneling Reinforced Concrete Pipe Class V 120-Inch. The department will use pay plan quantity according to the Pay Plan Quantity article. Longer pipe and additional excavation beyond the limits of the plan dimensions will not be measured for payment unless authorized and agreed to in advance of placement by the engineer.

E Payment

The department will pay for plan quantities or revised plan quantities if agreed to in advance of placement by the engineer, at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4450	Tunneling Reinforced Concrete Pipe Class V 120-Inch	LF

Payment is full compensation for providing the installing the specified reinforced concrete pipe using a tunneling method, including but not limited to, excavation support, tunneling, control of water, obstruction removal, pipe installation, lubrication, contact grouting, documentation, all materials, labors, equipments, tools, handling, transporting, disposing spoils, equipment mobilization/demobilization, and all other necessary incidental items as specified in this special provision.

186. Steel Casing w/ Ductile Iron 30-Inch Carrier, Item SPV.0090.5010.

A Description

This special provision describes the bore and jack of a steel casing pipe and the installation of a 30-inch diameter Ductile Iron carrier pipe to the length and elevations as shown on the plans.

A.1 General

Perform work under these items in accordance to the details as shown on the plans and the requirements of the City of Milwaukee Water Main Installation Specifications, dated January 2, 1987 (City Water Main Specifications). Additionally, perform all work in accordance to the “Milwaukee Water Works Standard Plan Notes for Water Main Construction”, June 14, 2011. Notes 4, 6, 16 through 18, and 21 shall not apply to this project. In case of conflicts between the city Water Main Specifications and the standard specifications or these special provisions, the requirements of the standard specifications and the special provisions shall govern. Contact Ms. Angela Baldwin, at (414) 286-2813 to purchase copies of the required documents.

A.2 Submittals

Address all required submittals to Milwaukee Water Works as follows:

Superintendent
Milwaukee Water Works
Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

B Materials

B.1 General

Furnish all fittings required for installation on this project. Water main shall be Restrained Joint Ductile Iron Thickness Class 55 pipe, conforming to the City of Milwaukee’s Material Specifications and AWWA C-151. Furnish all fittings conforming to the City of Milwaukee’s Material Specifications and AWWA C110. Material specifications can be found at the following website:

<http://city.milwaukee.gov/water/business/standardspecs.htm>

All materials will require inspection by the City of Milwaukee. Notify Mr. Mark Scheller, (414) 286-2427 or Mr. Steve Brengosz, (414) 708-2808, for materials inspection and the City of Milwaukee’s Construction Section, (414) 286-2497, for construction inspection, four working days prior to starting construction.

Milwaukee Water Works will test all pipe, including restrained joint pipe, in accordance to the City of Milwaukee Material Testing Specifications. Material testing done by the city will remove at least one welded end from a restrained pipe piece. Provide enough pipe for testing and installation. The department will not pay for additional pipe length used for material testing purposes.

B.2 Steel Casing Pipe

For casing pipe over 24-inch diameter, provide extra strong, spiral welded steel pipe conforming to ASTM A139, Grade B. Provide all steel casing pipe fabricated in sections for welded field joints. Steel casing shall have minimum yield strength of 35,000 psi, minimum thickness of .625’, and shall be spiral-welded steel pipe, uncoated, or equal. The casing pipe must have sufficient thickness to withstand both earth loads and live loads imposed from traffic. Provide engineer with manufacturer certification of steel

casing pipe, including minimum yield strength, wall thickness, manufacturer, and ASTM Grade and class.

All welds shall be free from embedded scale and slag, and have a tensile strength across the weld not less than that of the thinner of the connected sections. Make all pipe welds watertight. Use butt welds for all shop-welded joints (to be approved by Milwaukee Water Works). Welders shall be certified as specified in AWWA C200 and C206. The use of back-up welding strips or rings for welds will not be permitted. Repair leaks and defects in welds as directed by Milwaukee Water Works.

Install wrap around pull on type boot seals, or approved equal on both ends of the Steel Casing pipe after pipe installation. The seals shall be watertight and the type of seal shall be approved by the engineer before backfilling. Seals shall have a minimum of two type 304 stainless steel bands with worm screws. Boot seals shall be provided by same manufacturer as casing spacers.

C Construction

Notify engineer and the WisDOT in accordance to permit requirements before commencing casing installation. Provide complete installation at line and grade indicated on Drawings.

Prepare and submit a plan to the engineer for approval for casing installation means and methods. Submittal shall include detailed information on bore pit size and location, type and size of equipment, shaft construction, advance auger tooling, means for controlling grade line, lubrication, welding, means for preventing voids, over-ream, and means to fill over-ream voids, and any information necessary for casing installation.

30-inch Ductile Iron carrier pipe shall be restrained using stainless steel factory-fabricated **(wood not allowed)** spacers. Provide a minimum three spacers for each pipe length. Spacers shall be located within 2' of the end of casing. Design spacers to prevent uplifting of carrier pipe by hydrostatic forces and attach to pipe using stainless steel bands minimum (1 inch) wide. Spacers shall be a minimum 12" wide with a minimum 6 runners per spacer. Shell, risers and spacers shall be type 304 stainless steel or approved equal. Casing spacers shall be provided by same manufacturer as end boot seals.

Store pipes on level ground free of sharp objects which could damage the pipe. Limit the Stacking of the pipe to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature condition. Where necessary due to ground conditions, store the pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

Pipe shall be homogenous throughout and free of voids cracks, inclusions and other defects and shall be uniform in color, density and other physical characteristics.

Plug all open ends of all sections of joined and/or installed pipe (not in service) at night to prevent anything from entering the pipe line or section. The practice of stuffing cloth or paper in the open ends of the pipe will be considered unacceptable.

Prepare and submit a plan to the engineer for approval for insertion of the water main into the casing. Include pullback procedure, ballasting, use of rollers, side booms and side rollers, coating protection, internal cleaning, internal gauging, and purging in the plan.

Store excavated material from the boring and receiving pits in locations that minimize the interference with operations, minimize environmental damage, and protect adjacent areas from flooding, runoff and sedimentation.

Damage to utilities and the resulting repair, temporary service cost, etc., shall be borne by the contractor. Backfill access pits in accordance to the appropriate specifications.

Properly sheet/shore all excavations in accordance to relevant specifications for trench safety systems. Any damage resulting from improperly shored excavations shall be corrected to the satisfaction of the engineer with no compensation due to the contractor.

The Milwaukee Water Works will shut off the water main to be altered and provide temporary hose connections to affected services as required.

Provide all surveying required to layout and construct the casing pipe.

D Measurement

The department will measure Steel Casing w/ Ductile Iron 30-Inch Carrier by the linear foot of pipe in place measured along the top centerline of the casing, acceptably complete.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5010	Steel Casing w/ Ductile Iron 30-Inch Carrier	LF

Payment is full compensation for furnishing all labor, equipment, tools, materials and accessories required; for furnishing all surveying; excavating for sheeting and shoring, for laying pipe, for boring and receiving pit; for sheeting, shoring, bracing; for installing casing pipe, carrier pipe, spacers, end seals and lubricant work; for installing all valves and fittings; for concrete base, buttresses, and anchors; for bulkheading and abandoning existing water mains; for sealing joints and making connections to new or existing facilities; for dewatering; for removing shoring, sheeting, bracing; for cleaning out the site of the work and incidentals necessary to complete the work and in accordance to the contract.

187. Sanitary Sewer Pressure and Deflection Testing, Item SPV.0090.5015.

A Description

Work under this item shall be in accordance to the plans, standard specifications, Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition and amendments, (SSSW) and as hereinafter provided and these special provisions. Sanitary sewer deflection test of pipeline with an approved go-no-go mandrel device in accordance to requirements of Section 3.2.6(i)4 of the SSSW for 5% deflection of the base inside diameter. All mainline sanitary sewers shall be low pressure air tested in accordance to the requirements of Chapter 3.7.0 of the SSSW.

B Materials

Provide piping connections between section of line being tested and air supply, together with test pressure equipment, meters, pressure gauge, and other equipment, materials and facilities necessary to make specified tests. Provide bulkheads, blocking, bracing or other temporary sectionalizing devices that may be required.

C Construction

Remove temporary sectionalizing devices after test complete. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts during air test. Add air slowly while performing test. Pressurizing equipment shall include regulator set to avoid over-pressurizing and damaging line. Make air tests from manhole to manhole unless approved by City of Milwaukee Sewer Department.

Provide a deflection test for all PVC sewer piping installed with a go-no-go mandrel in accordance to requirements of Section 3.2.6(i)4 of the SSSW for 5% deflection of the base inside diameter. The deflection of the sewer pipe shall not exceed 5.0 percent when tested with a mandrel specifically designed for the type and size of pipe installed. Pipe segments failing the Mandrel test shall be removed and replaced.

D Measurement

The department will measure Sanitary Sewer Pressure and Deflection Testing by the linear foot of pipe in place measured from the centerline of manhole to the centerline of manhole, or from point of connection to downstream pipe line not at centerline of manhole to centerline of upstream manhole or from centerline of manhole to the end of pipeline not ending at a manhole, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5015	Sanitary Sewer Pressure and Deflection Testing	LF

Payment is full compensation for completing full pressure test and deflection tests, including furnishing and installing all testing equipment, including meters, mandrels, lasers, gauges, and material required to complete the test.

188. Steel Casing w/ Ductile Iron 12-Inch Carrier, Item SPV.0090.5020.

A Description

This special provision describes the bore and jack of a steel casing pipe and the installation of a 12-inch diameter Ductile Iron carrier pipe to the length and elevations as shown on the plans.

A.1 General

Perform work under these items in accordance to the details as shown on the plans and the requirements of the City of Milwaukee Water Main Installation Specifications, dated January 2, 1987 (City Water Main Specifications). Additionally, perform all work in accordance to the “Milwaukee Water Works Standard Plan Notes for Water Main Construction”, June 14, 2011. Notes 4, 6, 16 through 18, and 21 shall not apply to this project. In case of conflicts between the City Water Main Specifications and the standard specifications or these special provisions, the requirements of the standard specifications and the special provisions shall govern. Contact Ms. Angela Baldwin, at (414) 286-2813 to purchase copies of the required documents.

A.2 Submittals

Address all required submittals to Milwaukee Water Works as follows:

Superintendent
Milwaukee Water Works
Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

B Materials

B.1 General

Furnish all fittings required for installation on this project. Water main shall be Restrained Joint Ductile Iron Thickness Class 55 pipe, conforming to the City of Milwaukee’s Material Specifications and AWWA C-151. Furnish all fittings conforming to the City of Milwaukee’s Material Specifications and AWWA C110. Material specifications can be found at the following website:

<http://city.milwaukee.gov/water/business/standardspecs.htm>

All materials will require inspection by the City of Milwaukee. Notify Mr. Mark Scheller, (414) 286-2427 or Mr. Steve Brengosz, (414) 708-2808, for materials inspection and the City of Milwaukee’s Construction Section, (414) 286-2497, for construction inspection, four working days prior to starting construction.

Milwaukee Water Works will test all pipe, including restrained joint pipe, in accordance to the City of Milwaukee Material Testing Specifications. Material testing done by the city will remove at least one welded end from a restrained pipe piece. Provide enough pipe for testing and installation. The department will not pay for additional pipe length used for material testing purposes.

B.2 Steel Casing Pipe

For casing pipe over 24-inch diameter, provide extra strong, spiral welded steel pipe conforming to ASTM A139, Grade B. Provide all steel casing pipe fabricated in sections for welded field joints. Steel casing shall have minimum yield strength of 35,000 psi, minimum thickness of .625", and shall be spiral-welded steel pipe, uncoated, or equal. The casing pipe must have sufficient thickness to withstand both earth loads and live loads imposed from traffic. Provide engineer with manufacturer certification of steel casing pipe, including minimum yield strength, wall thickness, manufacturer, and ASTM Grade and class.

All welds shall be free from embedded scale and slag, and have a tensile strength across the weld not less than that of the thinner of the connected sections. Make all pipe welds watertight. Use butt welds for all shop-welded joints (to be approved by Milwaukee Water Works). Welders shall be certified as specified in AWWA C200 and C206. The use of back-up welding strips or rings for welds will not be permitted. Repair leaks and defects in welds as directed by Milwaukee Water Works.

Install wrap around pull on type boot seals, or approved equal on both ends of the Steel Casing pipe after pipe installation. The seals shall be watertight and the type of seal shall be approved by the engineer before backfilling. Seals shall have a minimum of two type 304 stainless steel bands with worm screws. Boot seals shall be provided by same manufacturer as casing spacers.

C Construction

Notify engineer and the WisDOT in accordance to permit requirements before commencing casing installation. Provide complete installation at line and grade indicated on Drawings.

Prepare and submit a plan to the engineer for approval for casing installation means and methods. Submittal shall include detailed information on bore pit size and location, type and size of equipment, shaft construction, advance auger tooling, means for controlling grade line, lubrication, welding, means for preventing voids, over-ream, and means to fill over-ream voids, and any information necessary for casing installation.

12-inch Ductile Iron carrier pipe shall be restrained using stainless steel factory-fabricated (wood not allowed) spacers. Provide a minimum three spacers for each pipe length. Spacers shall be located within 2' of the end of casing. Design spacers to prevent uplifting of carrier pipe by hydrostatic forces and attach to pipe using stainless steel bands minimum (1 inch) wide. Spacers shall be a minimum 12" wide with a minimum 6 runners per spacer. Shell, risers and spacers shall be type 304 stainless steel or approved equal. Casing spacers shall be provided by same manufacturer as end boot seals.

Store pipes on level ground free of sharp objects which could damage the pipe. Limit the Stacking of the pipe to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature condition. Where necessary due to ground conditions, store the pipe on wooden sleepers, spaced suitably and of such widths as not

to allow deformation of the pipe at the point of contact with the sleeper or between supports.

Pipe shall be homogenous throughout and free of voids cracks, inclusions and other defects and shall be uniform in color, density and other physical characteristics.

Plug all open ends of all sections of joined and/or installed pipe (not in service) at night to prevent anything from entering the pipe line or section. The practice of stuffing cloth or paper in the open ends of the pipe will be considered unacceptable.

Prepare and submit a plan to the engineer for approval for insertion of the water main into the casing. Include pullback procedure, ballasting, use of rollers, side booms and side rollers, coating protection, internal cleaning, internal gauging, and purging in the plan.

Store excavated material from the boring and receiving pits in locations that minimize the interference with operations, minimize environmental damage, and protect adjacent areas from flooding, runoff and sedimentation.

Damage to utilities and the resulting repair, temporary service cost, etc., shall be borne by the contractor. Backfill access pits in accordance to the appropriate specifications.

Properly sheet/shore all excavations in accordance to relevant specifications for trench safety systems. Any damage resulting from improperly shored excavations shall be corrected to the satisfaction of the engineer with no compensation due to the contractor.

The Milwaukee Water Works will shut off the water main to be altered and provide temporary hose connections to affected services as required.

Provide all surveying required to layout and construct the casing pipe.

D Measurement

The department will measure Steel Casing w/ Ductile Iron 12-Inch Carrier by the linear foot of pipe in place measured along the top centerline of the casing, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5020	Steel Casing w/ Ductile Iron 12-Inch Carrier	LF

Payment is full compensation for furnishing all labor, equipment, tools, materials and accessories required; for furnishing all surveying; excavating for sheeting and shoring, for laying pipe, for boring and receiving pit; for sheeting, shoring, bracing; for installing casing pipe, carrier pipe, spacers, end seals and lubricant work; for installing all valves

and fittings; for concrete base, buttresses, and anchors; for bulkheading and abandoning existing water mains; for sealing joints and making connections to new or existing facilities; for dewatering; for removing shoring, sheeting, bracing; for cleaning out the site of the work and incidentals necessary to complete the work and in accordance to the contract.

189. Greywolf Sanitary Sewer 8-Inch, Item SPV.0090.5025.

A Description

A.1 General

Perform work under these items in accordance to the details as shown in the plans and the requirements of the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

Notify the City of Milwaukee and the facility owner) prior to construction at least three business days in advance. Notify, in writing, all businesses and property owners/occupants within the project limits to inform them of the project and to inform them of any temporary sewer service disconnections. Provide and maintain all necessary bypass pumping for sanitary sewer relay

A.2 Submittals

A.2.1 General

Address all required submittals to the City of Milwaukee as follows:

City of Milwaukee Department of Public Works
Environmental Engineering Section, Infrastructure Services Division
Zeidler Municipal Building
841 North Broadway, Room 820
Milwaukee, WI 53202

A.2.2 Record Drawings

Prepare an “as-built” plan of the public main sanitary sewer showing all changes in location, elevation, or materials from those shown on the approved plans. Upon completion of the sewer work, submit the “as-built” plan to the Environmental Engineering Section for approval. Upon such approval, furnish two marked up “as-built” prints to the Environmental Engineering Section for record purposes.

B Materials

B.1 General

All materials and work required to install the sanitary sewer will conform to the SSSW.

B.2 PVC Pipe

The pipe shall be polyvinylchloride Pipe (PVC), ASTM D-3034 SDR-26. All fittings, including bends, shall be of the same material as the proposed sanitary sewer main. Material joining the fitting to the pipe shall be free from cracks and shall adhere tightly to each joining surface.

B.3 Pipe Gaskets

Sanitary sewer pipes shall have rubber gaskets conforming to ASTM F-477.

C Construction

C.1 General

Construct 8-Inch pipe as shown in the plans.

C.2 Bedding, Cover, Foundation and Backfill Material

All sewer pipe shall be laid in a Standard Section, Class "C" bedding conforming to File No. 3 with modifications as specified in Section 3.2.6(i) for PVC pipe of the SSSW, unless otherwise noted on the plans. Cover material for PVC pipe shall be the same as that specified in the SSSW for bedding

Compact granular backfill mechanically to a minimum of 95% maximum density as determined by ASTM D1557, Method D (Modified Proctor Test) from the top of the pipe cover material to the surface of the trench. Special compaction equipment and measures are required where standard compaction equipment cannot be utilized. Flooding of backfill will not be allowed. Compact native backfill mechanically to a minimum of 90% maximum density as determined by ASTM D1557 (Modified Proctor Test) from top of pipe cover material to trench surface. Compaction of the excavated and granular backfill material shall be compacted to achieve uniform consolidation in conformance with section 2.6.14(b) of the SSSW.

C.3 Joints Between Dissimilar Pipe Materials

Connect dissimilar pipe materials by means of a non-shear flexible compression coupling. Install couplings in strict accordance with the manufacturer's recommendations. Joints on sanitary sewers between dissimilar pipe shall be either a non-shear coupling as manufactured by DFW/HPI or shall be made with flexible mechanical compression joint coupling conforming to ASTM C-594 Type B with stainless steel bands and shear ring conforming to ASTM A-167 as manufactured by Joints, Inc. (Calder) of Gardena, CA; Fernco Joint Sealer Co. of Ferndale, MI., or equal and in addition, using a transitional bushing conforming to ASTM C-594 Type B when pipe with different outside diameters are to be connected.

The cost of connecting dissimilar pipe materials with non-shear flexible compression coupling is incidental to the cost of sanitary sewer pipe.

C.4 Sanitary Sewer Examination CCTV

Provide the City of Milwaukee a post-construction report and closed circuit television (CCTV) exam of the sewers and manholes built on this contract. The City of Milwaukee will promptly review the reports and exams and determine if any corrective action must be taken by the contractor. Supply the City with digital video discs (dvds) and written reports documenting the examinations.

Examine by CCTV all sewers, drains, and manholes constructed on this contract, as well as the existing downstream run of sewer to the next downstream manhole. The television

camera shall be equipped with and utilize a rotating head to allow for proper examination of the reconnections to existing sewers, building sewers, and drains. Also examine the most downstream 25 feet of all adjacent existing upstream runs of sewer.

Provide a video exam of the manhole frame and adjusting rings, showing proper underpinning and internal seals, where applicable. Perform examinations of the manholes within 5 days of completion of permanent restoration activities. At the discretion of the construction engineer, the contractor may request to extend the time of completion for a specific location if the contractor wishes to perform examinations for multiple locations at one time.

These video exams will become the property of the City of Milwaukee. Include all costs associated with this work in the unit bid price for Sanitary Sewer Examination CCTV. If it is determined that corrective action is required, additional exams may be ordered by the City of Milwaukee construction engineer. No extras will be paid for this additional work.

D Measurement

The department will measure Greywolf Sanitary Sewer 8-Inch by the linear foot of sewer, acceptably completed. The pipe will be measured horizontally to the nearest foot, from center-to-center of manholes, to the end of the new pipe, or to the outside face of structures, whichever is applicable.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5025	Greywolf Sanitary Sewer 8-Inch	LF

Payment is full compensation for providing all materials including all pipe materials, fittings, and accessories required; for furnishing all asphaltic pavement removal and excavating; for providing and placing pipe bedding and cover material; for laying pipe; for sealing joints and making connections to new or existing facilities; for backfilling and compaction; for leakage testing; for providing and maintaining all necessary bypass pumping for sanitary sewer relay; for removing existing pipe, for closed-circuit television examination; for cleaning out and restoring the work site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete contract work.

190. Steel Casing Concrete Cap, Item SPV.0090.5027.

A Description

This special provision describes constructing a concrete cap over a proposed sanitary sewer in a casing pipe as shown on the plans and as hereinafter provided.

B Materials

Furnish concrete masonry that is in accordance to the pertinent requirements of standard spec 501. Furnish steel reinforcement that is in accordance to the pertinent requirements of standard spec 505.

C (Vacant)

D Measurement

The department will measure Steel Casing Concrete Cap by the linear foot, in place and acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5027	Steel Casing Concrete Cap	LF

Payment is full compensation for furnishing, hauling and placing of all materials; excavation, backfilling and disposing of excess material; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

191. Sanitary Sewer 8-Inch PVC, Item SPV.0090.5030.

A Description

Perform work under these items in accordance to the details as shown in the plans and the requirements of the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

Notify the City of Milwaukee prior to construction at least three business days in advance. Notify, in writing, all businesses and property owners/occupants within the project limits to inform them of the project and to inform them of any temporary sewer service disconnections. Provide and maintain all necessary bypass pumping for sanitary sewer relay.

B Materials

B.1 General

All materials and work required to install the sanitary sewer will conform to the SSSW.

B.2 PVC Pipe

The pipe shall be polyvinylchloride Pipe (PVC), ASTM D-3034 SDR-26. All fittings, including bends, shall be of the same material as the proposed sanitary sewer main. Material joining the fitting to the pipe shall be free from cracks and shall adhere tightly to each joining surface.

B.3 Pipe Gaskets

Sanitary sewer pipes shall have rubber gaskets conforming to ASTM F-477.

C Construction

C.1 General

Construct 10-inch and 15-inch pipe as shown in the plans.

C.2 Bedding, Cover, Foundation and Backfill Material

All sewer pipe shall be laid in a Standard Section, Class "C" bedding conforming to File No. 3 with modifications as specified in Section 3.2.6(i) for PVC pipe of the SSSW, unless otherwise noted on the plans. Cover material for PVC pipe shall be the same as that specified in the SSSW for bedding

Compact granular backfill mechanically to a minimum of 95% maximum density as determined by ASTM D1557, Method D (Modified Proctor Test) from the top of the pipe cover material to the surface of the trench. Special compaction equipment and measures are required where standard compaction equipment cannot be utilized. Flooding of backfill will not be allowed. Compact native backfill mechanically to a minimum of 90% maximum density as determined by ASTM D1557 (Modified Proctor Test) from top of pipe cover material to trench surface. Compaction of the excavated and granular backfill material shall be compacted to achieve uniform consolidation in conformance with section 2.6.14(b) of the SSSW.

C.3 Joints Between Dissimilar Pipe Materials

Connect dissimilar pipe materials by means of a non-shear flexible compression coupling. Install couplings in strict accordance with the manufacturer's recommendations. Joints on sanitary sewers between dissimilar pipe shall be either a non-shear coupling as manufactured by DFW/HPI or shall be made with flexible mechanical compression joint coupling conforming to ASTM C-594 Type B with stainless steel bands and shear ring conforming to ASTM A-167 as manufactured by Joints, Inc. (Calder) of Gardena, CA; Fernco Joint Sealer Co. of Ferndale, MI., or equal and in addition, using a transitional bushing conforming to ASTM C-594 Type B when pipe with different outside diameters are to be connected.

The cost of connecting dissimilar pipe materials with non-shear flexible compression coupling is incidental to the cost of sanitary sewer pipe.

D Measurement

The department will measure Sanitary Sewer 8-Inch PVC by the linear foot of sewer, acceptably completed. The pipe will be measured horizontally to the nearest foot, from center-to-center of manholes, to the end of the new pipe, or to the outside face of structures, whichever is applicable.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5030	Sanitary Sewer 8-Inch PVC	LF

Payment is full compensation for providing all materials including all pipe materials, fittings, and accessories required; for furnishing all asphaltic pavement removal and excavating; for providing and placing pipe bedding and cover material; for laying pipe;

for sealing joints and making connections to new or existing facilities; for backfilling and compaction; for leakage testing; for providing and maintaining all necessary bypass pumping for sanitary sewer relay; for removing existing pipe, for cleaning out and restoring the work site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete contract work.

192. Abandoning Sanitary Sewer 8-Inch and 10-Inch, Item SPV.0090.5033, Abandoning Sanitary Sewer 12-Inch, Item SPV.0090.5034, and Abandoning Sanitary Sewer 24-Inch, Item SPV.0090.5035.

A Description

Perform work under these items in accordance to the details as shown on the plans and the requirements of the Standard Specifications for Sewer and Water Construction in Wisconsin, latest Edition.

Notify the Milwaukee Metropolitan Sewerage District (MMSD) and City of Milwaukee - Sewer of the commencement of construction at least three district business days in advance. Notify, in writing, all businesses and property owners/occupants within the project limits to inform them of the project and to inform them of any temporary sewer service disconnections. Provide and maintain all necessary bypass pumping for sanitary sewer abandonment.

B Materials

B.1 General

All materials and work required to abandon existing sanitary sewers will conform to the Standard Specifications for Sewer and Water.

B.2 Cellular Concrete

Provide cellular concrete meeting the following specifications: 1 part cement, 1 part fly ash, 8 parts sand, or an approved equal, and water. Provide cement meeting the requirements of standard spec 501.2.1 for Type 1 Portland Cement. Provide sand meeting the requirements of standard spec 501.2.5.3. Provide water meeting the requirements of standard spec 501.2.4.

C Construction

Bulkhead sewers that are to be abandoned in place with an 8-inch brick or concrete wall. Fill all sewers with cellular concrete. Remove frame, cover, and manhole to a minimum depth of 3 feet below grade.

D Measurement

The department will measure Abandoning Sanitary Sewer 8-Inch and 10-Inch, Abandoning Sanitary Sewer 12-Inch, and Abandoning Sanitary Sewer 24-Inch by the linear foot of sewer, acceptably completed. The pipe will be measured horizontally to the nearest foot, through all manholes designated to be abandoned, from face to face of bulkheads, including the bulkhead thickness.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5033	Abandoning Sanitary Sewer 8-Inch and 10-Inch	LF
SPV.0090.5034	Abandoning Sanitary Sewer 12-Inch	LF
SPV.0090.5035	Abandoning Sanitary Sewer 24-Inch	LF

Payment is full compensation for providing all materials including all excavating; for bulkheading and abandoning existing sanitary sewer with cellular concrete; for providing backfill slurry material; and for providing and maintaining all necessary bypass pumping.

193. Ductile Iron Water Main 12-Inch, Item SPV.0090.5040.**A Description**

This special provision describes the installation of 12-inch diameter water main alterations as shown on the plans.

A.1 General

Perform work under these items in accordance to the details as shown on the plans and the requirements of the City of Milwaukee Water Main Installation Specifications, dated January 2, 1987 (City Water Main Specifications). Additionally, perform all work in accordance to the "Milwaukee Water Works Standard Plan Notes for Water Main Construction", June 14, 2011. Notes 4, 6, 16 through 18, and 21 shall not apply to this project. In case of conflicts between the City Water Main Specifications and the standard specifications or these special provisions, the requirements of the standard specifications and the special provisions shall govern. Contact Ms. Angela Baldwin, at (414) 286-2813 to purchase copies of the required documents.

A.2 Submittals

Address all required submittals to Milwaukee Water Works as follows:

Superintendent
Milwaukee Water Works
Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

A.3 Sequence of Construction

Due to the nature of this work, including traffic staging and coordination with other work, the contractor is advised there may be multiple mobilizations to complete the water main work. No additional payment will be made by the department for said mobilizations.

Determine sequence and schedule for water main construction, subject to the requirements herein.

Prepare and submit for review by the Superintendent of Milwaukee Water Works a detailed construction schedule stating the anticipated dates and duration of all interruptions in water service necessary to complete the work under the contract, including the abandonment of existing water mains.

B Materials

B.1 General

The contractor shall furnish all fittings required for installation on this project. Contractor shall provide all ductile iron water main and fittings conforming to the latest version of the City of Milwaukee's Material Specifications. Material specifications can be found at the following website:

<http://city.milwaukee.gov/water/business/standardspecs.htm>.

All materials will require inspection by the City of Milwaukee. Notify Mr. Mark Scheller, (414) 286-2427 or Mr. Steve Brengosz, (414) 708-2808, for materials inspection and the City of Milwaukee's Construction Section, (414) 286-2497, for construction inspection, four working days prior to starting construction.

Milwaukee Water Works will test all pipe, in accordance to the City of Milwaukee Material Testing Specifications.

B.2 Valve Box Adapters

Install all valve boxes on gate valves with the use of valve box base adapters as detailed in the Standard Plan Notes Regarding Water Main Construction. Install the adapter in addition to the hardwood blocking.

C Construction

The Milwaukee Water Works will shut off the water main to be altered and provide temporary hose connections to affected services as required.

The contractor will be responsible for all surveying required to layout and construct the water main relocations.

The 12-inch water main installation from Station 38F+44.6 4,17.8'R to 40F+05.0 ,17.5'R includes two 2-inch air vent installations at Station 38F+47.6 ,17.8'R and Station 40F+02.0 ,17.5 'R. All costs for completing the work required for the vent installations are to be included in the price for furnishing and installing 12-inch water main under this item.

D Measurement

The department will measure Ductile Iron Water Main 12-inch by the linear foot of water main of the type and diameter specified, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5040	Ductile Iron Water Main 12-Inch	LF

Payment is full compensation for providing all labor, equipment, materials, air vents and accessories required; for furnishing all surveying; excavating, for sheeting and shoring; for forming foundation; for laying pipe; for removing valves; for installing all valves and fittings; for concrete base, buttresses, and anchors; for bulkheading and abandoning existing water mains; for sealing joints and making connections to new or existing facilities; for providing granular backfill material, including bedding material; for backfilling; for removing sheeting and shoring; for cleaning out the site of the work and incidentals necessary to complete the work.

194. Ductile Iron Water Main 16-Inch, Item SPV.0090.5050.

A Description

This special provision describes the installation of 16-inch diameter water main alterations as shown on the plans.

A.1 General

Perform work under these items in accordance to the details as shown on the plans and the requirements of the City of Milwaukee Water Main Installation Specifications, dated January 2, 1987 (City Water Main Specifications). Additionally, perform all work in accordance to the "Milwaukee Water Works Standard Plan Notes for Water Main Construction", June 14, 2011. Notes 4, 6, 16 through 18, and 21 shall not apply to this project. In case of conflicts between the City Water Main Specifications and the standard specifications or these special provisions, the requirements of the standard specifications and the special provisions shall govern. Contact Ms. Angela Baldwin, at (414) 286-2813 to purchase copies of the required documents.

A.2 Submittals

Address all required submittals to Milwaukee Water Works as follows:

Superintendent
Milwaukee Water Works
Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

A.3 Sequence of Construction

Due to the nature of this work, including traffic staging and coordination with other work, the contractor is advised there may be multiple mobilizations to complete the water main work. No additional payment will be made by the department for said mobilizations.

Determine sequence and schedule for water main construction, subject to the requirements herein.

Prepare and submit for review by the Superintendent of Milwaukee Water Works a detailed construction schedule stating the anticipated dates and duration of all interruptions in water service necessary to complete the work under the contract, including the abandonment of existing water mains.

B Materials

B.1 General

The contractor shall furnish all fittings required for installation on this project. Contractor shall provide all ductile iron water main and fittings conforming to the latest version of the City of Milwaukee's Material Specifications. Material specifications can be found at the following website:

<http://city.milwaukee.gov/water/business/standardspecs.htm>.

All materials will require inspection by the City of Milwaukee. Notify Mr. Mark Scheller, (414) 286-2427 or Mr. Steve Brengosz, (414) 708-2808, for materials inspection and the City of Milwaukee's Construction Section, (414) 286-2497, for construction inspection, four working days prior to starting construction.

Milwaukee Water Works will test all pipe, in accordance to the City of Milwaukee Material Testing Specifications.

B.2 Valve Box Adapters

Install all valve boxes on gate valves with the use of valve box base adapters as detailed in the Standard Plan Notes Regarding Water Main Construction. Install the adapter in addition to the hardwood blocking.

C Construction

The Milwaukee Water Works will shut off the water main to be altered and provide temporary hose connections to affected services as required.

The contractor will be responsible for all surveying required to layout and construct the water main relocations.

The 16-inch water main installation at Station 17TLWM+39 includes one 16-inch butterfly valve installation. All costs for completing the work required for the valve installation is to be included in the price for furnishing and installing 16-inch water main under this item.

D Measurement

The department will measure Ductile Iron Water Main 16-inch by the linear foot of water main of the type and diameter specified, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5050	Ductile Iron Water Main 16-Inch	LF

Payment is full compensation for providing all labor, equipment, materials, valves and accessories required; for furnishing all surveying; excavating, for sheeting and shoring; for forming foundation; for laying pipe; for removing valves; for installing all valves and fittings; for concrete base, buttresses, and anchors; for bulkheading and abandoning existing water mains; for sealing joints and making connections to new or existing facilities; for providing granular backfill material, including bedding material; for backfilling; for removing sheeting and shoring; for cleaning out the site of the work and incidentals necessary to complete the work.

195. Ductile Iron Water Main 30-Inch, Item SPV.0090.5060.

A Description

This special provision describes the installation of 30-inch diameter water main alterations as shown on the plans.

A.1 General

Perform work under these items in accordance to the details as shown on the plans and the requirements of the City of Milwaukee Water Main Installation Specifications, dated January 2, 1987 (City Water Main Specifications). Additionally, perform all work in accordance to the "Milwaukee Water Works Standard Plan Notes for Water Main Construction", June 14, 2011. Notes 4, 6, 16 through 18, and 21 shall not apply to this project. In case of conflicts between the City Water Main Specifications and the standard specifications or these special provisions, the requirements of the standard specifications and the special provisions shall govern. Contact Ms. Angela Baldwin, at (414) 286-2813 to purchase copies of the required documents.

A.2 Submittals

Address all required submittals to Milwaukee Water Works as follows:

Superintendent
Milwaukee Water Works
Zeidler Municipal Building
841 North Broadway, Room 409
Milwaukee, WI 53202

A.3 Sequence of Construction

Due to the nature of this work, including traffic staging and coordination with other work, multiple mobilizations may be required to complete the water main work. No additional payment will be made by the department for said mobilizations.

Determine sequence and schedule for water main construction, subject to the requirements herein.

Prepare and submit for review by the Superintendent of Milwaukee Water Works a detailed construction schedule stating the anticipated dates and duration of all interruptions in water service necessary to complete the work under the contract, including the abandonment of existing water mains.

B Materials

B.1 General

Furnish all fittings required for installation on this project. Water main shall be Restrained Joint Ductile Iron Thickness Class 55 pipe, conforming to the City of Milwaukee's Material Specifications and AWWA C-151. Furnish all fittings conforming to the City of Milwaukee's Material Specifications and AWWA C110. Material specifications can be found at the following website:

<http://city.milwaukee.gov/water/business/standardspecs.htm>

All materials will require inspection by the City of Milwaukee. Notify Mr. Mark Scheller, (414) 286-2427 or Mr. Steve Brengosz, (414) 708-2808, for materials inspection and the City of Milwaukee's Construction Section, (414) 286-2497, for construction inspection, four working days prior to starting construction.

Milwaukee Water Works will test all pipe, including restrained joint pipe, in accordance to the City of Milwaukee Material Testing Specifications. Material testing done by the city will remove at least one welded end from a restrained pipe piece. Provide enough pipe for testing and installation. The department will not pay for additional pipe length used for material testing purposes.

B.1 Valve Box Adapter

Install all valve boxes on butterfly valves with the use of valve box base adapters as detailed in the Standard Plan Notes Regarding Water Main Construction. Install the adapter in addition to the hardwood blocking.

C Construction

The Milwaukee Water Works will shut off the water main to be altered and provide temporary hose connections to affected services as required.

Provide all surveying required to layout and construct the water main relocations.

The 30-inch water main installation from Station 10TLWM+00 to 17TLWM+81.20 includes two 30-inch butterfly valve installations at Station 11TLWM+18.00 and Station 17TLWM+17.58 and two 2-inch air vent installations at Station 11TLWM+36.00 and Station 17TLWM+17.58. All costs for completing the work required for the valve and air vent installations are to be included in the price for furnishing and installing 30-inch water main under this item.

Abandon 8" water main blow off valve and manhole at Station 10TLWM+08.28, 26.94' RT after new 30" water main connections are made and the existing 30" water main is isolated and drained. Abandon blow off manhole per Milwaukee Specification Section

5.14.11. Install bulkheads in the open ends of all water mains per Milwaukee Specification 5.14.5

D Measurement

The department will measure Ductile Iron Water Main 30-Inch by the linear foot of water main of the type and diameter specified, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5060	Ductile Iron Water Main 30-Inch	LF

Payment is full compensation for providing all labor, equipment, materials, valves and accessories required; for furnishing all surveying; excavating, for sheeting and shoring; for forming foundation; for laying pipe; for removing valves; for installing all valves and fittings; for concrete base, buttresses, and anchors; for bulkheading and abandoning existing water mains, valves and manholes; for sealing joints and making connections to new or existing facilities; for providing granular backfill material, including bedding material; for backfilling; for removing sheeting and shoring; for cleaning out the site of the work and incidentals necessary to complete the work.

196. Steel Steel Casing w/ PVC 10-Inch Carrier, Item SPV.0090.5070.

A Description

A.1 General

Bore and jack a steel casing pipe to the length and elevations as shown on the plans and install PVC restrained joint pipe, fittings, joints and accessories for a new sanitary sewer in accordance to AWWA C-900 and the standard specifications for Sewer and Water Construction in Wisconsin, latest Edition (SSSW).

A.2 Submittals

A.2.1 General

Address all required submittals to the City of Milwaukee as follows:

City of Milwaukee Department of Public Works
Environmental Engineering Section, Infrastructure Services Division
Zeidler Municipal Building
841 North Broadway, Room 820
Milwaukee, WI 53202

A.2.2 Record Drawings

Prepare an “as-built” plan of the public main sanitary sewer showing all changes in location, elevation, or materials from those shown on the approved plans. Upon completion of the sewer work, submit the “as-built” plan to the Environmental Engineering Section for approval. Upon such approval, furnish two marked up “as-built” prints to the Environmental Engineering Section for record purposes.

B Materials

B.1 Steel Casing Pipe

Furnish steel casing pipe in accordance with ASTM A139, fabricated with ASTM A588, Grade A, API 5L, Grade B, 70,000 psi minimum yield strength, minimum wall thickness of 0.365-inch.

B.2 Joints

Provide full circumference welded joints in accordance with AWS D1.1 to withstand pressures and jacking forces.

B.3 Annular Space Filler

Annular space between steel casing and carrier pipe shall be filled with Cellular Concrete blended of preformed foam with cement-sand grout slurry to produce a concrete having a cast density per cubic foot of not less than 42 pounds and a 28-day compressive strength of 120 psi. Mixture shall consist of Cement-sand slurry proportioned by manufacturer and will contain Type 1 or Type 1A Portland cement.

Fill shall be Elastizell EF, Class IV, as manufactured by Elastizell Corporation of America, Ann Arbor, MI or approved equal.

B.4 Casing Spacers

Spacers shall be as manufactured by Advance Products & Systems, Inc. Model SSI, 8-inch, or Cascade Waterworks Manufacturing Co. Style CCS, or Pipeline Seal and Insulator, Inc., Model S8G2 or approved equal.

Construct casing spacers of circular stainless steel bands, which bolt together forming a shell around carrier pipe.

Design spacers with risers and runners to support carrier within the casing and maintain a minimum clearance of 1.00 inch between casing ID and spacer OD.

On carrier pipes with a nominal OD of 14 through 36 inches each spacer shall contain five or six riser and runner combinations consisting of two on top half and three or four on bottom half depending on annular space between carrier pipe OD and casing pipe ID and type of carrier pipe.

Casing spacer body shall be manufactured of 14-gauge T-304 stainless steel. Risers shall be constructed of 10-gauge T-304 stainless steel.

Attach abrasion resistant runners, having a minimum width of 1-inch to each riser to minimize friction between casing pipe and carrier pipe as it is installed.

Bevel ends of runners to facilitate installation over rough weld beads or welded ends of misaligned or deformed casing pipe.

Runner material shall be glass filled polymer or ultra-high molecular weight polyethylene with the following properties:

<u>Property</u>	<u>Test</u>	<u>Value</u>
Rockwell Hardness (M)	ASTM D785	100
Tensile Strength	ASTM D638	17,600 psi
Flexural Strength	ASTM D790	25,300 psi
Compression Strength	ASTM D 695	18,000 psi
Deflection Temperature(264 psi)	ASTM D 648	405 degrees F
Deformation under 2000 lb		
Load at 122 degrees F	ASTM D 621	1.2 percent
Coefficient of friction		0.12

Line interior surfaces of circular stainless steel spacer body with EPDM or PVC, having a minimum thickness of 0.090-inch and a hardness of Durometer "A", 85-90. Liner shall have a dielectric strength for 1/8-inch surge test of 58,000 VPM and a maximum water absorption of one (1) percent.

Connect flanges with stainless steel 1/4-inch, 20UNC x 2-inch long bolts with 1/4-inch hex nuts and SAE 2330 washers for pipe OD up to 16-inch or stainless steel 5/16-inch, 18UNC x 2-1/2-inch long bolts with 5/16-inch hex nuts and SAE 2330 washers for pipe OD over 16-inch.

Number and size of casing spacers shall be as recommended by manufacturer for size and material of carrier pipe.

B.5 Casing Pipe Seal

Casing Pipe Seals shall be as manufactured by Advance Products & Systems, Inc. Model AC, or Cascade Waterworks Manufacturing Co. Style CCES, or Pipeline Seal and Insulator, Inc., Model C or approved equal.

Fabricate casing seal of 1/8-inch thick neoprene rubber with 1/2-inch wide T304 stainless steel bandings with 100 percent non-magnetic worm gear mechanism.

Casing end seal is seamless, has vulcanized edges, and can be pulled on at the time of construction.

Seal shall have the following physical properties:

Temperature Limits	-20 to +212 degrees F
Color	Black
Finish	Smooth
Durometer	60 ± 5
Average Tensile Strength	1000 psi
Average Elongation	350 percent
Specific Gravity	1.50
Polymer Content	20 percent

C Construction

C.1 General

Attach pipe to casing spacers to be used as a carrier for insertion into casing.

Support and brace pipe to prevent shifting or flotation during filler material placement.

Provide minimum one-inch separation between outer wall of pipe and inside diameter of pipe casing shall be maintained.

Upon completion of installation of pipe, completely fill annular space between pipe and pipe casing with cellular concrete.

Ends of casing pipe shall be closed with a casing pipe seal.

Backfill of casing pipe ends and boring access pits with excavated spoil backfill and compact to 95% modified proctor.

Restore jack and bore work area to grades indicated on the plans.

C.2 Sanitary Sewer Examination CCTV

Provide the City of Milwaukee a post-construction report and closed circuit television (CCTV) exam of the sewers and manholes built on this contract. The City of Milwaukee will promptly review the reports and exams and determine if any corrective action must be taken by the contractor. Supply the City with digital video discs (dvds) and written reports documenting the examinations.

Examine by CCTV all sewers, drains, and manholes constructed on this contract, as well as the existing downstream run of sewer to the next downstream manhole. The television camera shall be equipped with and utilize a rotating head to allow for proper examination of the reconnections to existing sewers, building sewers, and drains. Also examine the most downstream 25 feet of all adjacent existing upstream runs of sewer.

Provide a video exam of the manhole frame and adjusting rings, showing proper underpinning and internal seals, where applicable. Perform examinations of the manholes within 5 days of completion of permanent restoration activities. At the discretion of the

construction engineer, the contractor may request to extend the time of completion for a specific location if the contractor wishes to perform examinations for multiple locations at one time.

These video exams will become the property of the City of Milwaukee. Include all costs associated with this work in the unit bid price for Sanitary Sewer Examination CCTV. If it is determined that corrective action is required, additional exams may be ordered by the City of Milwaukee construction engineer. No extras will be paid for this additional work.

D Measurement

The department will measure Steel Casing w/ PVC 10-Inch Carrier on a unit basis for each steel casing pipe installation, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5070	Steel Casing w/ PVC 10-Inch Carrier	Each

Payment is full compensation for furnishing all labor, equipment, tools, materials and accessories required; for all surveying; excavating for sheeting and shoring, for laying pipe; for sheeting, shoring, bracing; for installing casing pipe, spacers, end seals and lubricant work; for installing all fittings; for concrete base; for bulkheading existing sanitary sewers; for sealing joints and making connections to new or existing facilities; for dewatering; for removing shoring, sheeting, bracing; for closed-circuit television examination, for cleaning out the site of the work and incidentals necessary to complete the work and in accordance to the contract.

197. Sanitary Sewer and Steel Casing Removal, Item SPV.0090.5080.

A Description

This special provision describes removing existing PVC sanitary sewer and steel casing pipe that conflicts with the installation of proposed sanitary sewer manholes.

B (Vacant)

C Construction

Saw cut existing steel casing pipe and PVC pipe at each end as required. Remove in its entirety the designated PVC sanitary sewer and steel casing that conflicts with the installation of the new sanitary sewer system.

D Measurement

The department will measure Sanitary Sewer and Steel Casing Removal by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.5080	Sanitary Sewer and Steel Casing Removal	LF

Payment is full compensation for furnishing and installing all materials; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance to the requirements of the plans and contract.

198. Pipe Underdrain 6-Inch Special, Item SPV.0090.8001.**A Description**

This work shall consist of providing necessary subsurface drainage by constructing trenches, placing the required geotextile fabric, installing the designated pipes or drainage devices within, cored connections, back-plastering and or mortaring connections to storm sewer structures, and backfilling the trenches with the specified backfill material in accordance to standard spec 310, 612 and 645, as shown on the plans, and as hereinafter provided.

B Materials**B.1 Base Aggregate**

All aggregate shall be base aggregate open graded and shall conform to standard spec 310.2.

B.2 Pipe Underdrain

Conform to standard spec 612.2.

B.3 Geotextile Fabric

Geotextile fabric shall consist of Type DF Schedule A and shall conform to standard spec 645.2.4.

C Construction

Conform to standard spec 612.3.

D Measurement

The department will measure Pipe Underdrain 6-Inch Special by the linear foot, acceptably completed. The department will measure along the centerline of the pipe, center to center of junctions and fittings.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.8001	Pipe Underdrain 6-Inch Special	LF

Payment is full compensation for providing, handling, and placing all materials, including pipe, base aggregate open graded, geotextile fabric Type DF Schedule A, cored connections, back-plastering and or mortaring connection to storm sewer structure, fittings, and caps or plugs; for furnishing all excavating, plowing, and re-compacting, salvaging; disposing of surplus material; restoring the work site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work No additional payment will be made for base aggregate open graded.

199. Storm Sewer Pipe Reinforced Concrete Class III 24-Inch, Item SPV.0090.8500.

A Description

This special provision describes reinforced concrete piping, fittings, joints and accessories for new storm sewer construction.

B Materials

Furnish the following piping and fitting materials:

Reinforced Concrete Pipe:

Pipe shall meet all requirements contained in ASTM C76. Joints shall be of such design and ends of concrete pipe formed that pipe can be laid together to make a continuous line of pipe which is compatible with permissible variations. Reinforced concrete pipe shall meet the following:

Class III Reinforced Concrete Pipe: Wall Type B; 4000 psi concrete.

Reinforced Concrete Pipe Fittings:

Same material as pipe, molded or formed to suit pipe size and end design. Provide mortar fill at irregular sections of pipe ends. Fill fitting joint water-tight.

Mortar: ASTM C270, Type S.

Pipe Joints:

Design bell and spigot pipe joints in accordance to ASTM C443 to accommodate flexible watertight gaskets.

Gaskets (Flexible Watertight Joint):

ASTM C443 extruded or molded rubber gaskets. Annular space between gasket-bearing surfaces of assembled and centered joint shall not be more than 75 percent of uncompressed thickness of applied gasket including manufacturer's tolerances of joint and gasket.

Gasket shall be sole element depended upon to make joint flexible and watertight.

Gasket shall be a continuous ring that fits snugly into annular space between overlapping surfaces of assembled pipe joint to form a flexible watertight seal.

Gasket shall not be stretched more than 30 percent of its original circumference when seated on spigot or tongue end of pipe.

Pipe Location Materials:

Identification Warning Tape: Underground warning tape, 2-inch width. Color-Bright Green, warning message "Caution Buried STORM SEWER Below," repeating every 30 inches.

Pipe Bedding and Cover:

3/4-Inch Stone Chips: Crushed stone; free of clay, shale, organic matter; graded in accordance to the following limits:

Sieve Size	Percent Passing
1-inch	100
3/4-inch	90 - 100
3/8-inch	20 - 55
No. 4	0 - 10
No. 8	0 - 5

Trench Backfill: Trench Excavated Spoil Material.

C Construction

Excavation Notification:

Contractor, prior to any excavation work, shall notify (1) a designated locating service; (2) utilities, governmental agencies, entities, known to, or which can reasonably be assumed to have above or below ground pipe, conduit cables, structures, or similar items within limits of project; to locate and mark location of such items.

In accordance to Wisconsin Statute 182.0175, "Damage to Transmission Facilities," Excavator shall be solely responsible to provide advance notice to Statewide "One-Call System" known as "Digger's Hotline" at (800) 242-8511, not less than three working days prior to commencement of any excavation required to perform work contained in this Project, and further, Excavator shall comply with all other requirements of this Statute relative to Excavator's Work.

Trench Excavation Requirements:

Excavate subsoil required for installation of storm sewer piping.

Excavate trenches at top of pipe to a maximum width based on dimension of outside diameter of pipe plus 24 inches to enable installation of pipe and to allow inspection.

Width at top of pipe may be increased with prior approval of engineer to allow for stringers and sheathing when required.

Provide pipe laid in open-cut trench with 6-inch minimum clearance between outside face of pipe barrel and face of safety sheathing or sidewall of trench.

Maximum width of trench at ground surface shall not exceed width of trench at top of pipe by more than 2 feet without prior request to engineer, unless it is specifically allowed on Drawings.

Place excavated material stored along trench excavation a minimum distance back from edge of trench. Determine distance by angle of repose of trench material to prevent surcharging of trench wall material leading to potential shearing of trench wall and collapse of trench.

Store excavated material to be used for trench backfilling so that it will not interfere with:

- Public travel
- Adjacent property owners or tenants
- Other Contractors

Contractor shall immediately remove and dispose of excavated material which is not to be used as trench backfill unless directed otherwise by the Special Provisions.

Contractor shall maintain all finished excavations free of water during Work.

Hand trim trench excavation to accommodate pipe installation when necessary. Remove loose matter.

Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard, measured by volume.

Correct unauthorized excavation and over-excavated areas at no cost to Owner. Use WisDOT Dense-Graded 1-1/4-inch Aggregate to fill over-excavated areas and compact to 95 percent modified proctor.

Excavate no more trench in advance of completed pipe laying operations than can be completed and backfilled by end of workday.

Stone Bedding and Pipe Cover Material Installation:

Place and shape bedding material to pipe, to a minimum depth of three inches under bell and four inches under spigot and compact to 95 percent modified Proctor density.

Backfill around sides and top of pipe with bedding material to a loose lift depth of 24 inches above pipe and compact to 95 percent modified Proctor density.

Storm Sewer Pipe Installation:

Install pipe, fittings, and accessories in accordance to ASTM C1479. Seal joints watertight.

Pipe Identification Marking:

Place pipe identification marking tape in center of trench excavation buried 36 inches below finished grade.

Trench Backfill Requirements:

Backfill trenches with materials and to contours and elevations shown on Drawings.

Place spoil backfill in loose 12-inch lift layers. Use compaction equipment that will achieve desired compaction requirements.

Systematically backfill to allow for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

Employ a placement method that does not disturb or damage pipe in trench.

Maintain optimum moisture content of backfill materials to attain required compaction density.

Remove surplus backfill materials from site.

Leave fill material stockpile areas completely free of excess fill materials.

Trench Backfill Compaction:

Mechanically compact backfill by means of a tamping roller, sheepsfoot roller, pneumatic tire roller, vibrating roller, or other mechanical tampers. Impact, free-fall, or "stomping" type compaction equipment shall not be allowed.

Flooding or jetting of backfill for compaction purposes shall not be allowed.

Place material for mechanically compacted backfill in lifts, which, prior to compaction, shall not exceed thickness specified below for type of compaction equipment used:

- Vibratory equipment including vibratory plate, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers: maximum lift thickness 2 feet.
- Rolling equipment, including sheepsfoot (both vibratory and non-vibratory), grid, smooth-wheel (non-vibratory), pneumatic-tired (non-vibratory), and segmented wheels: maximum lift thickness 1 foot.
- Hand-directed mechanical tampers: maximum lift thickness of 6 inches.

D Measurement

The department will measure Storm Sewer Pipe Reinforced Concrete Class III 24-Inch by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.8500	Storm Sewer Pipe Reinforced Concrete Class III 24-Inch	LF

Payment is full compensation for furnishing and installing all materials; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance to the requirements of the Drawings and these Special Provisions.

200. Survey Project 1060-33-78, Item SPV.0105.0001.

A Description

This special provision describes modifying standard spec 105.6 and 650 to define the requirements for construction staking for this contract.

Replace standard spec 105.6.2 with the following:

The department will not perform any construction staking for this contract. Perform all survey required to lay out and construct the work under this contract, subject to engineer's approval.

The survey includes establishing horizontal and vertical position for all aspects of construction including but not limited to storm sewer, subgrade, base, curb, gutter, curb and gutter, pipe culverts, structure layout, pavement, barriers (temporary and permanent), electrical installations, supplemental control, slope stakes, ITS, FTMS, parking lots, utilities, landscaping elements, traffic control items, fencing, etc.

The department may choose to perform quality assurance surveys during the project. These quality assurance surveys do not relieve the responsibility for performing all survey work required to lay out and construct the work under this contract.

Delete standard spec 650.1.

B (Vacant)

C Construction

Conform to standard spec 650.3 and as modified in this special provision.

Replace standard spec 650.3.3.1 with the following:

Under the Survey Project bid item, global positioning system (GPS) machine guidance for conventional subgrade staking on all or part of the work may be substituted. The engineer may require reverting to conventional subgrade staking methods for all or part of the work at any point during construction if, in the engineer's opinion, the GPS machine guidance is producing unacceptable results.

Replace standard spec 650.3.3.3.4.1 with the following:

The department will provide the contractor staking packet as described in the Construction and Materials Manual (CMM) 7.10. At any time after the contract is awarded, the available survey and design information may be requested. The department will provide that information within 5 business days of receiving the contractor's request. The department incurs no additional liability beyond that specified in standard spec 105.6 or standard spec 650 by having provided this additional information.

Add the following to standard spec 650.3.3.3.6.2:

Record all subgrade elevation checks and submit a hard copy to the engineer at the completion of the project.

D Measurement

Replace standard spec 650.4 with the following:

The department will measure Survey Project 1060-33-70 as a separate single lump sum unit of work, acceptably completed.

E Payment

Replace standard spec 650.5 with the following:

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.0001	Survey Project 1060-33-78	LS

Payment is full compensation for performing all survey work required to lay out and construct all work under this contract; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work. No additional payments will be made for restaking due to construction disturbance and knock-outs.

201. Pavement Cleanup Project 1060-33-78, Item SPV.0105.0002.

A Description

This special provision describes cleanup of dust and debris from pavements within and adjacent to the job site.

B Materials

B.1 Pavement Cleanup

Furnish a vacuum-type street sweeper equipped with a power broom, water spray system, and a vacuum collection system.

Vacuum equipment shall have a self-contained particulate collector capable of preventing discharge from the collection bin into the atmosphere.

Use a vacuum-type sweeper as the primary sweeper, except as specified herein or approved by the engineer.

C Construction

C.1 Pavement Cleanup

Keep all pavements, curb lanes and gutters both closed and open to public traffic within the job-site boundaries free of dust and debris generated from any activity under the contract. Keep all pavements, curb lanes and gutters adjacent to the project free of dust and debris that are affected by land disturbing, dust generating activities, as defined in the contractor's dust control implementation plan.

Provide surveillance to identify if material is being tracked from the jobsite. Clean up spillage and material tracked from the project within an hour of occurrence or as directed by the engineer. Perform cleanup operations in a safe manner.

Provide routine sweeping of all pavements, curb lanes and gutters on local street active haul routes a minimum of once a day as defined in the Dust Control Implementation Plan (DCIP) or as directed by the engineer. This includes S. 84th Street, S. 76th Street, W. Kearney Street, W. O'Connor Street, and Schlinger Avenue.

In addition to routine sweeping, conduct sweepings as the engineer directs or approves, to deal with dust problems that might arise during off-work hours or emergencies. Provide the engineer with a contact person available at all times to respond to requests for emergency sweeping. Respond to emergency sweeping requests within four hours.

If the vacuum-type sweeper breaks down, a mechanical broom sweeper may be substituted for no more than 24 hours total elapsed time. Repair the vacuum-type sweeper within that 24 hours or substitute a vacuum-type sweeper.

Skid steers with mechanical power brooms may only be utilized on sidewalks and driveways whose pavements will not support the weight of a street sweeper, unless otherwise approved by the engineer.

D Measurement

The department will measure Pavement Cleanup Project 1060-33-78 as a single lump sum unit of work, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.0002	Pavement Cleanup Project 1060-33-78	LS

Payment schedule for this item will be in accordance to the percentage of contract value earned.

Payment is full compensation for surveillance, mobilization, sweeping, disposing of materials and any other labor, tools or equipment necessary to complete the work.

202. Moving Sign Bridge Cantilevered S-40-133, Item SPV.0105.0003.

A Description

This special provision describes removing and relocating existing sign bridge cantilevered S-40-133, as shown on the plans.

B (Vacant)

C Construction

Perform work in accordance to standard spec 641.3. Existing concrete bases, including anchor bolts, reinforcing steel, and conduit shall be removed to a minimum depth of 4 feet below the adjacent finished grade. Removed portions of the concrete foundations shall be disposed of outside the highway right-of-way in accordance to standard spec 204.

D Measurement

The department will measure Moving Sign Bridge Cantilevered S-40-133 as a lump sum unit of work, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.0003	Moving Sign Bridge Cantilevered S-40-133	LS

Payment is full compensation for removing, transporting and erecting the sign bridge, including signs, lighting and catwalk; removing existing concrete bases; for providing anchor bolts, but not including concrete supports paid for separately; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the work

203. Temporary Underpass Left in Place, Item SPV.0105.0010.

A Description

This special provision describes the design, construction and maintenance of a temporary underpass structure along the Hank Aaron State Trail and beneath the temporary US 45 northbound roadway NSA. Existing Structure B-40-99 is immediately west of temporary roadway NSA. A portion of the temporary underpass and associated backfill must be placed under this existing bridge. Low overheard erection and compaction equipment and techniques may be required to complete the installation. The temporary underpass must be left in place upon completion of the Contract.

Conform to standard spec 526, as modified in this special provision and shown in the plans. If the temporary underpass structure type is a structural plate pipe or structural steel plate pipe arch, also conform to standard spec 527, as modified in this special

provision. A geotechnical data report entitled “Temporary Underpass Left in Place Soil Borings and Data Report”, including soil boring logs, dated February 1, 2013, is available upon request.

B Materials

Furnish materials conforming to part 5. The contractor may incorporate used materials in the structure if they are sound and suitable for the purpose intended. If the temporary underpass structure type is a structural plate pipe or structural steel plate pipe arch, conform to standard spec 527.2

C Construction

C.1 General

Conform to standard spec 527.3 as applicable and as modified in this special provision. If the temporary underpass structure type is a structural plate pipe or structural steel plate pipe arch, conform to standard spec 527.3 and as modified in this special provision.

C.2 Design Requirements

It is the responsibility of the contractor to supply a design and supporting documentation as required by this special provision, for review by the department, to show the proposed underpass structure design is in compliance with the design specifications.

The plans and shop drawings shall be prepared on reproducible sheets 11 inch x 17 inch, including borders. Each sheet shall have a title block in the lower right corner. The title block shall include the project identification number. Design calculations and notes shall be on 8 ½ inch x 11 inch sheets, and shall contain the project identification number, name or designation of the underpass structure, date of preparation, initials of designer and checker, and page number at the top of the page. All plans, shop drawings, and calculations shall be signed, sealed and dated by a professional engineer licensed in the State of Wisconsin.

The design of the temporary underpass shall be in compliance with the *AASHTO LRFD Bridge Design Specifications 5th Edition 2010*, (AASHTO LRFD), WisDOT’s current *Standard Specifications for Highway and Structure Construction* (Standard Specifications), and standard engineering design procedures as determined by the department. The temporary underpass structure design must accommodate the AASHTO HL-93 design vehicle combined with the controlling fill height at this crossing. Design and plans must conform to the lines, grades, heights and minimum clearance dimensions shown on the plans, as herein specified, and as directed by the engineer. The design load and resistance factors shall conform to those for permanent structures.

The temporary underpass submittal package shall be submitted electronically to the engineer. Submit all required information no later than 30 days prior to beginning construction of the underpass. The detailed plans and shop drawings shall include all details, dimensions, quantities and cross-sections necessary to construct the underpass.

C.3 Backfill

The backfill material and placement shall conform to standard spec 210 and as shown on the plans. Compaction of backfill shall conform to standard spec 207.3.6.3. Use small compaction equipment in the vicinity of existing Structure B-40-99 pier columns where the side slope of the embankment fill must be placed around the columns.

D Measurement

The department will measure Temporary Underpass Left in Place as a single lump sum unit of work, acceptably designed and completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.0010	Temporary Underpass Left in Place	LS

Payment is full compensation for designing, excavating, constructing, backfilling, compacting, and maintaining the temporary underpass; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work and maintain the temporary underpass throughout the contract duration.

204. Concrete Pavement Joint Layout, Item SPV.0105.0015.

A Description

- (1) This special provision describes providing a concrete pavement or concrete base joint layout design for intersections and marking the location of all joints in the field.

B (Vacant)

C Construction

- (1) Plan and locate all points necessary to establish the horizontal position of the transverse and longitudinal joints in the concrete to prevent uncontrolled cracking. Submit a joint layout design to the engineer before paving each intersection. Mark the location of all concrete joints in the field. Follow the plan details for joints in concrete making adjustments as required to fit field conditions.

D Measurement

- (1) The department will measure Concrete Pavement Joint Layout as a single lump sum unit of work for all joint layout designs and marking, acceptably completed under the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.0015	Concrete Pavement Joint Layout	LS

- (2) Payment is full compensation for providing the intersection joint layout designs and marking all joints in the field.
- (3) The department will adjust pay for crack repairs as specified in standard spec 415.5.3.

205. Maintenance of Lighting Systems, Item SPV.0105.1005.

A Description

Maintain existing and proposed lighting system beginning on the date that the contractor's activities (electrical or otherwise) at the job site begin. Be responsible for the proper operation and maintenance of all existing and proposed lighting systems which are part of, or which may be affected by, the work until final acceptance or as otherwise determined by the engineer.

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the engineer and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. Make the request for the maintenance preconstruction inspection no less than seven calendar days prior to the desired inspection date.

Existing lighting systems, when depicted on the plans, are intended only to indicate the general equipment installation of the systems involved and shall not be construed as an exact representation of the field conditions. Visit the site to confirm and ascertain the exact condition of the electrical equipment and systems to be maintained.

B (Vacant)

C Construction

C.1 Existing Lighting Systems

Existing lighting systems are defined as any lighting system or part of a lighting system in service prior to this contract. The contract drawings indicate the general extent of any existing lighting. Ascertain the extent of effort required for compliance with these specifications; failure to do so will not be justification for extra payment or reduced responsibilities. The contractor is also expected to clear and replace any knockdowns or damage caused to the existing lighting system, regardless of who causes the damage. Maintain existing lighting system as follows:

Partial Maintenance: Only maintain the affected circuits if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work unless otherwise indicated. Isolate the affected circuits by means of in-line waterproof fuse holders as specified elsewhere and as approved by the engineer.

Full Maintenance: Maintain the entire controller and all associated circuits if the number of circuits affected by the contract is greater than 40% of the total number of circuits in a given controller, or if the controller is modified in any way under the contract work.

C.2 Proposed Lighting Systems

Proposed lighting systems shall be defined as any temporary or final lighting systems or part of a lighting system which is to be constructed under this contract.

Maintain all items installed under this contract. Maintenance shall include, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, contractor operations, or other means.

The contractor will be reimbursed for replaced equipment if the invoice paid for the individual piece of equipment is greater than \$500. The cost of maintaining equipment installed under this contract, labor, mobilization, tools and incidentals along with repairs due to contractor operations are incidental to this bid item.

C.3 Maintenance Operations

Maintain lighting units (including sign lighting), cable runs, and lighting controls. In the case of a pole knockdown or sign light damage caused by normal vehicular traffic, promptly clear the lighting unit and circuit discontinuity and restore the system to service. Reinstall the lighting unit (if salvageable), or install a new one.

Provide weekly night-time patrol of the lighting system, with patrol reports filed immediately with the engineer and copied to the region lighting coordinator with deficiencies corrected within 24 hours of the patrol. Present patrol reports on standard forms as designated by the engineer. Uncorrected deficiencies may be designated by the engineer as necessitating emergency repairs as described elsewhere herein.

Perform corrective action on specific lighting system equipment according to the following chart. The chart lists the maximum response, service restoration, and permanent repair time.

Incident or Problem	Service Response Time	Service Restoration Time	Permanent Repair Time
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm	1 hour to clear	na	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – Needs to reset breaker	1 hour	4 hours	na
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	na
Outage of 75% of lights on one tower	1 hour	4 hours	na
Outage of light nearest RR crossing approach, Islands and gores	1 hour	4 hours	na
Outage (single or multiple) found on night outage survey	na	na	7 Calendar days

C.4 Lighting

1. **Serve Response Time:** The amount of time from the initial notification to the contractor until a patrolman physically arrives at the location.
2. **Service Restoration Time:** The amount of time from the initial notification to the contractor until the time the system is fully operational again. (In cases of motorist-caused damage, the undamaged portions of the system are operational.)
3. **Permanent Repair Time:** The amount of time from initial notification to the contractor until the time permanent repairs are made if the contractor was required to make temporary repairs to meet the service restoration requirement.

Failure to provide this service will result in liquidated damages of \$500 per day per occurrence. In addition, the department reserves the right to assign any work not completed within this timeframe to the State Electrical Engineering and Electronics Unit. Reimburse all costs associated to repair this uncompleted work. Failure to pay these costs to the State Electrical Engineering and Electronics Unit within one month after the incident will result in additional liquidated damages of \$500 per month per occurrence. Unpaid bills will be deducted from the cost of the contract. Repeated failures and/or a gross failure of maintenance shall result in the State's Electrical Engineering and Electronics Unit being directed to correct all deficiencies and the resulting costs deducted from any monies owed the contractor.

Repair damage caused by the contractor's operations at no additional cost to the contract.

C.5 Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Do not keep lighting systems in operation during long daytime periods. Demonstrate to the satisfaction of the engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request.

D Measurement

The department will measure Maintenance of Lighting Systems as a single lump sum unit of work, per contract, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.1005	Maintenance of Lighting Systems	LS

Payment is full compensation for Maintenance of Lighting Systems; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

206. Sawing Concrete-Encased Duct Package, Item SPV.0105.2001.

A Description

The work under this provision consists of full depth sawing of cement encased multiple duct conduit below grade; preparing sawed conduit ends to accept adaptor couplings needed to allow transition of new PVC conduit from existing clay, fiber or PVC conduit (See Item SPV.0090.2001).

B (Vacant)

C Construction

Equipment

Use ring saw or concrete cutting chainsaw for all full-depth cuts. Use diamond blades. The contractor may use a high speed 16" construction saw on duct systems with less than 4-ducts when approved by the engineer.

Sawing Encasement

Carefully expose the outside of the existing cement encasement. The contractor is to verify that the conduit lines are free of all cabling. Saw a full depth transverse cut through the encasement. Saw straight cuts with the surface remaining vertical over its full depth. Hand chip concrete away from sawed conduit duct ends to allow transition fittings to be placed over the ends. The exposed conduit will be protected from damage. Any damaged conduit ends will be the responsibility of the contractor and will require a resaw at the contractor's expense.

D Measurement

The department will measure Sawing Concrete-Encased Duct Package as a single lump sum unit of work, acceptably completed. Up to 6 conduits per cement encasement will be considered a single unit.

Encasements in excess of 6 conduits will constitute multiple units.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.2001	Sawing Concrete-Encased Duct Package	LS

Payment is full compensation for sawing concrete encased duct packages full depth and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work in accordance to the requirements of the plans and contract.

207. Install State Furnished Traffic Signal Cabinet IH 94 Eastbound Ramps and STH 181, Item SPV.0105.3001; IH 94 Westbound Ramps and STH 181, Item SPV.0105.3002.

A Description

This special provision describes the installing of the state furnished Traffic Signal Cabinet for traffic signals.

B Materials

Use materials furnished by the department including: the traffic signal controller and the traffic signal cabinet. The department will provide notification at the preconstruction meeting of the Traffic Signal Cabinet vendor and provide the vendor's contact information.

Pick up the department furnished materials at the department's Electrical Shop located at 935 South 60th Street, West Allis. Notify the department's Electrical Field Unit at (414) 266-1170 and make arrangements for picking up the department furnished materials five (5) working days prior to picking up the materials.

Provide all other needed materials in conformance with standard spec 651.2, 652.2, 653.2, 654.2, 655.2, 656.2, 657.2, 658.2 and 659.2.

Append standard spec 651.3.3 (6) with the following:

Operate the completed traffic signal installation for 30 days consecutively, using the specified signal sequence(s) and all special functions, such as preemption as the plans show or as specified by the engineer.

C Construction

Perform work in accordance to standard spec 651.3, 652.3, 653.3, 654.3, 655.3, 656.3, 657.3, 658.3 and 659.3 except as specified below.

Request a signal inspection of the completed signal installation to the engineer at least five working days prior to the time of the requested inspection. The departments' Region Electrical personnel will perform the inspection.

Coordinate directly with the department's Traffic Signal Cabinet vendor to schedule the cabinet acceptance testing. Notify the department's Electrical Field Unit at (414) 266-1170 and participate in the acceptance testing. The department has the final determination of the cabinet acceptance testing date and time. The acceptance testing procedures will be provided by the department. The department shall not be responsible for project delays and costs due to the delays of delivery by the vendor or by the failure of the Traffic Signal Cabinet to pass acceptance testing.

D Measurement

The department will measure Install State Furnished Traffic Signal Cabinet [Location] as a single lump sum unit of work in place and acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.3001	Install State Furnished Traffic Signal Cabinet IH 94 Eastbound Ramps and STH 181	LS
SPV.0105.3002	Install State Furnished Traffic Signal Cabinet IH 94 Westbound Ramps and STH 181	LS

Payment is full compensation for installing and testing the Traffic Signal Cabinet; for furnishing and installing all other items necessary (such as, wire nuts, splice kits and/or connectors, tape, insulating varnish, ground lug fasteners, etc.) to make the proposed system complete from the source of supply to the most remote unit; for clean-up and waste disposal; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

208. Transporting and Installing State Furnished Autoscope Video Detection System IH 94 eastbound Ramps and STH 181, Item SPV.0105.3003; IH 94 westbound Ramps and STH 181, Item SPV.0105.3004.

A Description

This special provision describes the transporting and installing of department furnished Traffic Signal Autoscope Video Detection System on Trombone and Luminaire arms.

B Materials

Pick up all the department furnished Autoscope Video Detection System for all state maintained traffic signals for the project at the department's Electrical Shop located at 935 South 60th Street, West Allis. Notify the department's Electrical field unit at (414) 266-1170 to make arrangements for picking up the department furnished materials at least five working days prior to material pick-up.

C Construction

Install the Traffic Signal Terra Power Cable 18/3, the camera manufacturer's connector cable whip, pole/arm mounting bracket, extension arm (if required) and camera as shown on the plans (the final determination of location will be made by the department's electrical personnel to ensure best line of sight). The department Electrical Field Unit (EFU) shall install State-furnished Autoscope video detection equipment in the traffic signal control cabinet.

Install the Traffic Signal Terra Power Cable 18/3 to run continuously (without splices) from the traffic signal cabinet plus an additional 10 feet to the handhole or base. Leave 10 feet of cable in each pull box. Install the camera manufacturer's connector cable whip from the camera to the handhole or base.

Mark each end of the lead appropriately to indicate the equipment label (i.e. VID1, VID2, etc.). Splice, solder and shrink wrap the Terra power cable to the camera manufacturer's cable whip. Allow 3 feet of slack on each cable.

Notify department's Electrical Shop at (414) 266-1170 upon completion of the Trombone and Luminaire arm installation of the Traffic Signal Terra Power Cable 18/3, cable whip and camera at each intersection.

The department will provide notification of the video detection system vendor and provide the vendor's contact information. Coordinate directly with the department's video detection system vendor to arrange for the vendor to program the video detection. Notify the department and vendor at least five working days prior to the date of programming.

D Measurement

The department will measure Transporting and Installing State Furnished Autoscope Video Detection System (Location) as a single lump sum unit of work for each intersection acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.3003	Transporting and Installing State Furnished Autoscope Video Detection System IH 94 eastbound Ramps and STH 181	LS
SPV.0105.3004	Transporting and Installing State Furnished Autoscope Video Detection System IH 94 westbound Ramps and STH 181	LS

Payment is full compensation for transporting and installing the Intersection Autoscope Video Detection System, Traffic Signal Terra Power Cable 18/3, cable whips, mounting hardware, and cameras; arranging for and providing programming by the vendor; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

209. Install State Furnished EVP Detector Heads IH 94 EB Ramps and STH 181, Item SPV.0105.3005; IH 94 WB Ramps and STH 181, Item SPV.0105.3006.

A Description

This special provision describes the transporting and installing of state furnished Emergency Vehicle Preemption (EVP) Detector Heads, EVP Detector Head Mounting Brackets, and Confirmation Light Assemblies at the intersections of IH 94 EB Ramps and STH 181 (S. 84th Street) and IH 94 WB Ramps and STH 181 (S. 84th Street).

B Materials

Use materials furnished by the department including: Emergency Vehicle Preemption (EVP) Detector Heads, EVP Detector Head Mounting Brackets, and Confirmation Light Assemblies.

Pick up the state furnished materials at the department's Electrical Shop located at 935 South 60th Street, West Allis. Notify the department's Electrical Field Unit at (414) 266-1170 and make arrangements for picking up the state furnished materials at least five working days prior to picking the materials up.

C Construction

Install the EVP detector heads, EVP detector head mounting brackets, and confirmation light assemblies as shown on the plans. The department will determine the exact location to ensure that the installation does not create a sight obstruction. The department will terminate the EVP cable ends and install the discriminators and card rack in the cabinet.

Notify the department's Electrical shop at (414) 266-1170 upon completion of the installation of the Emergency Vehicle Preemption (EVP) Detector Heads and EVP Detector Head Mounting Brackets.

D Measurement

The department will measure Install State Furnished EVP Detector Heads (Location) as a single lump sum unit of work in place and acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.3005	Install State Furnished EVP Detector Heads IH 94 EB Ramps and STH 181	LS
SPV.0105.3006	Install State Furnished EVP Detector Heads IH 94 WB Ramps and STH 181	LS

Payment is full compensation for transporting and installing of department furnished Emergency Vehicle Preemption (EVP) Detector Heads, EVP Detector Head Mounting Brackets, and Confirmation Light Assemblies; and for all labor, tools, equipment, and incidentals necessary to complete this item of work.

210. Temporary EVP System IH 94 Eastbound Ramps and STH 181, Item SPV.0105.3007; IH 94 Westbound Ramps and STH 181, Item SPV.0105.3008.

A Description

This special provision describes furnishing, installing, and maintaining temporary EVP systems at the temporary signalized intersection as shown in the plans.

B Materials

Furnish an emergency vehicle preemption system compatible with the City of Milwaukee's system and users. Contact the City of Milwaukee Signals Shop [Al Nichols, Interim Manager/Dispatch; (414) 286-3687; 1540 W. Canal Street, Milwaukee, WI 53233] and City of Milwaukee Signals Engineering [Joseph Bondowski, Engineering Technician; (414) 286-5162; 841 N. Broadway, Milwaukee, WI 53202] for information regarding the equipment needs and operational requirements of the emergency vehicle preemption system.

C Construction

The Temporary EVP System, as shown in the temporary traffic signal plans or as directed by the engineer, shall be complete in place, tested, and in full operation during each stage and sub-stage of construction.

Install the temporary vehicle detection system as shown in the plans and according to the manufacturer's recommendations. Determine a suitable location for the temporary EVP detectors for each stage and sub-stage of construction. Detectors may be mounted on the temporary traffic signal span wire or wood poles. Relocate the temporary EVP detectors to a suitable location if construction activities and/or construction staging changes impede the detector operation. Arrange for testing of equipment prior to acceptance of the installation for each construction stage.

All cables associated with the temporary vehicle detection system shall be routed to the cabinet. Each lead shall be appropriately marked as to which EVP channel it is associated.

Periodic adjustment and/or moving of the temporary EVP detectors may be required due to changes in traffic control, staging, or other construction operations.

Ensure that the temporary EVP system stays in clean working order. Periodic cleaning of the equipment may be required due to dirt and dust build-up.

Remove the temporary EVP system upon project completion.

Provide WisDOT records of all EVP settings used during construction.

D Measurement

The department will measure Temporary EVP System (Location), furnished, installed, and completely operational, as a single complete lump sum unit of work per intersection, complete in place and accepted.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.3007	Temporary EVP System IH 94 eastbound Ramps and STH 181	LS
SPV.0105.3008	Temporary EVP System IH 94 westbound Ramps and STH 181	LS

Payment is full compensation for furnishing and installing all required equipment, materials, and supplies; for maintaining and changing the EVP detectors to match the plans, traffic control, and construction staging; for relocating the temporary EVP detectors due to construction activities, if required; for testing the EVP system for each stage and sub-stage of construction; for periodically cleaning all temporary EVP detectors; for removing the temporary EVP system; for cleaning up and properly disposing of waste; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

211. Install Fiber Optic Communications in Cabinet IH 94 Eastbound Ramps and STH 181, Item SPV.0105.3009; IH 94 Westbound Ramps and STH 181, Item SPV.0105.3010.

A Description

This special provision describes installing fiber optic communications equipment in traffic signal cabinets.

B Materials

The department will furnish pre-terminated fiber optic patch panels and managed Ethernet switches. The materials will be provided with the traffic signal cabinet. The patch panels will have pre-terminated fiber optic cable pigtails. Provide two each 1-meter lengths of ST-ST single mode fiber jumper (2 fibers per jumper) from the patch panel to the Ethernet switch. Provide a 1-meter length of CAT-5e cable from the Ethernet switch to the controller. Provide a 1-meter length of CAT-5e cable from the Ethernet switch to the Interface Panel. CAT-5e patch cords shall have factory pre-terminated RJ45 / 8P8C connectors on both ends per TIA/EIA T568B. Provide all patch panel, Ethernet switch, and Interface Panel attachment hardware.

Provide a 14 AWG XLP insulated, stranded, copper, 600 volt AC locate wire through the conduit run from the communication vault to the traffic signal cabinet. Connect the locate wire by using a silicone filled wire nut at each pull box, vault or other access point. Alternatively, use a single wire through the access points, leaving a 6 foot coil in each pull box, vault or other access point for splicing. All material under this item shall meet the requirements of standard spec 655.

C Construction

Install the patch panel and Ethernet switch on the side of the traffic signal cabinet opposite the electrical service at a location as approved by the engineer. With approval by the engineer, the Ethernet switch may be placed on a shelf near the patch panel. Install the pre-terminated fiber optic cable in conduit from the patch panel to the communication vault as specified in standard spec 678.3.1. Fiber optic cable ends shall be covered securely to protect open ends during installation in raceways. Leave the remainder of the fiber optic cable coiled in the communication vault.

Install the fiber jumpers and CAT-5e cable and provide a communications link from the communication vault to the controller. Install the CAT5-e cable from the Interface Panel to the Ethernet switch.

Connect the locate wire by using a wire nut at each access point. Alternatively, use a single wire through the access points.

D Measurement

The department will measure Install Fiber Optic Communications in Cabinet (Location) as a single lump sum unit of work in place and acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.3009	Install Fiber Optic Communications in Cabinet IH 94 Eastbound Ramps and STH 181	LS
SPV.0105.3010	Install Fiber Optic Communications in Cabinet IH 94 Westbound Ramps and STH 181	LS

Payment is full compensation for installing pre-terminated patch panels, Ethernet switches, and fiber optic cable in conduit; furnishing and installing attachment hardware, fiber jumpers, CAT-5e cable, and locate wire; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

212. Tunnel Instrumentation, Item SPV.0105.4500.

A Description

This Special Provision includes requirements to develop the geotechnical instrumentation plan, furnish, install, maintain and remove when applicable, the geotechnical instrumentation for the tunnel excavation. The purpose of the instrumentation program is to monitor ground movements within and around the tunnel. The instrumentation program specified herein is not intended to be used to ensure the safety of the work.

A.1 Personnel Qualifications

Technicians: A qualified technician shall be licensed surveyor registered in the State of Wisconsin and have a minimum of 2 years experience in the installation of geotechnical instrumentation similar to those specified herein.

Instrumentation Engineer: The contractor shall hire a professional civil or geotechnical engineer or engineering geologist, with a minimum of 5 years experience in the installation of instrumentation specified herein.

B Materials

Protective Cover: Each protective cover shall be 2 inches larger in inside diameter than the instrument within, or a minimum of 4 inches in inside diameter. Protective covers shall be guard casings or valve boxes depending upon installation location, as specified in this Special Provision. Guard casing shall consist of Schedule 40 steel pipe, or equal. Guard casing shall be of such length that it will have a minimum depth below ground surface of 2 feet, and a height above ground surface of 2 feet to 4 feet, or as instructed by the engineer. Guard casing shall have a bolting or screw-type cover that is free of sharp edges and burrs, and is easy to remove for monitoring. Valve boxes shall be cast iron or steel designed to resist traffic loading typical for roadway installation. Valve box shall be of such length that it will have a minimum depth below ground surface of 1.5 feet when installed flush with the ground surface. The valve box shall have a bolting cover.

Inclinometers (INC): Inclinometer casing shall be grooved plastic 2.75-inch OD casing that is compatible with the inclinometer being provided. The casing shall be complete with necessary rigid self-aligning couplings and end plugs. The inclinometer monitoring system shall include probe, 100 feet of cable, cable relief, pulley assembly, cable hold, and readout. The inclinometer readout shall measure inclinations at any depth selected by the operator and shall digitally store, process and report the data (by display and downloadable digital files) as lateral movements from a stored baseline reading. The cable connecting the sensor and indicator shall have a stranded steel core to take the stress of pulling so as not to break any connectors or wires. The cable shall be jacketed with a waterproof material and marked externally at 1-foot intervals for accurate depth determination. The cable guide pulley shall mount to the top of the inclinometer casing.

Utility Settlement Markers (UM): Subsurface settlement markers for monitoring utility movement shall consist of a 0.75-inch solid rod or No. 6 steel reinforcing rod set within a 2-inch Schedule 80 PVC pipe casing as depicted on a detail in the plans. The upper end of the rod shall have a rounded head or cap set perpendicular to the rod axis. Equivalent types of subsurface settlement markers may be used subject to the acceptance of the engineer.

Ground Settlement Markers (GM): Surface settlement markers in paved areas shall be hardened steel markers treated or coated to resist corrosion, with an exposed convex head having a minimum diameter of 1/2 inch and similar to surveyor's PK nails. Surface settlement markers in unpaved areas shall be a 2-inch by 2-inch by 18-inch long hardwood hub driven to grade.

Seismograph: The seismograph shall be battery operated. The battery must be capable of supplying power to monitor vibrations continuously for up to 24 hours. The seismograph shall have the capability to display readings in the field, to transfer data from memory to permanent storage medium, to record events up to 10-seconds long, to record events continuously. Seismographs shall be calibrated prior to be used for the project. The seismograph shall have seismic range of 0.01- to 10-inches per second with an accuracy of plus or minus 5-percent of the measured peak particle velocity or better at frequencies between 10- and 100-Hertz, and with a resolution of 0.01-inch per second or less.

C Construction

C.1 Submittals

C.1.1 General

Prepare and submit the Qualifications, Instrumentation Plan and Shop Drawings, and at least 21 calendar days prior to start of instrumentation installation. The engineer will accept the submittal as submitted or return the submittal with requested revisions. Do not start any work until the engineer provides acceptance of the submitted Qualifications and Instrumentation Plan and Shop Drawings. Acceptance of the submittals does not relieve the contractor of responsibility for successful completion of the tunnels.

C.1.3 Submittals for Approval

Qualifications: Submit qualifications of the technicians and the instrumentation engineer.

Instrumentation Plan and Shop Drawings: The Instrumentation Plan and Shop Drawings shall be prepared by the instrumentation engineer and shall bear the seal, signature and date of the instrumentation engineer. As a minimum, include the following:

- Shop Drawings detailing locations (coordinates), depths, types, details, and other pertinent information showing the installation details for each type of instrumentation required.
- Shop Drawing that indicates the locations of control points and benchmarks associated with surveys for monitoring geotechnical instrumentation.
- Description of methods for installing and protecting all instruments.
- Materials and mix portions for cement-bentonite or cement-lime grout for installing subsurface settlement markers and inclinometers.
- Schedule of instrument installation and baseline related to significant activities or milestones in the overall project.
- Manufacturer's literature describing installation, operation, and maintenance procedures for all instruments, materials, readout units, and accessories.
- Submit permits and consents from authority having jurisdiction, if applicable, for drilling holes from ground surface and conducting monitoring activities.
- Plans for geotechnical instrumentation to be installed at contractor's option.
- Contingency plan when monitoring Threshold Limits are exceeded.

As-built Plans: Following installation of the instruments and prior to the start of underground construction, submit as-built drawings showing the exact installed location (coordinates and elevation), inclinometer's groove orientation relative to the shaft, the instrument identification number, the instrument type, the installation date and time, the heading station or portal or shaft excavation depth on the installation date, when applicable, and the anchor or tip elevation and instrument length, when applicable, and installed locations of control points and benchmarks associated with surveys for monitoring geotechnical instrumentation. Include details of installed instruments, accessories, and protective measures including all dimensions and materials used.

C.1.3 Information Submittals

Certificates: Submit for each instrument to be installed, as applicable, a certificate issued by the instrument's manufacturer stating that the manufacturer has inspected and tested each instrument before it leaves the factory to confirm that the instrument is working correctly and has no defects or missing parts.

Reports and Records:

- Drilling and installation logs for instrumentation installations prepared by the instrumentation engineer.
- Submit copies of completed DNR abandonment forms for subsurface settlement markers and inclinometers as soon as possible after instruments are installed or abandoned.

- Submit pre-construction assessment report prior to start of any construction or dewatering activities. The pre-construction assessment report shall document the condition of the existing roadway, utilities, and any structures within the zone of influence defined herein.
- Submit post-construction assessment report at the end of construction.
- Submit initial/baseline readings specified herein to the engineer, at least 15 days prior to the start of any construction activity within 50 of the tunnel alignment centerline or edge of the shafts or dewatering within 100 feet of the instrument.
- Weekly monitoring report by the instrumentation engineer shall be submitted on a weekly basis as specified herein. Supply copies of field notes if requested. As a minimum, construction status (dewatering activity, excavation depth, tunnel progress etc.), monitoring data (with comparison to the baseline readings), interpreted results, exceedances and comments, and impact assessment to adjacent roadway/structure based on monitored movement shall be included in the weekly monitoring report.
- The contractor shall submit monthly reports, prepared by the contractor's excavation support system design engineer, which include his/her field observation on performance of shaft excavation support systems and review of relevant instrumentation monitoring data.

C.1.4 Acceptance

The department will evaluate the Submittals for Approval with the requirements of these special provisions. Within 14 calendar days after receipt of the Submittals of Approval, the engineer will notify the contractor of the acceptance of the submittal, or if additional information and/or changes are required. Any unacceptable part of the Submittals of Approval will require resubmission. The contractor must resubmit the Submittals of Approval for evaluation and review with the necessary changes or additional information provided. The engineer will provide a written notice of acceptance or rejection of contractor's resubmitted Submittal for Approval within 14 calendar days after its receipt.

After the engineer's acceptance of Submittal of Approval, no changes to the Submittal of Approval can be made without written consent of the engineer.

All Information Submittals should be submitted to the engineer. The engineer will reject submittals which do not confirm to the requirements specified herein. The contractor shall resubmit the rejected submittals within 7 days upon the receipt of the engineer's rejection notice.

C.2 General Requirement

The contractor shall develop the instrumentation plan based on the following requirements:

- Monitoring shall be performed within tunnel and shaft zone of influence. Tunnel zone of influence shall be defined as a theoretical slope of 1.5H:1V from the spring lines of tunnel excavation. Shaft zone of influence shall be defined as a theoretical slope of 1H:1V from the bottom of shaft excavation.
- At least one INC per shaft shall be installed between the shaft wall and the existing highway.

- UMs shall be installed for all active utilities larger than 18-inch diameter and deeper than 5 feet below ground surface to the crown which are located within the defined zone of influence.
- GMs shall be installed within 5 feet from edge of the shaft on each side of the shaft at 25-foot spacing along each tunnel centerline and above the utilities which do not require UM installation. One GM shall be installed on each light pole located within tunnel or shaft zone of influence.
- The seismograph shall be used for monitoring vibration if driven steel sheetpiles are used for shaft excavation support system. Seismographs shall be installed at the locations 50 feet and 100 feet away from the sheetpile driving site.

The contractor shall install instruments as per the approved submittals. The instrumentation engineer shall supervise and direct technicians and be responsible for instrument installation required. The instrumentation engineer shall be physically present at the installation sites to supervise the installations.

The contractor shall abandon all instruments upon completion of the work.

C.3 Installation

Geotechnical instrumentation shall be installed and baseline readings shall be completed before commencing any dewatering activity within 100 feet of the instrument or excavation work for shafts and tunnels within 50 feet from the tunnel alignment centerline or edge of shaft, whichever happens earlier. Complete installation and testing of each instrument located outside of excavations a minimum of one week prior to excavation or dewatering within 100 feet of the instrument.

The contractor shall locate conduits and underground utilities in all areas where borings are to be drilled and instruments installed. Instrument locations shall be modified, as approved by the instrumentation engineer, to avoid interference with the existing conduits and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the department.

All instruments shall be clearly marked, permanently labeled, and protected to avoid being obstructed or otherwise damaged by construction operations or the general public. Protective housing and box or vault covers shall be marked.

After installation of each instrument, survey the as-built location to define the vertical and lateral positions of the exposed parts.

Provide a protective cover for all instruments installed in boreholes from the ground surface. Maintain exposed parts of installed instruments as necessary to ensure their availability for use for the duration of the work. Replace, at no cost to the department, instrumentation in place that becomes damaged, inaccessible, or unreadable as a result of the contractor's means and methods of construction or changes in the contractor's means and methods of construction that could have been anticipated by the contractor prior to

installation. The locations of replacement instruments shall be jointly determined by the engineer and the contractor. Complete the repair or replacement as soon as practical.

C.4 Tremie Grouting

Perform tremie grouting by pumping grout through a tremie pipe positioned 3 to 5 feet above the bottom of the space to be grouted. Keep the bottom end of the tremie pipe submerged in grout as the grout level is brought up to the ground surface. The density of the grout flowing from the space at the ground surface shall be the same as the density of the grout being placed. Allow the grout to set for a minimum 12-hour period before additional materials are placed on top of the grout. Top off any settling of grout.

C.5 Installing Inclinometer

Drilling method utilized for INC installation shall be hollow-stem augers per ASTM D6151. Drill borings for inclinometers using 6-inch minimum inside diameter casing and water or, where ground conditions permit, using drilling mud in a 6-inch minimum diameter borehole. During the drilling, soil sampling at intervals of 2.5 feet or less using standard penetration tests shall be formed in accordance to ASTM D1586.

Install the inclinometer casing completed with end plug as shown on the plans. Install the inclinometer casing at least 10 feet below bottom of shaft excavation. Carefully orient the casing grooves as instructed by the instrumentation engineer. Grout the inclinometer casing in place. Place grout by tremie method. If steel drill casing has been used to support the borehole, remove the drill casing in increments, and top off the grout level with each increment.

Perform tremie grouting by pumping grout through a tremie pipe positioned 3 to 5 feet above the bottom of the space to be grouted. Keep the bottom end of the tremie pipe submerged in grout as the grout level is brought up to the ground surface. The density of the grout flowing from the space at the ground surface shall be the same as the density of the grout being placed. Allow the grout to set for a minimum 12-hour period before additional materials are placed on top of the grout. Top off any settling of grout.

The grout shall consist of a cement to water ratio ranging from 2.5 to 1 for hard soil and 6.6 to 1 for soft soil by weight. The specific ratio to be used will be determined by the instrumentation engineer. The bentonite to cement ratio will be approximate 0.3 to 1, by weight, adjusted to produce grout with the consistency of heavy cream. Mix cement and water first. Add bentonite as necessary to achieve the specified consistency.

Provide the top of each inclinometer casing with a cap. The cap shall be easy to remove.

Perform a groove tracking test after the installation has been completed to ensure that the inclinometer casing has been properly installed. Lower the inclinometer sensor to the bottom of the casing in all four possible orientations, verifying that on raising to the top of the casing the inclinometer orientation is unchanged.

C.6 Utility Settlement Markers

UMs shall be installed to 3 feet above the crown of the utility. Potholing methods shall be used to carefully advance a minimum 4-inch diameter hole to the upper surface of the utility to be monitored for installation of a utility settlement marker. Temporary casing shall be set if necessary. Great care shall be taken to prevent damage to the utility.

Potholing is defined as use of vacuum excavating or low pressure water jetting and vacuum excavating to advance holes with low risk of utility damage to confirm utility locations or to advance holes for grout pipes or geotechnical instrumentation to depths below utilities of concern.

A 6-inch minimum thickness bentonite seal shall be placed at the bottom of the borehole to prevent annular backfill and surrounding soil from entering the PVC casing. The bentonite shall be hydrated with water prior to placement.

A PVC casing shall be inserted to the bottom of the borehole, and the annular space outside the PVC casing shall be backfilled with coarse sand or grout. Sand shall be placed in maximum 1-foot lifts and tamped with a rod. Grout shall be placed by tremie method. Grout for subsurface settlement markers shall consist of cement and water, with the minimum amount of water necessary to allow pumping. Any temporary casing set in conjunction with potholing shall be withdrawn in a manner to prevent collapse of the borehole. After the annular space is filled, the PVC casing shall be flushed with clean water to remove any soil and grout. A steel rod or pipe with centralizers that is cut to the required length shall be set in firm contact with the top of the utility. A protective cover shall be installed. The installation shall conform to the details shown in the plans.

C.7 Ground Settlement Markers

The method of installation shall be the contractor's option; however, the marker shall be rigidly affixed so as not to move relative to the surface to which it is attached.

C.8 Monitoring Instruments

Horizontal and vertical survey accuracy shall be 0.01 feet or less.

The contractor shall take a minimum of two sets of initial readings. After initial readings are approved by the instrumentation engineer, the average from the initial readings shall be used to establish the baseline reading.

For shafts, monitor all instruments within shaft zone of influence as follows:

- a. Monitor all instruments within 50 feet of the outer edge of shaft daily beginning when shaft construction, or dewatering activity begins, whichever comes first.
- b. Monitor daily or once per shift, whichever is more frequent during active excavation of shaft, tunnel launching, and tunnel break through.
- c. Monitor twice per week during all other construction activities until backfill and removal of shaft excavation support systems.

For tunnels, monitor all instruments within tunnel zone of influence as follows:

- a. Monitor twice daily or twice per shift, whichever is more frequent during active tunnel excavation beginning when tunnel excavation approaches within 50 feet of the station of the instrument location. Continue monitoring at the same frequency until excavation advances 100 feet beyond the station of the instrument location or the tunnel drive is completed, i.e. tunnel shield or tunnel boring machine completely enters the receiving shaft. The monitoring shall be performed at a maximum interval of 4 hours.
- b. Upon completion of the tunnel drive, monitoring daily until contact grouting to fill exterior voids is complete.
- c. Continue to monitor weekly until backfill and removal of shaft excavation support systems are completed.

The monitoring threshold limits for all instruments are established as follows:

Facilities Monitoring	Threshold Limit Level 1	Threshold Limit Level 2
Pavement Settlement	1 inch	1.5 inch
Open Area Settlement	1 inch	2 inch
Underground Utilities	0.75 inch	1 inch
Light Poles Settlement	0.25 inch	0.50 inch
Inclinometer	0.50 inch	1 inch
Excavation Support System Deflection	0.75 inch	1.5 inch
Vibration at Existing Structure Location	0.5 inch/sec	2.0 inch/sec

Use whatever means and methods are necessary to limit ground movements, settlements, and damage of utilities, structures and other facilities. These means and methods include, but are not limited to excavation support systems, tunneling methods, underpinning of vulnerable facilities, grouting and other forms of ground improvement.

C.9 Actions to Mitigate Excess Ground Movements

If movement of an instrument reaches the Threshold Limit Level 1, the contractor shall proceed with the approval contingency plan. The likely cause of the movement shall be promptly discussed with the engineer and the contractor's excavation support system design engineer when applicable. The contractor shall increase the monitoring frequency where the Threshold Limit Level 1 was exceeded, as directed by the engineer or the contractor's excavation support system design engineer.

If movement of an instrument reaches the Threshold Limit Level 2, the contractor shall immediately report to the engineer and cease excavation or other construction operations that result in further movement until additional operational changes are made to reduce ground loss around the excavation. The approved contingency plan shall be implemented immediately. The likely cause of the displacement shall be discussed with the engineer and the contractor's excavation support system design engineer when applicable. The

contractor shall increase the monitoring frequency where the Threshold Limit Level 1 was exceeded, as directed by the engineer or the contractor's excavation support system design engineer. The contractor shall not resume the construction until the ground movement is stabilized, as determined by the instrumentation engineer. If the contractor has exhausted all measures in the approved contingency plan and is not able to stabilize the ground movement, the contractor shall submit a revised contingency plan to the engineer. Upon the engineer's acceptance of the revised contingency plan, the contractor shall implement the revised contingency plan immediately.

The cost of actions required for complying with Threshold Limits and to repair any damage to adjacent facilities shall be borne by the contractor with no additional cost to the department.

D Measurement

The department will measure Tunnel Instrumentation a single lump sum unit of work, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.4500	Tunnel Instrumentation	LS

Payment for Tunnel Instrumentation shall be full compensation for furnishing and installing each instrument which includes all materials, labor, tools and equipment necessary for providing submittals, furnishing materials, installation, testing, protection, maintenance, replacement or repair of damaged instruments, initial readings, abandonment, and all other specified items of work for which no separate bid item is provided.

213. Galvanized Steel Grating, Item SPV.0105.4510.

A Description

This special provision describes providing and installing galvanized steel grating between the north abutment of bridge B-40-799 and the coping of retaining wall R-40-524 as shown on the plans and as hereinafter provided.

B Materials

B.1 Carbon Steel Grating

Bearing bars and cross bars: ASTM A1011 commercial steel Type II for hot rolled carbon steel sheet and strip or ASTM A36. Cross bars made from wire rods are not permitted.

B2. Angle and Bent Plate Grating Supports

ASTM A36

C Construction

Provide manufactured steel, press locked bar grating with minimum bearing bar size and maximum bearing and cross bar spacing called for in the plans fabricated in accordance to NAAMM MBG 531-09. (National Association of Architectural Metal Manufacturers, Metal Bar Grating Manual, 2009)

The contractor shall determine the required grating span and grating layout through field measurements. Individual grating panels shall be not less than 1.5 feet or greater than 3.0 feet in width. Grating shall be pre-cut and fabricated in the shop. Field cutting of grating panels is not permitted.

Each grating panel shall be removable and replaceable. Provide compatible grating anchor saddle clips, bolts, nuts and washers to anchor each individual grating panel section with bolt head or nut recessed below the top of the grating surface. Anchor clips shall be removable from the top of the grating surface. Provide and install a minimum of four anchor clips per grating panel section.

Provide rolled steel angle for grating support as shown on the plans. Mount grating supports using concrete adhesive anchors as shown in the plans.

Hot-dip galvanize grating panels after fabrication. Hot-dip galvanize all grating accessory components including steel angle grating supports, saddle clips and mounting bolts. Galvanize per ASTM-A153.

D Measurement

The department will measure Galvanized Steel Grating as a single lump sum unit of work for each structure, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.4510	Galvanized Steel Grating	LS

Payment is full compensation for field measurements, grating fabrication and installation, angle grating supports, saddle anchor clips, bolts, nuts and washers, miscellaneous hardware, hot-dip galvanizing, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

214. Timber Lagging, Item SPV.0110.4600.

A Description

Work under this item consists of furnishing, delivering, and installing all timber lagging for soldier pile and lagging walls. Perform work in accordance to pertinent parts of the standard specifications, the plans, and these special provisions.

B Materials

Use materials that conform to lumber as specified in standard spec 507 except that preservative treatments according to standard spec 507.2.2.6 are not required and untreated lumber may be used. Use Douglas fir or Southern pine construction grade rough-cut lumber with a minimum thickness of 3-inches. Where necessary provide certification that the timber conforms to the grade, species, and other specified requirements.

C Construction

Place timber lagging from the top-down in sufficiently small lifts immediately after excavation to prevent erosion of materials into excavation. Before placing lagging, smooth the soil face to create a contact surface for the lagging. Backfill and compact large voids behind the lagging. Maintain a minimal gap between each vertically adjacent board for drainage between adjacent lagging sections. Never place lagging in tight contact to adjacent lagging.

D Measurement

The department will not measure Timber Lagging. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Basis of Payment

The department will pay for plan quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0110.4600	Timber Lagging	MBM

Payment is full compensation for Timber Lagging; for furnishing, framing, installing, and the timber lagging; and for furnishing all labor, tools, equipment, materials and hardware required to complete the work.

215. Temporary Shoring Left In Place, Item SPV.0165.0010.**A Description**

This special provision describes furnishing and installing or constructing Temporary Shoring that will remain in place at the locations shown on the plan and in accordance to the shoring design.

B Materials**B.1 Shoring Design**

The locations of required Temporary Shoring Left In Place will be shown on the contract plans. Provide a shoring design for each required shoring location. 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 engineer for documentation one copy of each shoring design that is signed and sealed by the same professional engineer verifying the design two weeks prior to installation.

C Construction

Construct or install the Temporary Shoring Left In Place at a required location in accordance to the design developed for that location.

Upon completion of the contract, leave the shoring in place. Backfill any space that is excavated, but not occupied by the new permanent construction, in accordance to standard spec 206.3.13.

D Measurement

The department will measure Temporary Shoring Left In Place in area by the square foot, acceptably completed, and the quantity to be paid for shall be the sum of the areas of exposed faces of shoring constructed at the locations shown on the plans. Area will be determined from measurements taken in the plane of the exposed face of the shoring. Areas of sheeting extending more than 1 foot above the retained ground surface will not be measured for payment.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.0010	Temporary Shoring Left In Place	SF

Payment is full compensation for providing a verified design of the shoring; providing a copy of the design; furnishing and hauling materials to each location; installing or constructing the shoring; maintaining the shoring as needed during the contract; and for furnishing all labor, tools, equipment, and incidentals needed to complete the contract work.

Shoring not required by the plans and installed for the convenience of the contractor's operations shall be considered incidental to work under the contract and will not be measured and paid for under this item.

216. Longitudinal Grooving Bridge Deck, Item SPV.0165.4700.

A Description

Provide longitudinal deck grooves parallel to the centerline of the roadway prior to opening the bridge to traffic as directed by the engineer.

B Materials

The grooving machine to contain blades mounted on a multi-blade arbor on a self-propelled machine built for grooving hardened concrete surfaces.

The grooving machine to have a depth control device that detects variations in the deck surface and adjusts the cutting head height to maintain a specified depth of groove.

The grooving machine to have a guide device to control multi-pass alignment.

C Construction

Perform longitudinal grooving operation in a manner to preclude any damage to the concrete deck surface.

Longitudinal grooving operation to result in a uniformly grooved deck surface.

Cut grooves continuously across the deck width to within 18 inches of the barrier rail, curb line, or median divider. If metal floor drains extend more than 18 inches from the barrier rail, curb line, or median divider, all grooves on the bridge deck surface are to end within 6 inches of the floor drain perimeter.

At skewed metal edged expansion joints in the bridge deck surface, all grooves on the bridge deck surface are to end within 6 inches of the joint leaving no ungrooved surface adjacent to each side of the joint greater than 6 inches in width on the deck side of the expansion joints.

Produce grooves that are continuous across construction joints or other joints in the concrete deck surface less than ½-inch wide.

Grooves shall be 1/8-inch wide and 3/16-inch deep. The longitudinal groove shall be spaced at ¾ inches center-to-center. Tolerance for groove width shall be +1/16 inch to -0 inch. Tolerance for groove depth shall be ± 1/16 inch. Tolerance for groove spacing shall be ± 1/16 inch.

Collect, remove and dispose of solid material residue and liquid waste resulting from grooving operations by vacuuming in a manner satisfactory to the engineer.

D Measurement

The department will not measure Longitudinal Grooving Bridge Deck. The department will use pay plan quantity according to the Pay Plan Quantity article. The quantity has been determined by multiplying the grooved width by the total length grooved.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.4700	Longitudinal Grooving Bridge Deck	SF

Payment is full compensation for providing the required machinery and operators; for grooving, for collecting, removing and properly disposing of all waste materials, and for furnishing all labor, equipment, tools and incidentals necessary to complete the work

217. Wall Concrete Panel Mechanically Stabilized Earth LRFD/QMP Pilot, Item SPV.0165.4710.

A Description

This special provision describes designing, furnishing materials and erecting a permanent earth retention system in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract. The design life of the mechanically stabilized earth (MSE) wall and all wall components shall be 75 years.

This special provision describes the quality management program (QMP) for MSE walls. A quality management program is defined as all activities, including process control, inspection, sampling and testing, and necessary adjustments in the process that are related to the construction of the MSE wall, which meets all the requirements of this provision.

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

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

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

B Materials

B.1 Proprietary Mechanically Stabilized Earth Concrete Panel Wall Systems

The supplied wall system must be from the department's approved list of concrete panel mechanically stabilized earth wall systems.

Proprietary wall systems may be used for this work, but must conform to the requirements of this specification and be pre-approved for use by the department's Bureau of Structures, Structures Design Section. The department maintains a list of pre-approved systems of retaining walls. To be eligible for use on this project, a system must have been pre-approved and added to that list prior to the bid opening date. The name of the pre-approved proprietary wall system selected shall be furnished to the engineer within 25 days after the award of contract. The location of the plant manufacturing the concrete panels shall be furnished to the engineer at least 14 days prior to the start of panel production.

To receive pre-approval, the retaining wall system must comply with all pertinent requirements of this provision. Applications for pre-approval may be submitted at any time. Applications must be prepared in accordance to the requirements of Chapter 14 of the department's LRFD Bridge Manual. Information and assistance with the pre-approval process can be obtained by contacting the Structures Design Section in Room 601 of the Hill Farms State Transportation Building in Madison or by calling (608) 266-8494.

B.2 Design Requirements

It is the responsibility of the contractor to supply a design and supporting documentation as required by this special provision, for review by the department, to show the proposed wall design is in compliance with the design specifications. Four copies of the following shall be submitted to the engineer for review and acceptance no later than 60 days from the date of notification to proceed with the project.

The plans and shop drawings shall be prepared on reproducible sheets 11 inch x 17 inch, including borders. Each sheet shall have a title block in the lower right corner. The title block shall include the project identification number and structure number. Design calculations and notes shall be on 8 ½ inch x 11 inch sheets, and shall contain the project identification number, name or designation of the wall, date of preparation, initials of designer and checker, and page number at the top of the page. All plans, shop drawings, and calculations shall be signed, sealed and dated by a professional engineer licensed in the State of Wisconsin.

The design shall be in compliance with the *AASHTO LRFD Bridge Design Specifications 5th Edition 2010*, (AASHTO LRFD) with latest interim specifications for Mechanically Stabilized Earth Walls, WisDOT's current *Standard Specifications for Highway and Structure Construction* (Standard Specifications), Chapter 14 of the WisDOT LRFD Bridge Manual and standard engineering design procedures as determined by the Department. Loads, load combinations, load and resistance factors shall be as specified in AASHTO LRFD Section 11. The associated resistance factors shall be defined in accordance with Table 11.5.6-1 LRFD.

Design and construct the walls in accordance to the lines, grades, heights and dimensions shown on the plans, as herein specified, and as directed by the engineer. Where walls or wall sections intersect with an included angle of 130 degrees or less, a vertical corner element separate from the standard panel face shall abut and interact with the opposing standard panels. The corner element shall have ground reinforcement connected specifically to that panel and shall be designed to preclude lateral spread of the intersecting panels. If the wall is installed in front of a bridge abutment or wing, it shall also be designed to resist the applied abutment/bridge lateral forces specified on the contract plans.

Walls parallel to supporting highway traffic shall be designed for the effects of highway surcharge loading equivalent of 2 feet soil surcharge weight or 240 psf. The design shall also consider the traffic barrier impact where applicable. Walls that do not carry highway traffic shall be designed for a live load surcharge of 100 psf in accordance with Chapter 14 of the WisDOT LRFD Bridge Manual or as stated on the plans.

A maximum value of the angle of internal friction of the wall backfill material used for design shall be assumed to be 30 degrees without a certified report of tests. If a certified report of tests yields an angle of internal friction greater than 30 degrees, the larger test value may be used for design, up to a maximum value of 36 degrees.

An external stability check at critical wall stations showing Capacity Demand Ratios (CDR) for sliding, eccentricity, and bearing checks is performed by the department and are provided on the wall plans.

The design of the Wall Concrete Panel Mechanically Stabilized Earth by the Contractor shall consider the internal and compound stability of the wall mass in accordance with AASHTO LRFD 11.10.6. The internal stability shall include soil reinforcement pullout, soil reinforcement rupture, and panel-reinforcement connection failure at each soil reinforcement level. The design shall be performed using the Simplified Method or Coherent Gravity Method. Calculations for factored stresses and resistances shall be based upon assumed conditions at the end of the design life. Compound stability shall be computed for the applicable strength limits.

Facing panels shall meet the design requirements of AASHTO LRFD 11.10.2.3. The Facing panels shall also be designed to resist compaction stresses that occur during the wall erection. The minimum thickness of the Facing panel shall be 5.5 inches. The surface area of a standard single panel cannot exceed 60 square feet. The maximum height of a standard panel shall be 5 feet. The top and bottom panels may exceed 5 foot in height based on site topography subject to the approval by the Structures Design Section. The design of the steel reinforcement within the panels shall be based on one-way bending action. Design the wall panels and joints between panels to accommodate a maximum differential settlement of 1 foot over a 100-foot length, unless the plans indicate other.

The minimum length of soil reinforcement measured from the back face of the wall shall be equal to 0.7 the wall height or as shown on the plan. In no case shall this length be less than 8 feet. The soil reinforcement length shall be the same from the bottom to the top of the wall. The soil reinforcement shall extend a minimum of 3.0 feet beyond the theoretical failure plane in all cases. The maximum vertical spacing of soil reinforcement layers shall be 31 inches. The uppermost layer of the reinforcement shall be located a minimum of six inches below the bottom of an overlying slab, footing or top of the wall. The upper layers of the soil reinforcement shall also be checked to verify that they have sufficient tensile resistance against traffic barrier impact where applicable.

All soil reinforcement steel required for the reinforced soil zone shall be connected to the face panels. The reinforcement and the reinforcement/facing connection strength shall be designed to resist maximum factored reinforcement loads in accordance with AASHTO LRFD Section 11.10.6. Facing connection strength shall be defined as the resistance factor times the failure load, or the load at 0.5 inch deformation times 0.9, whichever is less. The nominal long term design strength in steel reinforcement and connections shall be based upon assumed conditions at the end of the design life.

Soil reinforcement shall be prefabricated into single or multiple elements before galvanizing. Soil reinforcement shall be fabricated or designed to avoid piling, drainage structures or other obstacles in the fill without field modifications. Cutting or altering of the basic structural section of either the strip or grid at the site is prohibited unless

approved by the Structures Design Section. A minimum clearance of 3" shall be maintained between any obstruction and reinforcement unless otherwise approved by the Structures Design Section. Splicing steel reinforcement is not allowed, unless approved by the Structures Design.

MSE facing panels shall be installed on concrete leveling pads. The minimum cross section of the leveling pad shall be 6-inches deep by 1-foot wide. Potential depth of frost penetration at the wall location shall not be considered in designing the wall for depth of leveling pad.

Submit the following to the engineer for review: complete design calculations, explanatory notes, supporting materials, specifications, and detailed plans and shop drawings for the proposed wall system. Sample analyses and hand output shall be submitted to verify the output by the software. The design calculations and notes shall clearly indicate the Capacity to Demand Ratios (CDR) for all internal stabilities as defined in AASHTO LRFD.

The wall submittal package shall be submitted electronically to the project engineer and Structures Design Section. Submit all required information no later than 30 days prior to beginning construction of the wall. The detailed plans and shop drawings shall include all details, dimensions, quantities and cross-sections necessary to construct the walls.

B.3 Wall System Components

Materials furnished for wall system components under this contract shall conform to the requirements of this specification. All certifications related to material and components of the wall systems specified in this subsection shall be submitted to the engineer.

B.3.1 General

The walls shall have modular precast concrete face panels produced by a wet cast process, and have cast-in-place concrete pads or footings. The concrete panels shall have a minimum strength of 4000 psi at 28 days. The panel edges shall be configured so as to conceal the joints. The detail shall be a shiplap, tongue and groove or other detail adequate to prevent vandalism or ultraviolet light damage to the backside of the wall joint covering. Joints between panels shall be no more than 0.75 inch. Use full wall height slip joints at points of differential settlement when detailed on the plan. Horizontal joints must be provided with a compressible bearing material to prevent concrete to concrete contact.

A minimum of two bearing pads shall be used per panel. The allowable bearing stress shall not exceed 900 psi. The bearing pads shall be preformed EPDM rubber conforming to ASTM D-2000, Grade 2, Type A, Class A with a minimum Durometer Hardness of 80, or high-density polyethylene pads with a minimum density of 0.034 lb/in³ in accordance with ASTM 1505.

An 18-inch wide geotextile shall be used on the backface of the wall panels to cover all panel joints. The geotextile shall meet the physical requirements stated in standard spec 645.2.4 for Geotextile Fabric, Type DF, Schedule B, except that the grab tensile strength

shall be a minimum of 180 pounds in both the machine and cross-machine directions. The geotextile shall be attached with a standard construction adhesive suitable for use on concrete surfaces and cold temperatures. The adhesive shall be applied to the panels, not to the geotextile.

All steel portions of the wall system exposed to earth shall be galvanized. All soil reinforcement and attachment devices shall be carefully inspected to insure they are true size and free from defects that may impair the strength and durability.

Use a wall leveling pad that consists of poured concrete masonry, Grade A, A-FA, A-S, A-T, A-IS or A-IP concrete conforming to standard spec 501 as modified in standard spec 716. Provide QMP for leveling pad concrete as specified in standard speci 716.

The minimum embedment to the top of the leveling pad shall be 1 foot 6 inches or as given on the plan or given in AASHTO LRFD 11.10.2.2 whichever is greater. Step the leveling pad to follow the general slope of the ground line. The leveling pad's steps shall keep the bottom of the wall within one half the panel heights of the minimum embedment i.e. the minimum embedment plus up to one half the height of one panel. Additional embedment may be detailed by the contractor, but will not be measured for payment.

B.3.2 Backfill

Furnish and place backfill for mechanically stabilized earth concrete panel walls as shown on the plans and as hereinafter provided.

Provide and use backfill that consists of natural sand or a mixture of sand with gravel, crushed gravel or crushed stone. It shall not contain recycled or milled asphalt, recycled concrete, foundry sand, bottom ash, blast furnace slag or other potentially corrosive material.

Provide material conforming to the following gradation requirements as per AASHTO T27.

Sieve Size	Percentage by Weight Passing
1 inch	100
No. 40	0 - 60
No. 200	0 - 15

The material shall have a liquid limit not greater than 25, as per AASHTO T89, and a plasticity index not greater than 6, as per AASHTO T90. In addition, backfill material shall meet the following requirements.

Test	Method	Value
pH	AASHTO T-289	5 – 10.0
Sulfate content	AASHTO T-290	200 ppm max.
Chloride content	AASHTO T-291	100 ppm max.
Electrical Resistivity	AASHTO T-288	3000 ohm/cm min.
Organic Content	AASHTO T-267	1.0% max.
Angle of Internal Friction	AASHTO T-236	30 degrees min. (At 95.0% of maximum density and optimum moisture, per AASHTO T99)

Prior to placement of the backfill, obtain and furnish to the engineer a certified report of test results that the backfill material complies with the requirements of this specification. This certified report of test shall be less than 6 months old. Tests will be performed by a certified independent laboratory. Additional certified report of tests (except Angle of Internal Friction test) are required for every 2000 cubic yards of backfill used per wall. In addition, when backfill characteristics and/or sources change, a certified report of all tests will be provided for the new backfill material.

C Construction

C.1 Excavation and Backfill

Excavation will encompass preparing the leveling pad foundation and the area below the reinforcing strips in accordance to standard spec 206. The volume of excavation covered is limited to the width of the reinforced mass and to the depth of the leveling pad unless shown or noted otherwise on the plan. At the end of each working day, provide good temporary drainage such that the backfill shall not become contaminated with run-off soil or water if it should rain. Do not stockpile or store materials or large equipment within 10 feet of the back of the wall.

C.2 Compaction

Compact all backfill behind the wall as specified in standard spec 207.3.6. Compact the backfill to 95.0% of maximum density as determined by AASHTO T-99, Method C. Insure that adequate moisture is present in the backfill during placement and compaction to prevent segregation and to help achieve compaction.

Compaction of backfill within 3 feet of the back face of the wall should be accomplished using lightweight compaction devices. Use of heavy compaction equipment or vehicles should be avoided within 3 feet of the panels.

Place and compact the MSE backfill to the level of the next higher layer of MSE reinforcement before placing the MSE reinforcement or connecting it to the wall facing. The MSE reinforcement shall lay horizontally on the top of the most recently placed and compacted layer of MSE backfill. Bending of MSE reinforcement that result in a kink in the reinforcement shall not be allowed. If skewing of the reinforcement is required due to obstructions in the reinforced fill, the maximum skew angle shall not exceed 15 degrees

from the normal position unless a greater angle is shown on the plans. The adequacy of the skewed reinforcement in such a case shall be addressed by supporting calculations.

C.3 Panel Tolerances

As backfill material is placed behind a panel, maintain the panel in its proper inclined position according to the supplier specifications and as approved by the engineer. The supplier shall specify the back batter so that the final position of the wall is vertical. Vertical tolerances and horizontal alignment tolerances shall not exceed $\frac{3}{4}$ -inch when measured along a 10-foot straight edge. The maximum allowable offset in any panel joint shall be $\frac{3}{4}$ -inch. The overall vertical tolerance of the wall (plumbness from top to bottom) shall not exceed $\frac{1}{2}$ -inch per 10 feet of wall height. Erect the precast face panels to insure that they are located within 1 inch from the contract plan offset at any location to insure proper wall location at the top of the wall. Provide a $\frac{3}{4}$ -inch joint separation between all adjacent face panels to prevent direct concrete-to-concrete contact. Maintain this gap by the use of bearing pads and/or alignment pins. Failure to meet this tolerance shall cause the engineer to require the contractor to disassemble and re-erect the affected portions of the wall. In addition, imperfect molding, honeycombing, cracking or severe chipping of panels shall be cause of panel rejection.

C4 Quality Management Program

C.4.1 Quality Control Plan

Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not perform MSE wall construction work before the engineer reviews and accepts the plan. Construct the project as the plan provides.

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

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication process that will be used, and action time frames.
3. A list of source locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
4. Descriptions of stockpiling and hauling methods.
5. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.
6. Location of the QC laboratory, retained sample storage, and other documentation.
7. A summary of the locations and calculated quantities to be tested under this provision.

C.4.2 Quality Control Personnel

Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a grading technician certified under HTCP at level I present at the each grading site during all wall backfill placement, compaction, and nuclear testing activities. Have a nuclear density technician certified under HTCP at level I perform field density and field moisture content testing.

If an Assistant Certified Technician (ACT) is performing sampling or testing, a certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician insure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

C.4.3 Equipment

Furnish the necessary equipment and supplies for performing quality control testing. Insure that all testing equipment conforms to the equipment specifications applicable to the required testing methods. The engineer may inspect the measuring and testing devices to confirm both calibration and condition. Calibrate all testing equipment according to the CMM and maintain a calibration record at the laboratory.

Furnish nuclear gauges from the department's approved product list at <http://www.atwoodsyste.ms.com/materials>. Insure that the gauge manufacturer or an approved calibration service calibrates the gauge the same calendar year it is used on the project. Retain a copy of the calibration certificate with the gauge.

Conform to ASTM D 6938 and CMM 8.15 for density testing and gauge monitoring methods. Perform nuclear gauge measurements using gamma radiation in the backscatter or direct transmission position. Perform each test for 4 minutes of nuclear gauge count time.

Split each Proctor sample and identify so as to provide comparison with the department's test results. Unless the engineer directs otherwise, retain the QC split samples for 14 calendar days and promptly deliver the department's split samples to the department

C.4.4 Quality Control (QC) Testing

Perform compaction testing on the backfill. Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a grading technician certified under HTCP at level I present at the site during all wall backfill operations, compaction, and nuclear testing activities. Have a nuclear density technician certified under HTCP at level I, or ACT certified technician, perform field density and field moisture content testing. Conform to CMM 8.15 for testing and gauge monitoring methods. The QC technician must retain a split sample for the region and deliver it to the region laboratory within 72 hours. Conduct testing at a minimum frequency of 1 test per 150 cubic yards of backfill, or major portion thereof. A minimum of one test for every lift is required. Deliver documentation of all compaction testing results to the engineer at the time of testing.

Perform 1 gradation test every 750 cubic yards of fill and one 5-point Proctor test every 2000 cubic yards of fill. Provide the region split samples of both within 72 hours of sampling, at the region laboratory. Test sites shall be selected using ASTM Method D3665. Provide Proctor test results to the engineer within 48 hours of sampling. Provide gradation test results to the engineer within 24 hours of sampling.

C.4.5 Department Testing

C.4.5.1 General

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

C.4.5.2 Quality Verification (QV) Testing

- (1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in C.4 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.
- (2) The department will conduct QV tests at the minimum frequency of 30% of the required contractor tests.
- (3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will split each QV sample, testing half for QV, and retaining the remaining half for 10 business days.
- (4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.
- (5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to this special provision, the department will take no further action. If QV test results are nonconforming, the area shall be reworked until the requirements of this special provision are met.

C.4.5.3 Independent Assurance (IA)

- (1) Independence assurance is unbiased testing the department performs to evaluate the department's QV and the contractor's QC sampling and testing, including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department's independent assurance program. That review may include one or more of the following:

1. Split sample testing.
 2. Proficiency sample testing.
 3. Witnessing sampling and testing.
 4. Test equipment calibration checks.
 5. Reviewing required worksheets and control charts.
 6. Requesting that testing personnel perform additional sampling and testing.
- (2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in C.4.5.4.

C.4.5.4 Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.
- (2) Production test results, and results from other process control testing, may be considered when resolving a dispute.
- (3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product or work, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C.5 Geotechnical Information

Geotechnical data to be used in the design of the wall is given on the wall plan. After completing wall excavation of the entire reinforced soil zone, notify the department and allow the Regional Soils Engineer two working days to review the foundation.

D Measurement

The department will not measure Wall Concrete Panel Mechanically Stabilized Earth LRFD/QMP Pilot. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.4710	Wall Concrete Panel Mechanically Stabilized Earth LRFD/QMP Pilot	SF

Payment is full compensation for supplying a design and shop drawings; preparing the site, including all necessary excavation and disposal of materials; supplying all necessary wall components to produce a functional system including cap and copings; constructing the retaining system and drainage system; providing backfill, backfilling, compacting, developing/completing/documenting the quality management program, performing compaction testing; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the contract work. Parapets, railings, abutment bodies and other items above the wall cap or coping will be paid for separately. Vehicle barrier and its support will be paid separately.

Any required topsoil, fertilizer, seeding or sodding and mulch will be paid for at the contract unit price of topsoil, fertilizer, seeding or sodding and mulch, respectively.

218. Temporary Wall Wire Faced Mechanically Stabilized Earth LRFD/QMP, Item SPV.0165.4730.

A Description

This special provision describes designing, furnishing materials and erecting a temporary earth retention system in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract. The design life of the mechanically stabilized earth (MSE) wall and all wall components shall be 3 years minimum.

This special provision describes the quality management program (QMP) for MSE walls. A quality management program is defined as all activities, including process control, inspection, sampling and testing, and necessary adjustments in the process that are related to the construction of the MSE wall, which meets all the requirements of this provision.

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

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

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

B Materials

B.1 Proprietary Wire Faced Mechanically Stabilized Earth Wall Systems

The supplied wall system must be from the department's approved list of Wire Faced Mechanically Stabilized Earth Wall systems (Wire Faced MSE Walls).

Proprietary wall systems may be used for this work, but must conform to the requirements of this specification and be pre-approved for use by the department's Bureau of Structures, Structures Design Section. The department maintains a list of pre-approved Wire Faced Mechanically Stabilized Earth (Wire Faced MSE) Wall systems. To be eligible for use on this project, a system must have been pre-approved and added to that list prior to the bid opening date. The name of the pre-approved proprietary wall system selected shall be furnished to the engineer within 25 days after the award of contract.

To receive pre-approval, the retaining wall system must comply with all pertinent requirements of this provision. Applications for pre-approval may be submitted at any time. Applications must be prepared in accordance to the requirements of Chapter 14 of the department's LRFD Bridge Manual. Information and assistance with the pre-approval process can be obtained by contacting the Structures Design Section in Room 601 of the Hill Farms State Transportation Building in Madison or by calling (608) 266-8494.

B.2 Design Requirements

It is the responsibility of the contractor to supply a design and supporting documentation as required by this special provision, for review by the department, to show the proposed wall design is in compliance with the design specifications. Four copies of the following shall be submitted to the engineer for review and acceptance no later than 60 days from the date of notification to proceed with the project.

The plans and shop drawings shall be prepared on reproducible sheets 11 inch x 17 inch, including borders. Each sheet shall have a title block in the lower right corner. The title block shall include the project identification number and structure number. Design calculations and notes shall be on 8 ½ inch x 11 inch sheets, and shall contain the project identification number, name or designation of the wall, date of preparation, initials of designer and checker, and page number at the top of the page. All plans, shop drawings, and calculations shall be signed, sealed and dated by a professional engineer licensed in the State of Wisconsin.

The design of the Wire Faced MSE Walls shall be in compliance with the *AASHTO LRFD Bridge Design Specifications 5th Edition 2010*, (AASHTO LRFD) with latest interim specifications for Mechanically Stabilized Earth Walls, WisDOT's current *Standard Specifications for Highway and Structure Construction* (Standard Specifications), Chapter 14 of the WisDOT LRFD Bridge Manual and standard engineering design procedures as determined by the Department. Loads, load combinations, load and resistance factors shall be as specified in AASHTO LRFD Section 11. The associated resistance factors shall be defined in accordance with Table 11.5.6-1 LRFD.

Design and construct the walls in accordance to the lines, grades, heights and dimensions shown on the plans, as herein specified, and as directed by the engineer. If the wall is installed in front of a bridge abutment or wing, it shall also be designed to resist the applied abutment/bridge lateral forces specified on the contract plans.

Walls parallel to supporting highway traffic shall be designed for the effects of highway surcharge loading equivalent of 2 feet soil surcharge weight or 240 psf. The design shall also consider the traffic barrier impact where applicable. Walls that do not carry highway traffic shall be designed for a live load surcharge of 100 psf in accordance with Chapter 14 of the WisDOT LRFD Bridge Manual or as stated on the plans.

A maximum value of the angle of internal friction of the wall backfill material used for design shall be assumed to be 30 degrees without a certified report of tests. If a certified report of tests yields an angle of internal friction greater than 30 degrees, the larger test value may be used for design, up to a maximum value of 36 degrees.

An external stability check at critical wall stations showing Capacity Demand Ratios (CDR) for sliding, eccentricity, and bearing checks is performed by the department and are provided on the wall plans.

The design of the Wire Faced MSE Walls by the Contractor shall consider the internal and compound stability of the wall mass in accordance with AASHTO LRFD 11.10.6. The internal stability shall include soil reinforcement pullout, soil reinforcement rupture, and panel-reinforcement connection failure at each soil reinforcement level. The design shall be performed using the Simplified Method or Coherent Gravity Method. Calculations for factored stresses and resistances shall be based upon assumed conditions at the end of the design life. Compound stability shall be computed for the applicable strength limits.

The minimum embedment of the Wire Faced MSE wall shall be 1 foot 6 inches, or as given on the contract plan. Frost depth shall not be considered. The wall facings shall be designed in accordance with AASHTO 11.10.2.3. Geotextile filter fabric shall be used at the front face of the wall to retain the fines of the soil mass.

The nominal long term design strength to be used in steel reinforcement and connector design shall consider the corrosion losses and based upon conditions at the end of the design life. The minimum length of soil reinforcement measured from the back face of the wall shall be equal to 0.7 of the wall height or as shown on the plan. In no case shall this length be less than 8 feet. The soil reinforcement length shall be the same from the bottom to the top of the wall. All soil reinforcement layers shall be connected to facings. The soil reinforcement shall extend a minimum of 3.0 feet beyond the theoretical failure plane in all cases. The maximum vertical spacing of soil reinforcement layers shall be 31 inches. The uppermost layer of the reinforcement shall be located a minimum of six inches below the bottom of an overlying slab, footing or top of the wall. The upper layers

of the soil reinforcement shall also be checked to verify that they have sufficient tensile resistance against traffic barrier impact where applicable.

All soil reinforcement steel required for the reinforced soil zone shall be connected to the facings. The reinforcement and the reinforcement/facing connection strength shall be designed to resist maximum factored reinforcement loads in accordance with AASHTO LRFD Section 11.10.6. Facing connection strength shall be defined as the resistance factor times the failure load. The nominal long term design strength in steel reinforcement and connections shall be based upon assumed conditions at the end of the design life.

Soil reinforcement shall be fabricated or designed to avoid piling, drainage structures or other obstacles in the fill without field modifications. Cutting or altering of the basic structural section of either the strip or grid at the site is prohibited unless approved by the Structures Design Section. A minimum clearance of 3" shall be maintained between any obstruction and reinforcement unless otherwise approved by the Structures Design Section. Splicing steel reinforcement is not allowed, unless approved by the Structures Design Section.

Submit the following to the engineer for review: complete design calculations, explanatory notes, supporting materials, specifications, and detailed plans and shop drawings for the proposed wall system. Sample analyses and hand output shall be submitted to verify the output by the software. The design calculations and notes shall clearly indicate the Capacity to Demand Ratios (CDR) for all internal stabilities as defined in AASHTO LRFD.

The wall submittal package shall be submitted electronically to the project engineer and Structures Design Section. Submit all required information no later than 30 days prior to beginning construction of the wall. The detailed plans and shop drawings shall include all details, dimensions, quantities and cross-sections necessary to construct the walls.

B.3 Wall System Components

Materials furnished for wall system components under this contract shall conform to the requirements of this specification. All certifications related to material and components of the wall systems specified in this subsection shall be submitted to the engineer.

B.3.1 Steel Components

Provide steel reinforcement that meets the following requirements:

B3.1.1 Welded Wire Fabric Soil Reinforcement

Provide shop fabricated welded wire reinforcement from cold drawn steel wire that has a yield stress of 65,000 psi and conforming to the minimum requirements of ASTM A-82 and be welded into the finished configuration in accordance to ASTM A-185.. Replace welded wire fabric that has been damaged during handling, placing or backfilling at the direction of the engineer, at no expense to the department.

B3.1.2 Steel Reinforcing Strips and Tie Strips

As an alternate to Welded Wire Reinforcing mesh, provide Steel Reinforcing strips or ladder Reinforcing strips or equal, hot-rolled from bars, to the required shape and dimensions meeting the requirements of ASTM A-572 Grade 65 minimum. Tie strips shall be shop fabricated of hot-rolled steel meeting the requirements of ASTM A-1011 Grade 50.

B3.1.3 Welded Wire Fabric Facing Panels

Provide welded wire fabric that is used to fabricate the facings of the wire-Faced wall that has a yield stress of 65,000 psi. All steel shall be shop fabricated of cold drawn steel wire conforming to the minimum requirements of ASTM A-82 and be welded into the finished configuration in accordance to ASTM A-185. Replace welded wire fabric that has been damaged during handling, placing or backfilling at the direction of the engineer, at no expense to the department.

B3.1.4 Fasteners

High strength bolts shall meet the requirements of AASHTO M164 or equivalent.

B3.1.5 Connector Pins and Mat Bars

Connector pins and mat bars fabricated from cold drawn steel wire shall meet the requirements of ASTM A-82.

B.3.2 Geotextile Filter Fabric

Use geotextile filter fabric as recommended by the wall manufacturer. If none is recommended, use Type DF (schedule B) as shown in standard spec 645 or as specified on the contract plans.

B.3.3 Backfill

Furnish and place backfill for Wire-Faced MSE wall as shown on the plans and as hereinafter provided.

Provide and use backfill that consists of natural sand or a mixture of sand with gravel, crushed gravel or crushed stone. It shall not contain recycled or milled asphalt, recycled concrete, foundry sand, bottom ash, blast furnace slag or other potentially corrosive material.

Provide material conforming to the following gradation requirements as per AASHTO T27.

Sieve Size	Percentage by Weight Passing
1 inch	100
No. 40	0 – 60
No. 200	0 – 15

The material shall have a liquid limit not greater than 25, as per AASHTO T89, and a plasticity index not greater than 6, as per AASHTO T90.

In addition, backfill material shall meet the following requirements.

Test	Method	Value
pH	AASHTO T-289	5 – 10.0
Sulfate content	AASHTO T-290	200 ppm max.
Chloride content	AASHTO T-291	100 ppm max.
Electrical Resistivity	AASHTO T-288	3000 ohm/cm min.
Organic Content	AASHTO T-267	1.0% max.
Angle of Internal Friction	AASHTO T-236	30 degrees min. (At 95.0% of maximum density and optimum moisture, per AASHTO T99)

Prior to placement of the backfill, obtain and furnish to the engineer a certified report of test results that the backfill material complies with the requirements of this specification. This certified report of test shall be less than 6 months old. Tests will be performed by a certified independent laboratory. Additional certified report of tests (except Angle of Internal Friction test) are required for every 2000 cubic yards of backfill used per wall. In addition, when backfill characteristics and/or sources change, a certified report of all tests will be provided for the new backfill material.

C Construction

C.1 Excavation and Backfill

Excavation will encompass preparing the foundation and the area below the reinforcing strips in accordance to standard spec 206. The volume of excavation covered is limited to the width of the reinforced mass and to the depth of the bottom of the wall unless shown or noted otherwise on the plan. At the end of each working day, provide good temporary drainage such that the backfill shall not become contaminated with run-off soil or water if it should rain. Do not stockpile or store materials or large equipment within 10 feet of the back of the wall.

Stagger vertical joints in the welded wire facing.

C.2 Compaction

Compact all backfill behind the wall as specified in standard spec 207.3.6. Compact the backfill to 95.0% of maximum density as determined by AASHTO T-99, Method C. Insure that adequate moisture is present in the backfill during placement and compaction to prevent segregation and to help achieve compaction.

Compaction of backfill within 3 feet of the back face of the wall should be accomplished using lightweight compaction devices. Use of heavy compaction equipment or vehicles should be avoided within 3 feet of the wall face. Compact the backfill to 95.0% of maximum density as determined by AASHTO T-99, Method C.

Erect welded wire facing and other associated elements according to the wall manufacturer's construction guide. Place and compact the MSE backfill to the level of the next higher layer of MSE reinforcement before placing the MSE reinforcement or connecting it to the wall facing. Place remaining courses in vertical or battered positions as shown on the contract plans.

The MSE reinforcement shall lay horizontally on top of the most recently placed and compacted layer of MSE backfill. Bending of MSE reinforcement that result in a kink in the reinforcement shall not be allowed. If skewing of the reinforcement is required due to obstructions in the reinforced fill, the maximum skew angle shall not exceed 15 degrees from the normal position unless a greater angle is shown on the plans. The adequacy of the skewed reinforcement in such a case shall be addressed by supporting calculations.

C.3 Tolerances

The overall vertical tolerance of the wall and the horizontal alignment tolerance shall not exceed 3 inches per 10 feet for temporary installations.

For battered wire facing, the final deviation from the design batter shall be within ± 1 inch for each 10 feet of battered wall height.

C.4 Quality Management Program

C.4.1 Quality Control Plan

Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not perform MSE wall construction work before the engineer reviews and accepts the plan. Construct the project as the plan provides.

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

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication process that will be used, and action time frames.
3. A list of source locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
4. Descriptions of stockpiling and hauling methods.
5. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.
6. Location of the QC laboratory, retained sample storage, and other documentation.
7. A summary of the locations and calculated quantities to be tested under this provision.

C.4.2 Quality Control Personnel

Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a grading technician certified under HTCP at level I present at the each grading site during all wall backfill placement, compaction, and nuclear testing activities. Have a nuclear density technician certified under HTCP at level I perform field density and field moisture content testing.

If an Assistant Certified Technician (ACT) is performing sampling or testing, a certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician insure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

C.4.3 Equipment

Furnish the necessary equipment and supplies for performing quality control testing. Insure that all testing equipment conforms to the equipment specifications applicable to the required testing methods. The engineer may inspect the measuring and testing devices to confirm both calibration and condition. Calibrate all testing equipment according to the CMM and maintain a calibration record at the laboratory.

Furnish nuclear gauges from the department's approved product list at <http://www.atwoodsyste.ms.com/materials>. Insure that the gauge manufacturer or an approved calibration service calibrates the gauge the same calendar year it is used on the project. Retain a copy of the calibration certificate with the gauge.

Conform to ASTM D 6938 and CMM 8.15 for density testing and gauge monitoring methods. Perform nuclear gauge measurements using gamma radiation in the backscatter or direct transmission position. Perform each test for 4 minutes of nuclear gauge count time.

Split each Proctor sample and identify so as to provide comparison with the department's test results. Unless the engineer directs otherwise, retain the QC split samples for 14 calendar days and promptly deliver the department's split samples to the department

C.4.4 Quality Control (QC) Testing

Perform compaction testing on the backfill. Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a grading technician certified under HTCP at level I present at the site during all wall backfill operations, compaction, and nuclear testing activities. Have a nuclear density technician certified under HTCP at level I, or ACT certified technician, perform field density and field moisture content testing. Conform to CMM 8.15 for testing and gauge monitoring methods. The QC technician must retain a split sample for the region and deliver it to the region laboratory within 72 hours. Conduct testing at a minimum frequency of 1 test per 150 cubic yards of backfill, or major portion thereof. A minimum of one test for every lift is required. Deliver documentation of all compaction testing results to the engineer at the time of testing.

Perform 1 gradation test every 750 cubic yards of fill, and one 5-point Proctor test every 2000 cubic yards of fill. Provide the region split samples of both within 72 hours of sampling at the region laboratory. Test sites shall be selected using ASTM Method D3665. Provide Proctor test results to the engineer within 48 hours of sampling. Provide gradation test results to the engineer within 24 hours of sampling.

C.4.5 Department Testing

C.4.5.1 General

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

C.4.5.2 Quality Verification (QV) Testing

- (1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in C.4 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.
- (2) The department will conduct QV tests at the minimum frequency of 30% of the required contractor tests.
- (3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will split each QV sample, testing half for QV, and retaining the remaining half for 10 business days.
- (4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.
- (5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to this special provision, the department will take no further action. If QV test results are nonconforming, the area shall be reworked until the requirements of this special provision are met.

C.4.5.3 Independent Assurance (IA)

- (1) Independence assurance is unbiased testing the department performs to evaluate the department's QV and the contractor's QC sampling and testing, including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department's independent assurance program. That review may include one or more of the following:

1. Split sample testing.
 2. Proficiency sample testing.
 3. Witnessing sampling and testing.
 4. Test equipment calibration checks.
 5. Reviewing required worksheets and control charts.
 6. Requesting that testing personnel perform additional sampling and testing.
- (2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in C.4.5.4.

C.4.5.4 Dispute Resolution

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.
- (2) Production test results, and results from other process control testing, may be considered when resolving a dispute.
- (3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product or work, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C.5 Geotechnical Information

Geotechnical data to be used in the design of the wall is given on the wall plan. After completing wall excavation of the entire reinforced soil zone, notify the department and allow the Regional Soils Engineer two working days to review the foundation.

D Measurement

The department will measure Temporary Wall Wire Faced Mechanically Stabilized Earth LRFD/QMP in area by the square foot, acceptably completed, measured as the vertical area within the pay limits the contract plans show. No other measurement of quantities shall be made in the field. Unless the Engineer directs in writing, a change to the limits indicated on the contract plan, wall area constructed above or below these limits will not be measured for payment.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.4730	Temporary Wall Wire Faced Mechanically Stabilized Earth LRFD/QMP	SF

Payment is full compensation for supplying a design and shop drawings; preparing the site, including all necessary excavation and disposal of materials; supplying all necessary wall components to produce a functional system; constructing the retaining system and drainage system; providing backfill, backfilling, compacting, developing/completing/documenting the quality management program, performing compaction testing; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the contract work. Parapets, railings, abutment bodies and other items above the wall will be paid for separately. Vehicle barrier and its support will be paid separately.

Any required topsoil, fertilizer, seeding or sodding and mulch will be paid for at the contract unit price of topsoil, fertilizer, seeding or sodding and mulch, respectively.

219. Geocomposite Drain Board, Item SPV.0165.4740.

A Description

This special provision describes supplying and installing prefabricated geocomposite drain board as indicated on the plans. Perform work in accordance to pertinent provisions of the standard specifications, the plans, and as hereinafter provided.

B Materials

Use materials that conform to the following:

Physical Properties	Test Method	Value
Thickness		0.25 inch
Flow capacity, (at 3600 psi with I = 1)	ASTM D 4716 (mod)	9 gpm/ft
Geotextile tensile strength	ASTM D 4632	100 lb
Compressive strength	ASTM D 1621 (mod)	10,000 lbs/SF
Mullen burst	ASTM D 3786	Min. 200 lb
Apparent opening size	ASTM D 4751	70
Flow rate	ASTM D 4491	Min 140 gpm/SF

C Construction

Handle the prefabricated geocomposite drainage board in such a manner as to ensure the geocomposite is not damaged in any way. Take care during the placement of the geocomposite not to entrap dirt or excessive dust in the geocomposite that could cause clogging of the drainage system. Deliver, store, and handle the geocomposite in accordance to manufacturer's recommendations. Place and secure geocomposite against the retaining wall back face as indicated on the plans with the fabric facing outward towards the backfill.

Make seams and overlaps between adjacent boards according to the manufacturer's recommendations and specifications.

D Measurement

The department will measure Geocomposite Drain Board in area by the square foot, acceptably completed. The department will not pay for repairs to the geocomposite and will not pay for overlap of drain elements.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.4750	Geocomposite Drain Board	SF

Payment is full compensation for furnishing, installing, and trimming all materials; and for furnishing all labor, tools, equipment, fasteners, and incidentals necessary to complete the contract work.

220. Prestressed Precast Concrete Wall Panel, Item SPV.0165.4750.

A Description

This special provision describes constructing precast prestressed concrete wall panels with heights and patterns as shown on the plans including product design, fabrication, transportation, erection, anchorage and other related items.

These specifications provide for prestressing concrete panels by the pretensioning method. In this method, stress the reinforcing tendons initially, then place and cure the concrete and release the stress from the anchorages to the concrete after developing specified concrete strength.

Design shall be in accordance to the AASHTO LRFD Bridge Design Specifications, Fifth Edition 2010 and applicable interim specifications. The design life of the precast concrete wall panels and all panel components shall be 75 years.

B Materials

B.1 General

Furnish materials conforming to the following:

Masonry Anchors.....	standard spec 502
Coated High Strength Bar Steel Reinforcement	standard spec 505
Pretensioning Reinforcement.....	standard spec 503
Welded Steel Wire Fabric for Concrete Reinforcement	standard spec 505
Structural Steel and Miscellaneous Metals	standard spec 506
Elastomeric Bearing Pads	standard spec 506

Galvanize or furnish stainless steel materials for all hardware incorporated into the finished structures. (Not including reinforcement bars or pr tensioning reinforcement.)

B.2 Concrete

Furnish concrete as specified in standard spec 501 and 716.

Ensure concrete attains a minimum 28-day compressive strength of 5000 pounds per square inch. Base all tests on 6 inch by 12-inch cylinders, or 4 inch by 8-inch cylinders, provided the engineer develops and approves a correlation factor. Mold concrete cylinders in suitable steel or plastic molds. Cure concrete cylinders according to AASHTO T 23, except cure the cylinders with the member until release strength is obtained, then cure the cylinders according to AASHTO T 23.

Make and test the cylinders and make available to the engineer all information relating to the making and testing of cylinders. Notify the engineer immediately if concrete cylinder compressive strengths are less than the required 28-day strength. Keep neatly documented records of all cylinder testing on the day of the test and make them available to the engineer. Provide copies of the tests to the engineer by contract completion.

Furnish precast prestressed concrete panels cast from air entrained concrete. Use type I, IS, I(SM), IP, II, or III cement. The contractor may replace up to 30 percent of type I, II, or III portland cement with an equal weight of fly ash conforming to standard spec 501.2.6 or slag conforming to standard spec 501.2.7. Use only one source and replacement rate for work under a single bid item. Use a department-approved air entraining admixture conforming to standard spec 501.2.2 for air entrained concrete. Use only size No. 1 coarse aggregate conforming to standard spec 501.2.5.4.

Determine proportions for the mix within the following limitations:

Water cement ratio	not greater than 0.45
Cement content, pounds per cubic yard of concrete	610 minimum
Air content of concrete, percent maximum.....	3.5-6.0
Slump of mixed concrete, maximum.....	4 inches

If the mix does not contain a high range water reducer admixture, use a department-approved set retarding admixture as specified in standard spec 501.2.3.2 at the recommended rate if the ambient air temperature is 70 degrees F (21 degrees C) or higher. The contractor may use it at their option if the ambient air temperature is less than 70 degrees F (21 degrees C).

Do not add more admixtures or water after mixing is complete.

Use admixtures that do not have significant chlorides or chlorides added during manufacture.

Use admixtures that are compatible with all ingredients of the concrete mixture.

B.3 Pretensioning Reinforcement

Use high tensile strength, 7-wire strands conforming to ASTM A 416, grade 270.

B.4 Plant Certification

Obtain all precast prestressed concrete wall panels from fabrication plants that comply with the department's plant certification program for precast prestressed concrete, unless the engineer agrees to accept these items according to the alternate procedures set forth in the department's plant certification program.

B.5 Lifting Devices

The type, number and locations of lifting devices and the method of handling the architectural precast panels is determined by the fabricator and approved by the engineer. Do not locate lifting devices in the surface of the panel facing toward the road.

B.6 Accessories and Inserts

Materials:

Shims: High-density plastic or galvanized steel, 1/8-inch thick, smooth both sides

Carbon steel plate: ASTM A 283

Welded headed studs: AWS D1.1 – Type B

Bolts, nuts, rods, washers: subsection 506.2

Joint Material: Closed cell 100% virgin chloroprene (neoprene) filler meeting 14.7.6.2 of the AASHTO LRFD Bridge Design Specifications.

Inserts: Galvanized with minimum 12 Gage steel conforming to ASTM A1011 SS GR 33 or ASTM A653 GR 33 A. Inserts anchors to have 1 1/2-inch minimum cover.

Zinc coated fabrications: Conform to ASTM 385 for fabricating zinc coated work.

C Construction

C.1 Design Requirements

Design panels and components to withstand initial handling, transportation, and erection stress limits; dead loads; wind load of 40 pounds per square foot; suction load of 20 pounds per square foot; structural backfill in cavity to 42 inches above finished grade and in front of abutments as shown in the plans; thermal stresses; and other loads specified. In addition to the above loads also design inserts and connection assemblies for the loads indicated on the plans and a horizontal force equal to at least 20% of the dead weight of the panel.

Provide a minimum prestress of 250 psi and minimum temperature and shrinkage reinforcement as required by AASHTO LRFD Bridge Design Specifications Article 5.10.8.

C.2 Submittals

Erection drawings shall conform to the contract plans and consist of member piece marks and completely dimensioned size and shape of each member; plans and/or elevations locating and defining all products furnished by manufacturer; sections and details showing connections, cast-in items and their relation to the structure; relationship to adjacent material including footings and copings; joints between members and structure;

description of all loose, cast-in and field hardware; field installed anchor location drawings; erection sequences, when required to satisfy stability, and handling requirements; and all dead, live and other applicable loads used in the design.

Production drawings shall conform to the contract plans and consist of elevation view of each member; sections and details to indicate quantities and position of reinforcing steel, anchors, inserts, etc.; handling devices; dimensions and finishes; prestress for strand; concrete strengths; estimated cambers; and methods for storage and transportation.

Submit on request design calculations performed by a registered engineer licensed in the State of Wisconsin experienced in the design of precast prestressed architectural concrete.

Design modifications necessary to meet performance criteria and field coordination. Variations in details or materials shall not adversely affect the appearance, durability, or strength of units. Maintain general design concept without altering profiles and alignment.

Submit on request reports on materials, compressive strength tests on concrete and water absorption tests on units.

Submit to the engineer, for acceptance and placing on file before commencing, one set of the submittals that the contractor has checked. In addition, provide two sets to the Southeast Region Office (Jeff Bohen, P.E., 141 NW Barstow Street, Waukesha, WI 53187, (414) 750-2928) and one set to the Bureau of Structures for acceptance and inspection purposes. Only after acceptance by the region may fabrication commence of panels begin. The engineer may refuse prints of submittals that are not clear and legible. If the engineer requests, submit one additional copy of submittals for review. After acceptance, furnish as many copies of submittals as required.

The submittals become a part of the contract, provided any differences between sections on production drawings and sections the plans show are made only if the engineer approves and if the substitution is made at no additional expense to the department.

After initial submittal and acceptance, make no deviation from the production drawings or changes to them without the engineer's further review and acceptance.

The engineer's review of submittals means only a review of the character and sufficiency of the details and does not relieve the contractor from responsibility in regard to errors or omissions on those drawings.

C.3 Sample Panel

Produce one standard sample panel for acceptance of color and texture. Deliver test panel(s) to the Zoo Interchange Construction Field Office, 2424 South 102nd Street, West Allis, WI 53227 or an alternate location within the Zoo Interchange project limits designated by the engineer. Before any final panels are produced the 4 x 4 foot sample panel shall be reviewed and accepted by the engineer. If the panel is not acceptable, a

second panel shall be produced and submitted for acceptance. The accepted sample panel shall remain on site and be the reference standard of quality for precast panel work on the project.

When decorative mural or relief patterns are shown on the plans and required to be cast into the face of the panels different from the general form liner surface texture or treatment, provide additional decorative relief pattern sample panels per paragraph C.9.2.

C.4 Stressing Procedure

Stressing procedure shall be in accordance to standard spec 503.3.1. Ensure all the strands of a pretensioned member are free from kinks or twists before starting tensioning operations. Ensure no strand unwinds more than one turn after starting tensioning operations.

Perform transfer of prestress to concrete after the concrete develops the minimum required strength for transfer determined by the test cylinders.

C.5 Placing and Fastening Steel

Placing and fastening steel shall be in accordance to standard spec 503.3.1.1. Place all steel units in the position the plans show and hold firmly during concrete placing and setting as specified in standard spec 505.3.

Ensure that all prestressing steel is free of dirt, grease, wax, scale, rust, oil, or other foreign material that may prevent bonding between the steel and the concrete.

C.6 Placing Concrete

Handle and place the concrete as specified in standard spec 502.

C.7 Tolerances

Cast architectural precast concrete panels to plan dimensions within the following applicable tolerances:

Overall height of panel measured at the face exposed to view	$\pm 3/16$ -inch per 10 ft.
Overall width of panel measured at the face exposed to view.....	$\pm 3/16$ -inch per 10 ft.
Total thickness	$\pm 1/4$ -inch
Structural thickness	$\pm 1/4$ -inch
Variation from square or designated skew.....	$\pm 1/2$ -inch
Local smoothness, unconcealed surfaces.....	$\pm 1/4$ -inch per 10 ft.
Bowing.....	$\pm$ Length/360, to a maximum of 1-inch
Warp (from adjacent corner).....	$\pm 1/16$ -inch per ft.
Location of inserts.....	$\pm 1/2$ -inch
Tipping and flushness of inserts	$\pm 1/4$ -inch
Position of handling devices	± 3 -inch
Reinforcing steel:	
Where position has structural implications or affects concrete cover	$\pm 1/4$ -inch
Otherwise	$\pm 1/2$ -inch

Location of strand:

Perpendicular to panel.....± ¼-inch
Parallel to panel.....±1-inch
Dimensions of architectural features and rustications.....±¼-inch

C.8 Curing

Cure concrete in accordance to standard spec 503.3.2.2.

C.9 Surface Finish

Provide architectural surface treatment, brick pattern, as detailed in the plans. Provide a rubbed surface finish on the remaining exposed surfaces of prestressed concrete panels as specified in standard spec 502.3.7.3 before shipping from the plant. Exposed face to match approved mockup panel. Use rigid molds to maintain panels within specified tolerances conforming to shape, lines, and dimensions shown on the production drawings. Construct molds to withstand vibration method selected.

Coat bottom of panels with bitumastic after cutting strands flush. Do not coat top of panels.

C.9.1 Decorative Relief Patterns

When shown on the plans, provide prestressed precast panels with decorative relief murals or patterns as shown in the plans. The exposed surfaces must match approved sample panels. Electronic files of the decorative patterns are available from Wisconsin Department of Transportation, Jeff Bohen, P.E., 141 NW Barstow Street, Waukesha, WI 53187, (414) 750-2928.

C.9.2 Decorative Relief Pattern Sample Panels

When the plans call for prestress precast panels with decorative relief murals or patterns, supply to the engineer a minimum of two non-production test panels with the decorative details as shown in the plans. Deliver test panel(s) to the Zoo Interchange Construction Field Office, 2424 South 102nd Street, West Allis, WI 53227 or an alternate location within the Zoo Interchange project limits designated by the engineer. Sample panels shall be at nominally 5 feet by 5 feet or larger in size to sufficiently demonstrate the finished appearance of the decorative relief pattern shown in the plans. The submitted test panels shall fit together to demonstrate the continuation of the decorative relief murals or patterns across vertical panel joints. Obtain the engineer's acceptance of the decorative patterned sample panels, prior to production of the decorative relief patterned panels required for the contract. Only one set of accepted decorative sample panels for prestressed precast concrete wall panels is required per contract.

C.10 Erection

Erect panels without damage to shape or finish. Replace or repair damaged panels. Do not drill or form holes through the precast prestressed wall facing panels to erect panels. An alternate method of anchoring/attaching the precast prestressed concrete wall panels may be submitted to the engineer for review and possible acceptance.

Place precast concrete wall panels so that their final position is vertical. Ensure that the vertical joint openings between panels are uniform and that decorative patterns between panels are aligned.

When panels require adjustment beyond design or tolerance criteria, discontinue affected work; advise engineer.

Verify structure, footings, anchors blocks, rods, couplers, clevises, and other anchor devices are ready to receive panels. Verify that wall panel footings are placed at the proper horizontal and vertical alignments and are ready to the receive wall panels. Place elastomeric pad and shims behind panels to ensure proper horizontal alignment. Set panels on elastomeric bearing pads and shims and install base angles at ends of panels. Place a 2 foot wide layer of Geotextile Fabric Type DF over the joint between the tilt up panel and the panel footing as shown on the plans. Shim vertical joints to get proper opening. Install and compress neoprene joint filler in the lap joints between panels. Fasten top of panels to deadman anchor block assemblies at MSE walls, as shown on the plans.

Touch-up scratched or damaged galvanized surfaces.

C.11 Erection Tolerances

Plan location from wall reference line	± ½-inch
Plan location from wall alignment.....	± ½-inch
Top elevation from nominal top elevation.....	± 1.4-inch
Support elevation from nominal elevation:	
Maximum low	½-inch
Maximum high.....	¼-inch
Plumb in any 10 ft. of panel height.....	± ¼-inch
Maximum offset of matching edges and decorative patterns	± ¼-inch
Maximum offset of matching faces	± ¼-inch
Joint width (governs over joint taper).....	± ¼-inch
Joint taper maximum.....	± 3/8-inch
Joint taper over 10 ft. length	± ¼-inch
Differential bowing or camber as erected between adjacent members of the same design.....	± ¼-inch

C.12 Adjusting

Adjust panels so joint dimensions are within tolerances.

D Measurement

The department will not measure Prestressed Precast Concrete Wall Panel. The department will pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.4750	Prestressed Precast Concrete Wall Panel	SF

Payment is full compensation for preparing the design drawings and calculations, production drawings, and coordination; for providing concrete and reinforcement steel for the cast-in-place concrete footings and copings, sample panels, prestressed precast wall panels, including all concrete, grout, mortar, reinforcement steel, tie bars, bearing pads, geotextile fabric Type DF, excavation, shims, masonry anchors, filler, anchor plates, angles, slotted inserts and other embedded metal; for casting and curing concrete; for jacking and prestressing; and for all handling, hauling and erecting, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work. Deadmen, anchor blocks, rods, couplers and clevises shall be produced and supplied to the job site under this item. (Installing deadmen within the reinforced earth mass will be covered under the MSE Wall bid item.) Parapets, railings, abutment bodies and other items above the wall panel cap or coping will be paid for separately. Architectural Surface Treatment will be paid for separately.

221. Concrete Pavement Repair Special, Item SPV.0180.0010.

A Description

This special provision describes the excavating, grading, compacting, and finishing necessary to accommodate Concrete Pavement Repair Special as shown on the plans and in accordance to the pertinent requirements of the standard specifications, and as hereinafter provided.

B Materials

Conform to standard spec 416.2.

C Construction

Conform to standard spec 416.3 of the standard specifications and as modified in this special provision.

Backfill all subgrade voids beneath the repair area using compacted Base Aggregate Dense. Upon approval of the engineer, backfill voids that cannot be compacted with standard equipment with Backfill Controlled Low Strength.

Adjust and reset any castings for all drainage structures within the repair area prior to the placement of the Concrete Pavement.

D Measurement

The department will measure Concrete Pavement Repair Special by the square yard, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0180.0010	Concrete Pavement Repair Special	SY

Payment for the Concrete Pavement Repair Special item is full compensation for furnishing, hauling, preparing, placing, curing, and protecting all materials; for removing and disposing of existing pavements and excavated materials; for repairing asphaltic shoulders; for sawing joints; for tie bars and dowel bars provided and placed in the repair area; for sawing existing pavement for removal; for adjusting castings; for preparing the foundation; for backfilling; and for testing concrete cylinders. The department will pay for individual repairs the width of the existing concrete lane or shoulder and less than 100 feet long as Concrete Pavement Repair Special.

The department will pay for Base Aggregate Dense and/or Backfill Controlled Low Strength separately under the respective bid items.

222. Joint Sealing, Item SPV.0180.0020.

A General

This special provision describes the minimum requirements for preparing the pavement joint or crack, and furnishing and installing the sealant. Seal all expansion, hand-formed, and sawed joints in the pavement. Also, seal all bond or construction joints.

B Materials

Joint sealer must comply with the requirements of ASTM Designation D3405. Joint sealer shall be composed of a mixture of materials that will form a resilient and adhesive compound capable of effectively sealing joints in concrete against the infiltration of moisture and foreign material throughout repeated cycles of expansion and contraction with temperature changes, and of a mixture that will not flow from the joints or be picked up by vehicle tires at summer temperatures. The material must be capable of being brought to a uniform pouring consistency suitable for completely filling the joints without inclusion of large air holes or discontinuities.

The joint sealer shall be elastic type but poured; melt by using indirect heat in suitable equipment provided with positive temperature control and mechanical agitation. Do not damage the material when heating it to the temperature required for satisfactory pouring.

When applying the joint sealer, the atmospheric and concrete temperature will be above 40° F.

C Construction

C.1 Preparation of Pavement Joint or Crack

Clean the pavement joint or crack of all foreign material prior to the installation of the joint sealer. Completely remove the slurry resulting from the sawing operations from the joint by blowing it clean with compressed air (minimum air pressure – 80 pounds per square inch).

D Measurement

The department will not measure Joint Sealing. The department will use pay plan quantity according to the Pay Plan Quantity article.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0180.0020	Joint Sealing	SY

Payment in full compensation for the cost of and placement of the sealant; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

223. Geogrid Reinforcement, Item SPV.0180.0030.

A Description

This special provision describes furnishing and installing geogrids for subgrade stabilization, base reinforcement, or pavement structure applications in accordance to the plans, standard spec 645, and as hereinafter provided.

B Materials

Provide geogrid that consists of either single or joined multiple layers of a uniform rectangular grid of bonded, formed, or fused polymer tensile strands crossing with a nominal right angle orientation. The polymer shall consist of polyester, polypropylene, polyamide, or polyethylene. The grid shall maintain dimensional stability during handling, placing, and installation. The geogrid shall be insect, rodent, mildew, and rot resistant. Minimum geogrid width shall be 6.0 feet.

Provide geogrid that complies with the following physical properties:

Test	Method	Value ⁽¹⁾
Tensile Strength at 5% Strain, Both Principal Directions (lb/ft)	ASTM D 4595 ⁽²⁾	450 min.
Flexural Rigidity Both Principal Directions (mg-cm)	ASTM D 1388 ⁽³⁾	150,000 min.
Aperture Area (in ²)	Inside Measurement ⁽⁴⁾	5.0 max
Aperture Dimension (in)	Inside Measurement ⁽⁴⁾	0.5 min.

(1) All numerical values represent minimum/maximum average roll values, i.e. the average minimum test results on any roll in a lot should meet or exceed the minimum specified value.

(2) The tensile strength (T) of a joined multi-layered geogrid shall be computed using the following equation:

$$T = n(f)t$$

where

n = the number of individual layers in the joined multi-layered geogrid,

t = the tensile strength of a single layer of geogrid as determined using testing method ASTM D4595, and

f = reduction factor based on the number of layers comprising the multi-layered system and determined by the equation $f = 1.00 - [0.04(n - 1)]$.

(3) Values shall be determined by Option “A” (Cantilever Test) of testing method ASTM D1388 using test specimens that are 36 inches ± 0.04 inch long. Test specimen widths for differing geogrids shall be variable and equal to one element plus $\frac{1}{2}$ the aperture width on both sides of that element. An element is defined as the minimum number of parallel strands that form a distinguishable repeating pattern.

(4) Aperture Area and Aperture Dimension for joined multi-layer geogrids shall be determined based on measurement of a single layer of the geogrid.

Protect the geogrid from ultraviolet radiation and from damage due to shipping and handling. Keep the geogrid dry until it is installed. The geogrid rolls shall be clearly marked to identify the material contained.

Deliver a sample of the geogrid material to the engineer at least ten days prior to its incorporation into the work. At the same time, furnish a manufacturer’s Certified Report of Test or Analysis that verifies that the geogrid delivered for use on the work meets the above requirements. Samples of geogrid for test purposes will be obtained from the job site for each 10,000 square yards or portions thereof used on the contract.

C Construction

Prior to placement of the geogrid, bring the indicated placement surface to the required lines, grades, and dimensions as shown on the plans. Smooth and shape the surface to eliminate any rocks, clods, roots, or other items that may cause damage to the geogrid during placement or covering.

Place the geogrid on the prepared surface at the locations and to the limits as shown on the plans. After placement, pull the geogrid taut and secure it using pins, clips, staples, or other devices to prevent movement or displacement. Place parallel strips of geogrid with a minimum overlap of 24 inches. Lap butt joints between roll ends a minimum of 12 inches. Fasten all lapped sections together by using ties, straps, clips, or other devices to develop a secure joint that meets the approval of the engineer. No vehicles or construction equipment shall be permitted to operate directly on the geogrid.

Cover small rips, tears, or defects in the geogrid with an additional section of geogrid; secure the additional geogrid in place so that it overlaps the damaged area by at least 3 feet in all directions. Remove and replace geogrid sections with large rips, tears, defects, or other damage at the direction of the engineer. Take responsibility for all costs to repair or replace damaged or defective geogrid.

After placement, cover the geogrid to the indicated depth with the type of material required on the plans or in the special provisions. Placing, spreading, and compacting of this material shall comply with the applicable sections of the standard specifications or special provisions except that the initial lift of material placed on the geogrid must be at least 4 inches. Place, spread, and compact the required backfill material so that the geogrid is not displaced or damaged. The engineer may require changes in equipment and/or operations to prevent such damage or displacement.

D Measurement

The department will measure Geogrid Reinforcement by the square yard of surface area upon which the geogrid has been placed and accepted.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0180.0030	Geogrid Reinforcement	SY

Payment is full compensation for furnishing, transporting, and installing the geogrid; furnishing and installing all devices and materials necessary to join or secure the geogrid in place; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

224. Geotextile Fabric Type FF, Item SPV.0180.0040.

A Description

This special provision describes furnishing, installing and removing geotextile fabric and fabric hold down systems for filtering storm water, as shown in the plans and as hereinafter provided.

B Materials

Furnish type FF geotextile fabrics conforming to standard spec 645.2.1 except use a woven polypropylene fabric. Furnish type FF geotextile fabrics selected from the department's erosion control product acceptability list (PAL). Obtain copies of the erosion control PAL and prequalification procedure from the Bureau of Technical Services.

C Construction

Meet the pertinent requirements as set forth in standard spec 645.3 and as follows:

Install in accordance to the plan details for the intended use in such a manner to preclude ripping and tearing of the fabric, or otherwise rendering the fabric or assembly ineffective for its intended use.

D Measurement

The department will measure Geotextile Fabric, Type FF by the square yard of surface area of the fabric placed and accepted in accordance to the contract.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0180.0040	Geotextile Fabric, Type FF	SY

Payment is full compensation for furnishing, transporting, installing and removing the fabric and fabric hold down systems; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

225. Asphaltic Pavement Repair Special, Item SPV.0195.0010.**A Description**

This special provision describes the excavating, grading, compacting, and finishing necessary to accommodate Asphaltic Pavement Repair Special as shown on the plans and in accordance to the pertinent requirements of the standard specifications, and as hereinafter provided.

B Materials

Delete standard spec 460.2.8.

Submit a mix design under the Asphaltic Pavement Repair Special bid item. Furnish an asphaltic mixture meeting the requirements specified for either type E-3 or E-10 under standard spec 460.2.

Provide asphaltic material PG 64-22 for this mix in accordance to standard spec 455.

Provide tack coat that is in accordance to standard spec 455.2.5.

C Construction

Conform to standard spec 315.3.1.

Backfill all subgrade voids beneath the repair area using compacted Base Aggregate Dense. Upon approval of the engineer, backfill voids that cannot be compacted with standard equipment with Backfill Controlled Low Strength.

Adjust and reset any castings for all drainage structures within the repair area prior to the placement of Asphaltic Pavement.

D Measurement

The department will measure Asphaltic Pavement Repair Special by the ton, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0195.0010	Asphaltic Pavement Repair Special	TON

Payment for the Asphaltic Pavement Repair Special item is full compensation for sawing joints, sawing existing pavement, for removing and disposing of existing pavements and excavated materials, preparing the foundation, adjusting castings, placing tack coat, providing and placing the asphaltic mixture (including asphaltic material), and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work in accordance to the contract. The department will pay for individual repairs the width of the existing lane or shoulder and less than 100 feet long as Asphaltic Pavement Repair Special.

The department will pay for Base Aggregate Dense and/or Backfill Controlled Low Strength separately under the respective bid items.

226. Cold Patch, Item SPV.0195.0020.

A Description

This special provision describes furnishing, stockpiling, placing, and maintaining cold patch material. The cold patch material shall be used for short term maintenance purposes to fill potholes/voids in the existing pavement surface that the engineer deems necessary.

B Materials

B.1 General

Furnish cold patch that is a combination of course aggregate, natural sand and bituminous material MC-250. The mixture shall be designed to have a workability range of 15°F-100° F without the addition of heat. The mixture shall have good adhesion to wet surfaces and be resistant to damage by water, salt and deicing products. The mixture shall be uniform and not require any mixing or special handling prior to use.

B.2 Gradations

Conform to the following gradation requirements:

SIEVE SIZE	PERCENT PASSING (by weight)
3/8 Inch (9.5mm)	96 - 100
No. 4 (4.75 mm)	76 - 82
No. 8 (2.38mm)	50 - 60
No. 50 (.297mm)	15 - 20
No. 200 (.074mm)	2 - 5
Bitumen	4.8 - 5.2

C Construction

C.1 General

Choose a smooth, firm, and well-drained area for an on-site stockpile that is cleared of vegetation and foreign material that may contaminate the cold patch. The stockpile shall be easily accessible and able to be maintained and replenished at any time during the duration of the project.

Application of the cold patch must be able to be accomplished by hand labor. Prior to filling any potholes/voids all ponded water and loose debris shall be removed. Place material into the pothole/void and compact flush with a tamper, roller, or vehicle tire. Traffic must be able to travel over the patch immediately after installation.

D Measurement

The department will measure Cold Patch by the ton stockpiled on site, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0195.0020	Cold Patch	Ton

Payment for cold patch is full compensation for the patch; furnishing and providing a stockpile of material; preparing the pothole/void for material placement, stockpiling, placing, compacting, and maintaining, and all incidentals necessary to complete the contract work.

The contractor shall be compensated for any unused stockpile quantities remaining on site at the completion of the project, thus the stockpile is not to exceed 10 tons on site at any given time unless approved by the engineer.

Any unused portions of the stockpile shall be removed and disposed of at the completion of the project unless otherwise directed by the engineer. This work shall be completed at no additional expense to the department.

227. Loading, Hauling, and Disposal of Petroleum Contaminated Soil, Item SPV.0195.0040.

A Description

A.1 General

This special provision describes loading, hauling, and disposing of petroleum contaminated soil at a DNR licensed facility. The closest DNR licensed landfill facilities are:

Waste Management Orchard Ridge Landfill
N96W13503 County Line Road
Menomonee Falls, WI 53051
(262) 532-6200

Waste Management Metro Landfill
10712 S. 124th Street
Franklin, WI 53132
(414) 529-6180

Excavation for this item is paid for under other bid items within this contract.

Perform this work in accordance to standard spec 205 and with pertinent parts of Chapters NR 700-754 of the Wisconsin Administrative Code, as supplemented herein. Per NR 718.07, a solid waste collection and transportation service-operating license is required under NR 502.06 for each vehicle used to transport contaminated soil.

A.2 Notice to the Contractor – Contaminated Soil and Groundwater Location

The department and others completed testing for soil and groundwater contamination for locations within this project where excavation is required. Testing indicated that petroleum-contaminated soil mixed with foundry sand is present at the following location as shown on the plans:

- West Kearney Street Station 111+30 to 125+00, from project limits left to right, from as shallow as 3 to as deep as 12 feet bgs, estimated 1400 cubic yards
- Structure B-40-892 Station 40+00 to 40+40, project limits from left to right, Zero feet to 24 feet bgs, estimated 1604 cubic yards

Directly load soil excavated by the project at the above locations into trucks that will transport the soil to a WDNR-licensed bioremediation facility.

If contaminated soils are encountered elsewhere on the project, terminate excavation activities in the area and notify the engineer.

No active groundwater monitoring wells were observed within the construction limits. If active groundwater monitoring wells are encountered during construction, notify engineer and protect them to maintain their integrity.

The excavation management plan for this project has been designed to minimize the offsite disposal of contaminated material. The excavation management plan, including these special provisions, has been developed in cooperation with the WDNR. The WDNR concurrence letter is on file at the Wisconsin Department of Transportation. For further information regarding previous investigation and remediation activities at these sites contact:

Name: Michael Cape, P.G.
Address: 141 NW Barstow Street, Waukesha, WI 53187-0798
Phone: (262) 548-5930
Fax: (262) 548-6891
E-mail: michael.cape@dot.state.wi.us

A.3 Coordination

Coordinate work under this contract with the environment consultant:

Consultant: TRC Environmental Corporation
Address: 150 N. Patrick Blvd. Ste. 180, Brookfield, WI 53045
Contact: Mr. Ken Yass, P.E., CHMM
Phone: (262) 901-2145
Fax: (262) 879-1220
E-mail: kyass@trcsolutions.com

The role of the environmental consultant will be limited to:

1. Determining the location and limits of contaminated soil to be excavated based on soil analytical results from previous investigations, visual observations, and field screening of soil that is excavated;
2. Identifying contaminated soils to be hauled to the landfill facility;
3. Documenting that activities associated with management of contaminated soil are in conformance with the contaminated soil management methods for this project as specified herein; and
4. Obtaining the necessary approvals for disposal of contaminated soil from the landfill facility.

Provide at least a 14-calendar day notice of the preconstruction conference date to the environmental consultant. At the preconstruction conference, provide a schedule for all excavation activities in the areas of contamination to the environmental consultant. Identify the DNR licensed landfill facility that will be used for disposal of contaminated soils, and provide this information to the environmental consultant no later than 15 calendar days prior to commencement of excavation activities in the contaminated area or at the preconstruction conference, whichever comes first. The environmental consultant will be responsible for obtaining the necessary approvals from the landfill facility for disposal of contaminated soils.

Coordinate with the environmental consultant to ensure that the environmental consultant is present during excavation activities in the contaminated area. Notify the environmental consultant at least three calendar days prior to commencement of excavation activities the contaminated area. Do not transport contaminated soil offsite without prior approval from the environmental consultant.

A.4 Health and Safety Requirements

Supplement standard spec 107.1 with the following:

During excavation activities, expect to encounter soil contaminated with gasoline, diesel fuel, fuel oil, or other petroleum related products. Site workers taking part in activities that will result in the reasonable probability of exposure to safety and health hazards associated with hazardous materials shall have completed health and safety training that meets the Occupational Safety and Health Administration (OSHA) requirements for Hazardous Waste Operations and Emergency Response (HAZWOPER), as provided in 29 CFR 1910.120.

Prepare a site-specific Health and Safety Plan, and develop, delineate and enforce the health and safety exclusion zones for the contaminated site location as required by 29 CFR 1910.120. Submit the site-specific health and safety plan and written documentation of up-to-date OSHA training to the engineer prior to the start of work.

B (Vacant)

C Construction

Supplement standard spec 205.3 with the following:

Control operations in the contaminated area to minimize the quantity of contaminated soil excavated.

The environmental consultant will periodically monitor soil excavated from the contaminated area. The environmental consultant will evaluate excavated soil based on field screening results, visual observations, and soil analytical results from previous environmental investigations. Assist the environmental consultant in collecting soil samples for evaluation using excavation equipment. The sampling frequency shall be a maximum of one sample for every 20 cubic yards excavated.

Directly load and haul soils designated by the environmental consultant for offsite disposal to the DNR approved landfill facility. Use loading and hauling practices that are appropriate to prevent any spills or releases of petroleum-contaminated soils or residues. Prior to transport, sufficiently dewater soils designated for off-site disposal so as not to contain free liquids.

Verify that the vehicles used to transport material are licensed for such activity in accordance with applicable state and federal regulations. Obtain the necessary disposal facility approvals and DNR approvals for disposal. Do not transport regulated solid waste

off-site without obtaining the approval of the environmental consultant and engineer and notifying the disposal facility.

If dewatering is required in area of known contamination, water generated from dewatering activities may contain very low-level metals. Based on the limited groundwater testing performed in the Phase 2.5 investigation, the water generated may meet the effluent limits specified in “Contaminated Groundwater from Remedial Action Operations” (WPDES Permit No. WI-0046566-5), Table 3.1 once standard construction sediment removal is employed. Notify the engineer of any dewatering activities, and obtain any permits necessary to discharge water. Provide copies of such Permit to the engineer. Ensure continuous dewatering and excavation safety at all times. Provide, operate, and maintain adequate pumping equipment and drainage and disposal facilities. Meet any requirements and pay any costs for obtaining and complying with such permit use. Follow all applicable legislative statutes, judiciary decisions, and regulations of the State of Wisconsin.

Costs associated with excavation dewatering in the contaminated area are considered incidental to this pay item. The Wisconsin Department of Transportation will be the generator of regulated solid waste from this construction project.

D Measurement

The department will measure Loading, Hauling, and Disposal of Petroleum Contaminated Soil in tons of contaminated soil accepted by the landfill facility as documented by weight tickets generated by the landfill facility, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0195.0040	Loading, Hauling, and Disposal of Petroleum Contaminated Soil	Ton

Payment is full compensation for segregating, loading, hauling, and disposal of contaminated soil; obtaining solid waste collection and transportation service operating licenses; assisting in the collection of soil samples for field evaluation; and dewatering of soils prior to transport, if necessary. No additional payment will be made for tipping fees associated with the disposal of contaminated soil.

**ADDITIONAL SPECIAL PROVISION 1 (ASP 1)
FOR TRANSPORTATION ALLIANCE FOR NEW SOLUTIONS (TrANS)
PROGRAM EMPLOYMENT PLACEMENTS AND APPRENTICESHIPS**

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Section 5204(e) – Surface Transportation Workforce Development Training and Education, provides for 100 percent Federal funding if the core program funds are used for training, education, or workforce development purposes, including “pipeline” activities. The core programs includes: Congestion Mitigation and Air Quality Improvement (CMAQ) Program, Highway Bridge Program (HBP), Interstate Maintenance (IM), National Highway System (NHS), and Surface Transportation Program (STP). These workforce development activities cover surface transportation workers, including OJT/SS programs for women and minorities as authorized in 23 U.S.C. §140(b).

TrANS is an employment program originally established in 1995 in Southeastern Wisconsin. Currently TrANS has expanded to include TrANS program locations to serve contractors in Southeast (Milwaukee and surrounding counties), Southcentral (Dane County and surrounding counties including Rock County), and most Northeastern Wisconsin counties from locations in Keshena, Rhinelander and surrounding far Northern areas. TrANS attempts to meet contractor’s needs in other geographic locations as possible. It is an industry driven plan of services to address the outreach, preparation, placement and retention of women, minorities and non-minorities as laborers and apprentices in the highway skilled trades. These candidate preparation and contractor coordination services are provided by community based organizations. For a list of the TrANS Coordinators contact the Disadvantaged Business Enterprise Office at (414) 438-4583 in Milwaukee or (608) 266-6961 in Madison. These services are provided to you at no cost.

I. BASIC CONCEPTS

Training reimbursements to employing contractors for new placements, rehires or promotions to apprentice of TrANS Program graduates will be made as follows:

- 1) **On-the-Job Training, Item ASP.1T0G, ASP 1 Graduate.** At the rate of \$5.00 per hour on federal aid projects when TrANS graduates are initially hired, or seasonally rehired, as unskilled laborers or the equivalent.

Eligibility and Duration: To the employing contractor, for up to 2000 hours from the point of initial hire as a TrANS program placement.

Contract Goal: To maintain the intent of the Equal Employment Opportunity program, it is a goal that 6 (number) TrANS Graduate(s) be utilized on this contract.

- 2) **On-the-Job Training, Item ASP.1T0A, ASP 1 Apprentice.** At the rate of \$5.00 per hour on federal aid projects at the point when an employee who came out of the TrANS Program is subsequently entered into an apprenticeship contract in an underutilized skilled trade (this will include the Skilled Laborer Apprenticeship when that standard is implemented).

Eligibility and Duration: To the employing contractor, for the length of time the TrANS graduate is in apprentice status.

Contract Goal: To maintain the intent of the Equal Employment Opportunity program, it is a goal that 6 (number) TrANS Apprentice(s) be utilized on this contract.

- 3) The maximum duration of reimbursement is two years as a TrANS graduate plus time in apprentice status.
- 4) If a TrANS program is not available in the contractor's area and another training program is utilized, payment of On-the-Job Training hours may be approved by the Wisconsin Department of Transportation (WisDOT) if the training program meets the established acceptance criteria. Only On-the-Job Training Hours accumulated after WisDOT approval will be reimbursed as specified under Items ASP.1T0G and ASP.1T0A. For more information, contact the Disadvantaged Business Enterprise Office at the phone numbers listed above.
- 5) WisDOT reserves the right to deny payments under items ASP.1T0G and ASP.1T0A if the contractor either fails to provide training or there is evidence of a lack of good faith in meeting the requirements of this training special provision.

I. RATIONALE AND SPECIAL NOTE

The \$5.00 per hour now being paid for TrANS placements is intended to cover the duration of two years to allow for reaching entry-level laborer status. An additional incentive, the \$5.00 rate, would promote movement into the underutilized skilled trades' apprenticeships and applies until the individual completes their apprenticeship. These incentives benefit TrANS candidates by giving them a better opportunity to enter a skilled trade; benefits contractors who will be assisted in meeting their EEO profiles and goals; and benefits the public who will see the program reinforce larger public-private employment reform in Wisconsin. The pool of TrANS graduates was created for the purpose of addressing underutilization in the skilled trades, an objective that is further reinforced by a parallel retention pilot program, known as the Companywide Reporting. *Whether or not reimbursement is involved, the WisDOT reassures contractors who are in the Companywide Program that TrANS placements still contribute toward fulfilling the new hire goal of 50% women and minorities.* Based on data administered by United States Department of Labor (US DOL), the highway skilled trades remain underutilized for women statewide (less than 6.9%); and for minorities in all counties (% varies by county).

NOTE: *Unless using other advancement strategies, contractors are encouraged to use some or all of this monetary incentive to offset the cut in hourly wages an individual may incur when entering an apprenticeship if the full general laborer hourly rate has been previously paid. No special accounting measures are required.*

II. IMPLEMENTATION

The implementation of ASP 1 is intended to cover only the amount of time it takes for underutilization to be resolved across the trades. This will be measured annually at the county and/or state levels using data administered by WisDWD in relation to goals set by the USDOL-

OFCCP. With appropriate state and federal approvals, we may also do some measurement at the company level.

It is the contractor's responsibility to note on their Certified Payrolls if their employee is a TrANS graduate or a TrANS apprentice. The District EEO Coordinators utilize the information on the Certified Payrolls to track the hours accumulated by TrANS Graduates and TrANS apprentices on WisDOT contracts. Payment under this ASP 1 is made based on the hours recorded off of the Certified Payrolls. Tracking may eventually include improved linkages with the WisDWD apprentice database, information from company and committee level sources.

TrANS is nondiscriminatory by regulation, and is a tool for optional use by contractors to address the underutilization of women and minorities as laborers and apprentices in our industry's skilled trades.

IV. TRANS TRAINING

As part of the contractor's equal employment opportunity affirmative action program, training shall be provided to employees enrolled in apprenticeship and on-the-job training programs as follows:

The contractor shall provide on-the-job training aimed at developing full journey workers in the type of trade or job classifications involved. In the event the contractor subcontracts a portion of the contract work, the contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract.

Training and upgrading of minorities and women toward journey workers status is a primary objective of this training special provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority trainees and women trainees); to the extent such persons are available within a reasonable area of recruitment. The contractor will be given an opportunity and will be responsible for demonstrating the steps that they have taken in pursuance thereof, prior to determination as to whether the contractor is in compliance with this training special provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journey workers status or in which they have been employed as a journey worker. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the contractor's records should document the findings in each case.

V. APPRENTICESHIP TRAINING

The Federal Highway Administration's (FHWA) policy is to require full use of all available training and skill improvement opportunities to assure increased participation of minority groups, disadvantaged persons and women in all phases of the highway construction industry. The FHWA On-the-Job Training (OJT) Program requires the State transportation agencies (STAs) to establish apprenticeships and training programs targeted to move women, minorities, and disadvantaged individuals into journey-level positions to ensure that a competent workforce is available to meet highway construction hiring needs, and to address the historical underrepresentation of members of these groups in highway construction skilled crafts.

The OJT Supportive Services (OJT/SS) Program was established in Title 23 Code of Federal Regulations (CFR), Part 230) to supplement the OJT program and support STA training programs by providing services to highway construction contractors and assistance to highway construction apprentices and trainees. The primary objectives of OJT/SS are:

- (1) To increase the overall effectiveness of the State highway agencies' approved training programs.
- (2) To seek other ways to increase the training opportunities for women, minorities, and disadvantaged individuals.

The STAs are responsible for establishing procedures, subject to the availability of Surface Transportation and Bridge Funds under 23 U.S.C. §140(b) (Nondiscrimination), for the provision of supportive services with respect to training programs approved under 23 CFR, Part 230(a) (Equal Employment Opportunity on Federal and Federal-aid Construction Contracts – including Supportive Services).

The contractor and subcontractor shall maintain records to demonstrate compliance with these apprenticeship requirements. Reasonable exemptions and modifications to and from any or all of these requirements will be determined by the Wisconsin Department of Transportation-Civil Rights Office. A request for an exemption or modification, with justification, shall be made in writing, addressed to WisDOT Civil Rights Office, 4802 Sheboygan Avenue, P.O. Box 7965, Rm. 451, Madison, WI 53707.

ADDITIONAL SPECIAL PROVISION 3 DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

1. Description

General

- a. The disadvantaged business enterprise (DBE) requirements of 49 CFR Part 26 apply to this contract. The department's DBE goal is shown on the cover of the bidding proposal. The contractor can meet the specified contract DBE goal by procuring services or materials from a DBE or by subcontracting work to a DBE. The department calculates the DBE participation as the dollar value of DBE participation included in the bid expressed as a percentage of the total contract bid amount.
- b. Under the contract, the contractor agrees to provide the assistance to participating DBE's in the following areas:
 - i. Produce accurate and complete quotes.
 - ii. Understand highway plans applicable to their work.
 - iii. Understand specifications and contract requirements applicable to their work.
 - iv. Understand contracting reporting requirements.
- c. The department encourages the contractor to assist and develop DBE firms to become fully knowledgeable contractors to successfully perform on its contracts.
- d. For information on the disadvantaged business program, visit the department's Civil Rights and Compliance Section website at:

<http://www.dot.wisconsin.gov/business/engrserv/dbe-main.htm>

2. Definitions

- a. Interpret these terms, used throughout this additional special provision, as follows:
 - i. **Bid Percentage:** The DBE percentage indicated in the bidding proposal at the time of bid.
 - ii. **DBE:** A disadvantaged business enterprise (DBE) certified as a DBE by the department and included on the department's list of certified DBE's who are determined to be ready, willing and able.
 - iii. **DBE goal:** The amount of DBE participation expected in the contract as shown on the cover of the Highway Work Proposal.
 - iv. **Discretionary Goal:** A contractor assigned DBE goal, typically abbreviated as "Disc" on the cover of the Highway Work Proposal, which is enforced as committed.
 - v. **Manufacturer:** A firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract.
 - vi. **Supplier:** A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment required under the contract are bought, kept in stock, and regularly sold or leased to the public.
 - vii. **Voluntary Achievement:** The amount of DBE participation achieved and reported in the contract in excess of the assigned goal.

3. DBE Percentage Required at Bid Submission

Indicate the bid percentage (i.e. 0% through 100%) of DBE participation on the completed bidding proposal, including projects with discretionary goals. For electronic submittals, show the percentage in the miscellaneous data folder, Item 3, DBE Percent. For paper submittals, show the percentage on the sheet included after the schedule of items. By submission of the bid, the bidder contractually commits to DBE participation at or above the bid percentage, or certifies that they have utilized

comprehensive good faith efforts to solicit and utilize DBE firms to meet the DBE participation requirements of this contract proposal, and that the bid percentage is reflective of these good faith efforts. If the bidder does not indicate the bid percentage of DBE participation on the completed bidding proposal, the department will consider the bid irregular and may reject the bid.

4. Department's DBE Evaluation Process

a. Documentation Submittal

Within 10 business days after the notification of contract award, the contractor is to identify, by name, the DBE firms whose utilization is intended to satisfy this provision, the items of work of the DBE subcontract or supply agreement and the dollar value of those items of work by completing the Commitment to Subcontract to DBE Form [DT1506] and all necessary attachment A forms, as well as, Good Faith Waiver Form [DT1202] and supporting documentation as necessary. If the contractor fails to furnish the required forms within the specified time, the department may cancel the award. Delay in fulfilling this requirement is not a cause for extension of the contract time and shall not be used as a tool to delay execution.

i. Bidder Meets DBE Goal

If the bidder indicates that the contract DBE goal is met, after award and before execution, the department will evaluate the Commitment to Subcontract to DBE Form DT1506 and attachment A(s) to verify the actual DBE percentage achieved. If the DBE commitment is verified, the contract is eligible for execution with respect to the DBE commitment.

ii. Bidder Does Not Meet DBE Goal

- (1) If the bidder indicates a bid percentage on the Commitment to Subcontract to DBE Form [DT1506] that does not meet the contract DBE goal, the bidder must submit a Good Faith Waiver Form [DT1202] and supporting documentation. After award and before execution, the department will evaluate the bidder's DBE commitment and consider the bidder's good faith waiver request.
- (2) The department will review the bidder's good faith waiver request and notify the bidder of one of the following:
 - a. If the department grants a good faith waiver, the bid is eligible for contract execution with respect to DBE commitment.
 - b. If the department rejects the good faith waiver request, the department may declare the bid ineligible for execution. The department will provide a written explanation of why the good faith waiver request was rejected. The bidder may appeal the department's rejection as allowed under 7 a. & b.

5. Department's Criteria for Good Faith Effort

The Code of Federal Regulations {CFR}, 49 CFR Part 26-Appendix A, is the guiding regulation concerning good faith efforts. However, the federal regulations do not define "good faith" but states that bidder must actively and aggressively attempt to meet the goal. The federal regulations are general and do not include every factor or effort that can be considered. As a result, each state must establish its own processes and consider the factors established in its own process when making a determination of good faith.

- a. The department will only grant a good faith waiver if the bidder has made the effort, given the relevant circumstances under the contract that a bidder actively and aggressively seeking to meet the goal would make. The department will evaluate the bidder's good faith effort to determine whether a good faith waiver will be granted. The bidder must demonstrate, on the DT1202 that they have aggressively solicited DBE participation in an attempt to meet the contract DBE goal and attaining the stated DBE goal is not feasible.

- b. The department, in conjunction with industry stakeholders, has developed the following guidance for contractor good faith effort. The guidance and the attached appendices provide a framework for the actions required by all parties in the processing and evaluation of bidder's total efforts to achieve the project specific DBE goal prior to the bid letting date.
- c. Prime Contractors should:
 - i. Document all efforts and decisions made toward achieving the DBE goal on the contract. The bidder should use the Civil Rights & Compliance System [CRCS] and related WisDOT-approved DBE outreach tools, including the Bid Express Small Business Network, to foster DBE participation on all applicable contracts.
 - ii. Request quotes by identifying potential items to subcontract and solicit. Prime contractors are strongly encouraged to include in their initial contacts a single page including a detailed list of items for which they are accepting quotes, by project, within a letting. *See attached sample entitled "Sample Contractor Solicitation Letter" in Appendix A.* Prime contractors should also indicate a willingness to accept quotes in areas they are planning to perform themselves, **as required by federal rules**. In some cases, it might be appropriate to use DBE's to do work in a prime contractor's area of specialization.
 - (1) Solicit quotes through all reasonable and available means from certified DBE firms who match 'possible items to subcontract' and send copies to DBESS office, highlighting areas in which you are seeking quotes. Email is acceptable.
 - (2) SBN is the preferred outreach tool. <https://www.bidx.com/wi/main>. Other acceptable means include postal mail, email, fax, phone call.
 - a. Primes must ask DBE firms for a response in their solicitations. See *Sample Contractors Solicitation Letter* in Appendix. This letter can be included as an attachment to the SBN sub-quote request.
 - b. Solicit quotes at least 10 calendar days prior to the letting date {ideally two Fridays before the letting} to allow DBE firms sufficient time to respond. Prime contractors should contact DBE firms early, asking them if they need help in putting together a quote, or helping to arrange for equipment needs, or solve other problems.
 - (3) Second solicitation should take place within 5 days
 - a. An email solicitation is highly recommended for this second solicitation
 - (4) Upon request, provide interested DBE firms with adequate information about plans, specifications and the requirements of the contract by letter, information session, email, phone call and/or referral.
 - (5) When potential exists, advise interested DBE firms on how to obtain bonding, line of credit or insurance as may be requested.
 - (6) Document DBE firm's interest in quoting by taking appropriate steps to follow up initial solicitation with:
 - a. Email to all prospective DBE firms in relevant work areas
 - b. Phone call log to DBE firms who express interest via written response or call.
 - c. Fax/letter confirmation
 - d. Copy of the DBE quotes
 - e. Signed copy of Bid Express SBN Record of Subcontractor Outreach Effort.
- d. Evaluate DBE quotes as documentation is critical if the prime does not utilize the DBE firm's quote for any reason.
 - i. Evaluate DBE firm's capability to perform 'possible items to subcontract' using legitimate reasons, including but not limited to, **a discussion with the DBE firm** regarding its

- capabilities prior to the bid letting. If lack of capacity is your reason for not utilizing the DBE quote, you are required to contact the DBE directly regarding their ability to perform the work indicated in the UCP directory as their work area [NAICS code]; only the work area and/or NAICS code listed in the UCP directory will be counted for DBE credit. Documentation of the conversation is required.
- ii. In striving to meet a DBE conscious contract goal, prime contractors are expected to use DBE quotes that are responsive and reasonable. This includes DBE quotes that are not the low quote.
 - iii. **Special Circumstance:** Evaluation of DBE quotes with tied bid items. "Tied quotes are the condition in which a subcontractor submits quotes including multiple areas of expertise across multiple work areas noting that the items and price are tied. Typically this type of quoting represents a cost saving to the prime but is not clearly stated as a discount; tied quotes are usually presented as 'all or none' quote to the prime." When non-DBE subcontractors submit tied bid items in their quotes to the prime, the DBE firms' quote may seem not competitive. In such a case, the following steps are taken in comparing the relevant quotes. These are qualitative examples.
 - (1) Compare bid items common to both quotes, noting the reasonableness in the price comparison.
 - (2) Review quotes from other firms for the bid items not quoted by the DBE firm to see if combining both can provide the same competitive advantage that the tied bid items offered.
- e. After notification of contract award, submit '**Commitment to Subcontract**' form within the time period specified in the contract.
 - i. Provide the following information along with department form DT1202:
 - (1) The names, addresses, e-mail addresses, telephone numbers of DBE's contacted. The dates of both initial and follow-up contact. A printed copy of SBN solicitation is acceptable.
 - (2) A description of information provided to the DBE's regarding the plans, specifications, and estimated quantities for portions of the work to be performed by that DBE.
 - (3) Photocopies or electronic copies of all written solicitations to DBE's.
 - (4) Documentation of each quote received from a DBE and, if rejected, the reason for that rejection.
 - (5) Bidder attendance at any pre-solicitation or pre-bid meetings the department held to inform DBE's of participation opportunities available on the project.
 - f. The department's DBE Support Services Office is available by phone, email or in writing to request assistance in meeting the DBE goal:

DBE Support Services Office
6150 Fond du Lac Ave.
Milwaukee, WI 53218
Phone: 414-438-4583 / 608-266-6961
Fax: 414-438-5392
E-mail: DOTDBESupportServices@dot.wi.gov

6. Bidder's Appeal Process

- a. A bidder can appeal the department's decision to deny the bidder's good faith waiver request. The bidder must provide written documentation refuting the specific reasons for rejection as stated in the department's rejection notice. The bidder may meet in person with the department if so

requested. Failure to appeal within 7 calendar days after receiving the department's written notice of rejection of a good faith waiver request under constitutes a forfeiture of the bidder's right of appeal. If the bidder does not appeal, the department may declare the bid ineligible for execution.

- b. The department will appoint a representative, who did not participate in the original determination, to assess the bidder's appeal. The department will issue a written decision within 7 calendar days after the bidder presents all written and oral testimony. In that written decision, the department will explain the basis for finding that the bidder did or did not meet the contract DBE goal or make an adequate good faith effort to meet the contract DBE goal. The department's decision is final. If the department finds that the bidder did not meet the contract DBE goal or did not make adequate efforts to meet the DBE goal, the department may declare the bid ineligible for execution.

7. Department's Criteria for DBE Participation

Department's DBE List

- a. The department maintains a DBE list on the department's website at <http://app.mylcm.com/wisdot/Reports/WisDotUCPDirectory.aspx>
- b. The DBE office is also available to assist at 414-438-4583 or 608-266-6961.

8. Counting DBE Participation

Assessing DBE Work

- a. The department will only count the DBE usage towards the contract DBE goal if the DBE firm is certified as a DBE by one of the unified certification program agencies. If a firm becomes DBE certified before entering into a subcontract, the department may consider that DBE usage towards the contract goal. The department only counts the value of the work a DBE actually performs towards the DBE goal. The department assesses the DBE work as follows:
- b. The department counts work performed by the DBE's own resources. The department includes the cost of materials and supplies the DBE obtains for the work. The department also includes the cost of equipment the DBE leases for the work. The department will not include the cost of materials, supplies, or equipment the DBE purchases or leases from the prime contractor or its affiliate, except the department will count non-project specific leases the DBE has in place before the work is advertised.
- c. The department counts fees and commissions the DBE charges for providing a bona fide professional, technical, consultant, or managerial services. The department also counts fees and commissions the DBE charges for providing bonds or insurance. The department will only count costs the engineer deems reasonable based on experience or prevailing market rates.
- d. If a DBE subcontracts work, the department counts the value of the subcontracted work only if the DBE's subcontractor is also a DBE.
- e. The contractor shall maintain records and may be required to furnish periodic reports documenting its performance under this item.
- f. It is the prime contractor's responsibility to determine the DBE's ability to perform the work with the use of the UCP directory.

9. Commercially Useful Function

- a. The department counts expenditures of a DBE toward the DBE goal only if the DBE is performing a commercially useful function on that contract.
- b. A DBE is performing a commercially useful function if the following conditions are met:
- c. For contract work, the DBE is responsible for executing a distinct portion of the contract work and it is carrying out its responsibilities by actually performing, managing, and supervising that work.
- d. For materials and supplies, the DBE is responsible for negotiating price, determining quality and quantity, ordering, and paying for those materials and supplies.

10. Trucking

All bidders are expected to adhere to the department's current trucking policy posted on the HCCI website at

<http://www.dot.wisconsin.gov/business/engrserv/docs/dbe-trucking-notice.pdf>

11. Manufacturers and Suppliers

The department counts material and supplies a DBE provides under the contract. The department will give full credit toward the DBE goal if the DBE is a manufacturer of those materials or supplies. The department will give 60 percent credit toward the DBE goal if the DBE is merely a supplier of those materials or supplies. It is the bidder's responsibility to find out if the DBE is considered a supplier or a manufacturer before listing them on Commitment to Subcontract to DBE form DT1506.

12. DBE Prime

If the prime contractor is a DBE, the department will only count the work the contractor performs with its own forces, the work DBE subcontractors perform, and the work DBE suppliers or manufacturers perform.

13. Joint Venture

If a DBE performs as a participant in a joint venture, the department will only count that portion of the total dollar value of the contract equal to that portion of the work that the DBE performs with its own forces.

14. Mentor Protégé

- a. If a DBE performs as a participant in a mentor protégé agreement, the department will credit the portion of the work performed by the DBE protégé firm
- b. On every other project that the mentor protégé team identifies itself on.
- c. For no more than one half of the total contracted DBE goal on any WisDOT project.

15. DBE Replacement

In the event a Prime Contractor needs to replace a DBE firm originally listed on the approved DBE Commitment Form DT1506, the Prime Contractor must comply with the department's DBE Replacement Policy located on the DBE page on the following web site:

<http://www.dot.wisconsin.gov/business/engrserv/docs/policyreplacingdbe.pdf>

16. Changes to the approved DBE Commitment Form DT1506

If there are any changes to the approved Commitment to Subcontract to DBE Form DT1506, the prime contractor must submit a revised DBE Commitment Form DT1506 and relevant attachment A(s) to the DBE Programs Office within 5 business days.

17. Contract Modifications

When additional opportunity is available by contract modifications, the Prime Contractor shall utilize DBE Subcontractors, that were committed to equal work items, in the original contract.

18. Payment

Costs for conforming to this Additional Special Provision (ASP) and any associated DBE requirements are incidental to the contract.

APPENDIX A
Sample Contractor Solicitation Letter Page 1
This sample is provided as a guide not a requirement

GFW SAMPLE MEMORANDUM

TO: DBE FIRMS
FROM: POTENTIAL PRIME CONTRACTOR OR MAJOR SUBCONTRACTOR
SUBJECT: REQUEST FOR DBE QUOTES
LET DATE & TIME
DATE: MONTH DAY YEAR
CC: DBE OFFICE ENGINEER

Our company is considering bidding on the projects indicated on the next page, as a prime and/or a subcontractor for the Wisconsin Department of Transportation Month- date -year Letting. Page 2 lists the projects and work items that we may subcontract for this letting. We are interested in obtaining subcontractor quotes for these projects and work categories. Also note that we are willing to accept quotes in areas we may be planning to perform ourselves as required by federal rules.

Please review page 2, respond whether you plan to quote, highlight the projects and work items you are interested in performing and return it via fax or email within 3 days. Plans, specifications and addenda are available through WisDOT at the DBE Support Services office or at the Highway Construction Contract Information (HCCI) site at <http://roadwaystandards.dot.wi.gov/hcci/>

Your quote should include all of the costs required to complete the items you propose to perform including labor, equipment, material, and related bonding or insurance. The quote should note items that you are DBE certified to perform, tied items, and any special terms. Page 2, with the indicated projects and items you plan to quote, should be used as a cover sheet for your quote.

Please make every effort to have your quotes into our office by time deadline the prior to the letting date. **Make sure the correct letting date, project ID and proposal number, unit price and extension are included in your quote.** We prefer quotes be sent via SBN but prime's alternative's are acceptable. Our office hours are include hours and days. Please call our office as soon as possible prior to the letting if you need information/clarification to prepare your quote at contact number.

If you wish to discuss or evaluate your quote in more detail, contact us after the contract is awarded. Status of the contract can be checked at WisDOT's HCCI site at <http://roadwaystandards.dot.wi.gov/hcci/>

All questions should be directed to:

Project Manager, John Doe,
Phone: (000) 123-4567
Email: Joe@joetheplumber.com
Fax: (000) 123- 4657

Sample Contractor Solicitation Letter Page 2

This sample is provided as a guide not a requirement

REQUEST FOR QUOTATION

Prime's Name: _____

Letting Date: _____

Project ID: _____

Please check all that apply

- ☐ Yes, we will be quoting on the projects and items listed below
- ☐ No, we are not interested in quoting on the letting or its items referenced below
- ☐ Please take our name off your monthly DBE contact list
- ☐ We have questions about quoting this letting. Please have some one contact me at this number

Prime Contractor 's Contact Person

Phone: _____
Fax: _____
Email: _____

DBE Contractor Contact Person

Phone _____
Fax _____
Email _____

Please circle the jobs and items you will be quoting below

Proposal No.	1	2	3	4	5	6	7
County							

WORK DESCRIPTION:

Clear and Grub	X		X	X		X	X
Dump Truck Hauling	X		X	X		X	X
Curb & Gutter/Sidewalk, Etc.	X		X	X		X	X
Erosion Control Items	X		X	X		X	X
Signs and Posts/Markers	X		X	X		X	X
Traffic Control		X	X	X		X	X
Electrical Work/Traffic Signals		X	X	X		X	
Pavement Marking		X	X	X	X	X	X
Sawing Pavement		X	X	X	X	X	X
QMP, Base	X	X		X	X	X	X
Pipe Underdrain	X			X			
Beam Guard				X	X	X	X
Concrete Staining							X
Trees/Shrubs	X						X

Again please make every effort to have your quotes into our office by time deadline prior to the letting date.

We prefer quotes be sent via SBN but prime's preferred alternative's are acceptable.

If there are further questions please direct them to the prime contractor's contact person at phone number.

APPENDIX B BEST PRACTICES FOR PRIME CONTRACTOR & DBE SUBCONTRACTOR GOOD FAITH EFFORT

This list is not a set of requirements; it is a list of potential strategies

Primes

- Prime contractor open houses inviting DBE firms to see the bid “war room” or providing technical assistance
- Participate in speed networking and mosaic exercises as arranged by DBE office
- Host information sessions not directly associated with a bid letting;
- Participate in a formal mentor protégé or joint venture with a DBE firm
- Participate in WisDOT advisory committees i.e. TRANSAC, or Mega Project committee meetings
- Facilitate a small group DBE ‘training session’ Clarifying how your firm prepares for bid letting, evaluates subcontractors, preferred qualifications and communication methods
- Encourage subcontractors to solicit and highlight DBE participation in their quotes to you
- Quality of communication, not quantity creates the best results. Contractors should do as thorough a job as possible in communicating with DBE firms before the bid and provide any assistance requested to assure best possible bid.

DBE

- DBE firms should contact primes as soon as possible with questions regarding their quotes or bid; seven days prior is optimal.
- Continually check for contract addendums on the HCCI website through the Thursday prior to letting to stay abreast of changes.
- Review the status of contracts on the HCCI website reviewing the ‘apparent low bidder’ list, and bid tabs at a minimum.
- Prepare a portfolio or list of related projects and prime and supplier references; be sure to note transportation-related projects of similar size and scope, firm expertise and staffing.
- Participate in DBE office assessment programs
- Participate on advisory and mega-project committees
- Sign up to receive the DBE Contracting Update
- Consider membership in relevant industry or contractor organizations
- Active participation is a must. Quote as many projects as you can reasonably work on; quoting the primes and bidding as a prime with the department are the only ways to get work.

APPENDIX C

Types of Efforts considered in determining GFE

This list represents concepts being assessed; analysis requires additional steps

1. Whether the contractor attended any pre-solicitation or pre-bid meetings that were scheduled by WisDOT to inform DBEs of contracting and subcontracting opportunities;
2. Whether the contractor provided written notice to a reasonable number of specific DBEs that their interest in the contract was being solicited, in sufficient time to allow the DBEs to participate effectively;
3. Whether the contractor followed up initial solicitations of interest by contacting DBEs to determine if the DBEs were interested; returned the phone calls of interested DBE firms.
4. Whether the contractor selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the DBE goal;
5. Whether the contractor provided interested DBEs with adequate information about the plans, specifications and requirements of the contract;
6. Whether the contractor negotiated in good faith with interested DBEs, not rejected DBEs as unqualified without sound reasons based on a thorough investigation of their capabilities;
7. Whether the contractor made efforts to assist interested DBEs in being more competitive.
8. Whether the contractor effectively used the services of available minority community organizations: minority contractors groups, local, state, and Federal minority business assistance offices, and other organizations that provide assistance to small businesses and DBE firms.
9. Whether Prime used CRCS to identify DBE who specialize in relevant work areas.
10. Whether the contractor used available resources including contacting the DBE office, using WisDOT's website
11. Whether the contractor returned calls of firms expressing interest in a timely manner.

APPENDIX D
Good Faith Effort Evaluation Guidance
Excerpt from Appendix A of 49 CFR Part 26

APPENDIX A TO PART 26 -- GUIDANCE CONCERNING GOOD FAITH EFFORTS

- I. When, as a recipient, you establish a contract goal on a DOT assisted contract, a bidder must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The bidder can meet this requirement in either of two ways. First, the bidder can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the bidder can document adequate good faith efforts. This means that the bidder must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.
- II. In any situation in which you have established a contract goal, part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a bidder that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The efforts employed by the bidder should be those that one could reasonably expect a bidder to take if the bidder were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere pro forma efforts are not good faith efforts to meet the DBE contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.
- III. The Department also strongly cautions you against requiring that a bidder meet a contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a contract, even though the bidder makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring bona fide good faith efforts.
- IV. The following is a list of types of actions which you should consider as part of the bidder's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.
 - A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
 - B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
 - C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

- D.
 - (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.
 - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
- E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non solicitation of bids in the contractor's efforts to meet the project goal.
- F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.
- V. In determining whether a bidder has made good faith efforts, you may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the contract goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, you may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.

Appendix E

Small Business Network [SBN] Overview

The Small Business Network is a part of the Bid Express® service that was created to ensure that prime bidders have a centralized online location to find subs - including small and disadvantaged business enterprises (DBEs). It is available for prime bidders to use as part of their Basic Service subscription. Within the Small Business Network, **Prime Contractors** can:

1. Easily select proposals, work types and items:
 - a. After adding applicable work types, select items that you wish to quote. Enter the sub-quote quantities and add comments, if desired. Adding or removing items and work types can be done quickly. If needed, you can save the sub-quote for completion at a later time.
2. Create sub-quotes for the subcontracting community:
 - a. Create sub-quotes with ease using the intuitive sub-quote creator. In seven short steps, you can rapidly create a custom sub-quote directed to all subcontractors that bid on the applicable work types. Steps include: provide contact information and sub-quote expiration date, select letting and proposal, add work types and items, specify terms and conditions, upload attachments, and select vendors.
 - b. Create a sub-quote to send to subcontractors or suppliers that lists the items in a proposal that you want quoted
 - c. Create an unlimited number of sub-quotes for items you want quoted, and optionally mark them as a DBE-preferred request
 - d. Add attachments to sub-quotes
3. View sub-quote requests & responses:
 - a. After logging into the Bid Express service, you can quickly review all of your sub-quote requests and all unsolicited sub-quote requests from subcontractors. To simplify the Small Business Network home screen, sub-quote requests can be hidden with one click if they are not applicable.
 - b. View or receive unsolicited sub-quotes that subcontractors have posted, complete with terms, conditions and pricing
4. View Record of Subcontractor Outreach Effort:
 - a. For each sub-quote produced, a *Record of Subcontractor Outreach Effort* is generated that shows the response statistics for a particular sub-quote. If accepted by the letting agency, this report may serve as proof of a “Good Faith” effort in reaching out to the DBE community.
 - b. Easily locate pre-qualified and certified small and disadvantaged businesses
 - c. Advertise to small and disadvantaged businesses more efficiently and cost effectively
 - d. Document your interactions with subs/DBEs by producing an Outreach Report (may be accepted as proof of DBE outreach at the discretion of each agency)

The Small Business Network is a part of the Bid Express® service that was created to ensure that small businesses have a centralized area to access information about upcoming projects. It can help small businesses learn more about opportunities, compete more effectively, network with other contractors and subcontractors, and win more jobs.

1. View and reply to sub-quote requests from primes:
 - a. After logging into the Bid Express service, you can quickly review all incoming sub-quote requests and all unsolicited sub-quotes created by your company. Receive notifications by selected work type. To simplify on the Small Business Network home screen, sub-quote requests can be filtered by work types relevant to your interests, or hidden with one click if they are not applicable.
2. Select items when responding to sub-quote requests from primes:
 - a. You have the freedom to choose and price any number of items when responding to a sub-quote request. Quantities can be modified, and per-item comments are also available.
 - b. View requests for sub-quotes for work that primes have posted for projects they are bidding, add your pricing, terms, and conditions, and submit completed sub-quotes to the requesting primes
 - c. Add attachments to a sub-quote
3. Create and send unsolicited sub-quotes to specific contractors:
 - a. Create unsolicited sub-quotes with ease using the intuitive sub-quote creator. In eight short steps, you can rapidly create a custom sub-quote directed at any number of specific vendors of your choosing. Steps include: provide contact information and sub-quote expiration date, select letting and proposal, add work types and items, specify terms and conditions, upload attachments, and select vendors.
4. Easily select and price items for unsolicited sub-quotes:
 - a. After adding applicable work types, select items that you wish to quote. The extended price calculates automatically, cutting out costly calculation errors. Comments can be provided on an per-item basis as well.
 - b. Create an unsolicited sub-quote that lists the items from a proposal that you want to quote, include pricing, terms and conditions, and send it to selected prime/plan holder
 - c. Add attachments to a sub-quote
 - d. Add unsolicited work items to sub-quotes that you are responding to
5. Easy Access to Valuable Information
 - a. Receive a confirmation that your sub-quote was opened by a prime
 - b. View Bid Tab Analysis data from past bids, including the high, average and low prices of items.
 - c. View important notices and publications from DOT targeted to small and disadvantaged businesses
6. Accessing Small Business Network for WisDOT contracting opportunities
 - a. If you are a contractor not yet subscribing to the Bid Express service, go to **www.bidx.com** and select “Order Bid Express.” The Small Business Network is a part of the Bid Express Basic Service.
 - b. DBE firms can request a Bid Express Small Business Network Account at no cost by calling 414-438-4588

ADDITIONAL SPECIAL PROVISION 4

Payment to First-Tier Subcontractors

Within 10 calendar days of receiving a progress payment for work completed by a subcontractor, pay the subcontractor for that work. The prime contractor may withhold payment to a subcontractor if, within 10 calendar days of receipt of that progress payment, the prime contractor provides written notification to the subcontractor and the department documenting the reasons for withholding payment.

The prime contractor may also withhold retainage from payments due subcontractors. Reduce the total amount retained from all first-tier subcontractors to no more than the department retains within 10 calendar days of the department releasing retainage.

Payment to Lower-Tier Subcontractors

Ensure that subcontracting agreements at all tiers provide prompt payment and release of retainage rights to lower-tier subcontractors that parallel those granted first-tier subcontractors in this provision.

ADDITIONAL SPECIAL PROVISIONS 5**Fuel Cost Adjustment****A Description**

Fuel Cost Adjustments will be applied to partial and final payments for work items categorized in Section B as a payment to the contractor or a credit to the department. ASP-5 shall not apply to any force account work.

B Categories of Work Items

The following items and Fuel Usage Factors shall be used to determine Fuel Cost Adjustments:

(1) Earthwork.		Unit	Gal. Fuel Per Unit
205.0100	Excavation Common	CY	0.23
205.0200	Excavation Rock	CY	0.39
205.0400	Excavation Marsh	CY	0.29
208.0100	Borrow	CY	0.23
208.1100	Select Borrow	CY	0.23
209.0100	Backfill Granular	CY	0.23
350.0102	Subbase	CY	0.28
350.0104	Subbase	Ton	0.14
350.0115	Subbase 6-Inch	SY	0.05
350.0120	Subbase 7-Inch	SY	0.05
350.0125	Subbase 8-Inch	SY	0.06
350.0130	Subbase 9-Inch	SY	0.07
350.0135	Subbase 10-Inch	SY	0.08
350.0140	Subbase 11-Inch	SY	0.09
350.0145	Subbase 12-Inch	SY	0.09
SPV.0035.0010	Loading, Hauling and Reuse of Solid Waste Soil	CY	0.23
SPV.0195.0040	Loading Hauling and Disposal of Petroleum Contaminated Soil	Ton	0.12

C Fuel Index

A Current Fuel Index (CFI) in dollars per gallon will be established by the Department of Transportation for each month. The CFI will be the price of No. 2 fuel oil, as reported in U.S. Oil Week, using the first issue dated that month. The CFI will be the average of prices quoted for Green Bay, Madison, Milwaukee and Minneapolis.

The base Fuel Index (BFI) for this contract is \$2.90 per gallon.

D Computing the Fuel Cost Adjustment

The engineer will compute the ratio CFI/BFI each month. If the ratio falls between 0.85 and 1.15, inclusive, no fuel adjustment will be made for that month. If the ratio is less than 0.85 a credit to the department will be computed. If the ratio is greater than 1.15 additional payment to the contractor will be computed. Credit or additional payment will be computed as follows:

- (1) The engineer will estimate the quantity of work done in that month under each of the contract items categorized in Section B.
- (2) The engineer will compute the gallons of fuel used in that month for each of the contract items categorized in Section B by applying the unit fuel usage factors shown in Section B.
- (3) The engineer will summarize the total gallons (Q) of fuel used in that month for the items categorized in Section B.
- (4) The engineer will determine the Fuel Cost Adjustment credit or payment from the following formula:

$$FA = \left(\frac{CFI}{BFI} - 1 \right) \times Q \times BFI$$

(plus is payment to contractor; minus is credit to the department)

Where	FA	=	Fuel Cost Adjustment (plus or minus)
	CFI	=	Current Fuel Index
	BFI	=	Base Fuel Index
	Q	=	Monthly total gallons of fuel

E Payment

A Fuel Cost Adjustment credit to the department will be deducted as a dollar amount each month from any sums due to the contractor. A Fuel Cost Adjustment payment to the contractor will be made as a dollar amount each month.

Upon completion of the work under the contract, any difference between the estimated quantities and the final quantities will be determined. An average CFI, calculated by averaging the CFI for all months that fuel cost adjustment was applied, will be applied to the quantity differences. The average CFI shall be applied in accordance with the procedure set forth in Section D.

ADDITIONAL SPECIAL PROVISION 6
ASP 6 - Modifications to the standard specifications

Make the following revisions to the 2013 edition of the standard specifications:

104.4 Requests for Information

Replace paragraph one with the following effective with the July 2013 letting:

- (1) Either the department or the contractor may request information that the other party must provide in order for the requesting party to fulfill its contract obligations. The requesting party shall submit requests for information (RFI) on department form DT2502 either in hard copy or via email. RFI must conform to the following:
 - Be of reasonable scope.
 - Explain why a response is necessary to fulfill contract obligations.
 - Provide a requested response time, which must be reasonable in relation to its scope.
-

106.1 General

Replace the entire text with the following effective with the July 2013 letting:

106.1.1 Materials

- (1) Provide materials conforming to the contract. Use new products and materials for items permanently incorporated into the work unless the contract specifies or allows otherwise. Use materials the contract specifies unless the engineer authorizes substitutes under 108.8. Monitor construction operations to identify potential nonconforming materials and prevent their incorporation into the work.
- (2) All materials are subject to the engineer's approval before incorporation into the work. The engineer may inspect or test all materials at any time during their preparation, storage, and use. Notify the engineer of the proposed source of materials before delivering those materials to the project site. If the engineer requests, provide samples of material and access to facilities that the engineer needs to assess the acceptability of all materials. The department will, on request, share with the contractor available information on a source or material. The department will maintain a web-based list of approved aggregate sources. Aggregate producers must provide test results as required in the department policy for aggregate source approval to have their source approved and to keep that approval over time.
- (3) For fabricated components, the materials and the fabricator are subject to the department's approval before delivery of those components to the project site. The engineer may require the contractor to obtain components from another department-approved source if the department determines a fabricator's product does not conform to the contract.
- (4) Do not incorporate materials into the work until the engineer approves those materials. However, the contractor may request permission to incorporate materials not already approved. The engineer will grant this permission only if the contractor can provide convincing evidence that the engineer will subsequently find those materials conforming. Incorporation of materials before approval is at the contractor's risk and permission to do so does not imply that the department will subsequently approve those materials.
- (5) Except as required under the contract, ensure that products incorporated into the work, either temporarily or permanently, do not display advertising or messages not directly related to the manufacturer, properties, or function of those products; or advertising or messages in violation of state statutes

106.1.2 Designated Materials Person

- (1) Designate one person, either a member of the contractor's own organization or acting as an agent for the contractor responsible for the following:
 - Communicating contract sampling and testing requirements to subcontractors at all tiers.
 - Reporting out-of-specification test results to the department as soon as the information is available.

- Providing certified reports of test or analysis and manufacturers' certificates of compliance from subcontractors at all tiers and maintaining certification records as specified in 106.3.3.2.
 - (2) Ensure that the contractor-designated materials person submits materials information required under the contract to a person the engineer designates. Ensure that the contractor-designated materials person communicates with their department counterpart weekly.
-

106.3.4.3.1 General

Replace paragraph two with the following effective with the November 2012 letting:

- (2) Required sampling and testing methodologies and documentation are specified in CMM chapter 8.
 - (3) If disputed, approval of materials and components, as well as acceptance of the work incorporating those materials or components, is subject to review under the QMP dispute resolution process.
-

107.17.3 Railroad Insurance Requirements

Replace the entire text with the following effective with the August 2012 letting:

- (1) If required by the special provisions, provide or arrange for a subcontractor to provide railroad protective liability insurance in addition to the types and limits of insurance required in 107.26. Keep railroad protective liability insurance coverage in force until completing all work, under or incidental to the contract, on the railroad right of way or premises of the railroad and until the department has accepted the work as specified in 105.11.2.4.
- (2) Provide railroad protective liability insurance coverage written as specified in 23 CFR part 646 subpart A. Provide a separate policy for each railroad owning tracks on the project. Ensure that the railroad protective liability insurance policies provide the following minimum limits of coverage:
 - 1. Coverage A, bodily injury liability and property damage liability; \$2 million per occurrence.
 - 2. Coverage B, physical damage to property liability; \$2 million per occurrence.
 - 3. An annual aggregate amount of \$6 million that shall apply separately to each policy renewal or extension.
- (3) Obtain coverage from insurance companies licensed to do business in Wisconsin that have an A.M. Best rating of A- or better. The cost of providing the required insurance coverage and limits is incidental to the contract. The department will make no additional or special payment for providing insurance.
- (4) Submit the following to each railroad owning tracks on the project as evidence of that railroad's respective coverage:
 - 1. A certificate of insurance for the types and limits of insurance specified in 107.26.
 - 2. The railroad protective liability insurance policy or other acceptable documentation to the railroad company.
- (5) Submit the following to the region as evidence of the required coverage:
 - 1. A copy of the letter to the railroad company transmitting the submittal documents specified in 107.17.3(4).
 - 2. A certificate of insurance for the required railroad protective liability coverages.
- (6) Do not begin work on the right of way or premises of the railroad company until the region receives the submittals specified in 107.17.3(5) and notification from the railroad company that the contractor has provided sufficient insurance information to begin work.
- (7) Notify the railroad and the region immediately upon cancellation or initiating cancellation, whichever is earlier, or any material change in coverage. Cease operations within 50 feet of the railroad right of way immediately if insurance is cancelled or reduced. Do not resume operations until the required coverage is in force.

460.2.8.3.1.4 Department Verification Testing Requirements

Replace paragraph four with the following effective with the December 2012 letting:

- (4) The department will randomly test each design mixture at the following minimum frequency:
- FOR TONNAGES TOTALING:
- Less than 501 tons no tests required
- From 501 to 5,000 tons..... one test
- More than 5,000 tons..... add one test for each additional 5,000-ton increment

501.2.1 Portland Cement

Replace paragraph one with the following effective with the March 2013 letting:

- (1) Use cement conforming to ASTM specifications as follows:
- Type I portland cement; ASTM C150.
 - Type II portland cement; ASTM C150.
 - Type III portland cement; ASTM C150, for high early strength.
 - Type IP portland-pozzolan cement; ASTM C595, except maximum loss on ignition is 2.0 percent.
 - Type IS portland blast-furnace slag cement; ASTM C595.
 - Type IL portland-limestone cement; ASTM C595, except maximum nominal limestone content is 10 percent with no individual test result exceeding 12.0 percent.

501.2.5.5 Sampling and Testing

Replace the entire text with the following effective with the January 2013 letting:

- (1) Sample and test aggregates for concrete according to the following:
- | | |
|--|---------------------------|
| Sampling aggregates | AASHTO T2 |
| Lightweight pieces in aggregate | AASHTO T113 |
| Material finer than No. 200 sieve | AASHTO T11 |
| Unit weight of aggregate | AASHTO T19 |
| Organic impurities in sands | AASHTO T21 |
| Sieve analysis of aggregates | AASHTO T27 |
| Effect of organic impurities in fine aggregate | AASHTO T71 |
| Los Angeles abrasion of coarse aggregate | AASHTO T96 |
| Freeze-thaw soundness of coarse aggregate..... | AASHTO T103 |
| Sodium sulfate soundness of aggregates | AASHTO T104 |
| Specific gravity and absorption of fine aggregate | AASHTO T84 |
| Specific gravity and absorption of coarse aggregate | AASHTO T85 |
| Flat & elongated pieces based on a 3:1 ratio..... | ASTM D4791 ^[1] |
| Sampling fresh concrete | AASHTO R60 |
| Making and curing concrete compressive strength test specimens | AASHTO T23 |
| Compressive strength of molded concrete cylinders | AASHTO T22 |

^[1] As modified in CMM 8-60.

501.2.6 Fly Ash

Replace paragraph three with the following effective with the March 2013 letting:

- (3) Test fly ash using a recognized laboratory, as defined in 501.2.2(1), starting at least 30 days before its proposed use, and continuing at ASTM-required frequencies as the work progresses. The manufacturer shall test the chemical and physical properties listed in tables 1 and 2 of ASTM C618 at the frequencies and by the test methods prescribed in ASTM C311.

501.3.1.1.1 Air-Entrained Concrete

Replace paragraph one with the following effective with the March 2013 letting:

- (1) Prepare air-entrained concrete with type I, IL, II, IS, or IP cement and sufficient air-entraining admixture to produce concrete with the air content specified in 501.3.2.4.
-

501.3.1.3.2 Special Restrictions

Replace paragraph one with the following effective with the July 2013 letting:

- (1) If using coarse aggregate composed primarily of igneous or metamorphic materials, provide concrete for concrete pavement, approach slabs, barrier, surface drains, driveways, alleys, sidewalks, curb, gutter, and curb & gutter as follows:

Grade A, A-FA, A-S, and A-T : If using type II portland cement, or if using Type IL blended cement where the base portland cement meets Type II chemical requirements.

Grade A-IS and A-IP : If using type I/II blended portland cement.

Grade A-S2 : If placing by a slip-formed process and using type II portland cement.

Grade C, C-FA, C-S, C-IS, and C-IP : If using types I or III portland cement.

503.2.2 Concrete

Replace paragraph five with the following effective with the March 2013 letting:

- (5) Furnish prestressed concrete members cast from air-entrained concrete, except I-type girders may use non-air-entrained concrete. Use type I, IL, IS, , IP, II, or III cement. The contractor may replace up to 30 percent of type I, IL, II, or III cement with an equal weight of fly ash, slag, or a combination of fly ash and slag, except for prestressed box girders and slabs, the contractor shall replace 20-30 percent of the cement with fly ash, slag, or a combination of fly ash and slag. Ensure that fly ash conforms to 501.2.6 and slag conforms to 501.2.7. Use only one source and replacement rate for work under a single bid item. Use a department-approved air-entraining admixture conforming to 501.2.2 for air-entrained concrete. Use only size No. 1 coarse aggregate conforming to 501.2.5.4.
-

506.3.22 Shop Inspection

Replace paragraph one with the following effective with the July 2010 letting:

- (1) The engineer or an independent inspection agency under department contract may inspect all structural steel and miscellaneous metals furnished. The department will provide the contractor with monthly consultant inspection invoices and identify any quality deficiencies at the fabrication facility.
-

506.5 Payment

Add paragraph nine as follows effective with the June 2010 letting:

- (9) The department will limit costs for inspections conducted under 506.3.2 to \$0.05 per pound of material and deduct costs in excess of that amount from payment due the contractor. The department will determine costs for in-house inspections based on hourly rates for department staff plus overhead and use invoiced costs for contracted-out inspections. The department will administer deductions for the contractor's share of the total inspection cost under the Excess Costs For Fabrication Shop Inspection administrative item.
-

507.2.2.1 General

Replace paragraph four with the following effective with the December 2012 letting:

- (4) Ensure that there are no unsound knots or knot holes. Also ensure that there are no tight knots of a diameter exceeding one-quarter of the greater dimension at the point where they occur. Measure a knot by taking its diameter at right angles to the length of the timber. Ensure that the sum of sizes of all

knots in any one-foot length does not exceed 2 times the size of the largest allowed single knot. The engineer will treat cluster knots as if they were a single knot. A cluster knot is 2 or more knots grouped together, with the fibers of the wood deflected around the entire unit.

512.3.1 Driving and Cutting Off

Replace the entire text with the following effective with the December 2012 letting:

512.3.1.1 General

- (1) Coordinate driving operations to prevent damage or displacement of concrete in substructure units or damage to adjacent facilities due to vibrations.
- (2) Drive sheeting with a variation of 1/4 inch or less per foot from the vertical or from the batter the plans show. Ensure that the sheetpiles are within 6 inches of the plan position after driving. Do not damage sheetpiles attempting to correct for misalignment.
- (3) Remove and replace, or otherwise correct, sheetpiles the engineer deems unacceptable under 105.3. Submit details of planned corrections to the engineer for review and approval before initiating any corrective actions.
- (4) Drive sheetpiles to or beyond the required tip elevation the plans show.

512.3.1.2 Driving System

- (1) Furnish a sheetpile driving system capable of driving the sheetpiles to the required minimum tip elevation the plans show.
- (2) The engineer may order the contractor to remove a pile driving system component from service if it causes insufficient energy transfer or damages the sheetpiles. Do not return a component to service until the engineer determines that it has been satisfactorily repaired or adjusted.
- (3) Drive sheetpiles with diesel, air, steam, gravity, hydraulic, or vibratory hammers.

512.3.1.3 Cut-Offs

- (1) Cut off sheetpiles at the elevations the plans show or as the engineer directs. Pile cut-offs become the property of the contractor. Dispose of cut-offs not incorporated into the work.
-

518.2.1 General

Replace paragraph one with the following effective with the March 2013 letting:

- (1) Furnish portland cement and water as specified in 501.2. Unless the engineer allows an alternate, use either type I, IL, IS, or IP cement.
-

526.3.3 Temporary Structures

Replace paragraphs two through four with the following effective with the January 2013 letting:

- (2) Inspect temporary structures conforming to the National Bridge Inspection Standards (NBIS) and the department's structure inspection manual before opening to traffic. Perform additional inspections, as the department's structure inspection manual requires, based on structure type and time in service. Submit inspection reports on department form DT2007 to the engineer and electronic copies to the department's bureau of structures maintenance section. Ensure that a department-certified active team leader, listed online in the department's highway structures information system (HSIS), performs the inspections.
- (3) Maintain temporary structures and approaches in place until no longer needed. Unless the engineer directs otherwise, completely remove and dispose of as specified in 203.3.4. Contractor-furnished materials remain the contractor's property upon removal.

614.2.5 Wood Posts and Offset Blocks

Retitle and replace the entire text with the following effective with the July 2012 letting:

614.2.5 Posts and Offset Blocks**614.2.5.1 Wood Posts and Offset Blocks**

- (1) Furnish sawed posts and offset blocks of one of the following species:

Douglas fir	Southern pine	Ponderosa pine	Jack pine	White pine
Red pine	Western hemlock	Western larch	Hem-fir	Oak
- (2) Ensure that posts are the size the plans show and conform to the nominal and minimum dimensions tabulated in 507.2.2.3. The contractor does not have to surface the posts. Provide posts of the net length the plans show after setting and cut off.
- (3) Use stress graded posts rated at 1200 psi f_b or higher. Determine the stress grade rating for douglas fir, western larch, and southern pine as specified in 507.2.2.4.
- (4) For hem-fir, hemlock, red pine, white pine, jack pine, ponderosa pine, and oak conform to the following:

TABLE 614-1 PROPERTIES FOR WOOD POSTS AND BLOCKS

SPECIES			WESTERN HEMLOCK, HEM-FIR, RED PINE, WHITE PINE, JACK PINE, PONDEROSA PINE		OAK	
MAXIMUM SLOPE OF GRAIN			1 in 15		1 in 12	
NOMINAL WIDTH OF FACE			6"	8"	6"	8"
SHAKES, CHECKS, AND SPLITS	GREEN		1"	1 3/8"	2 3/8"	3 1/8"
	SEASONED		1 1/2"	2"	2 5/8"	3 1/2"
MAXIMUM WANE			1"	1 3/8"	1 1/8"	1 5/8"
MAXIMUM ALLOWABLE KNOTS	NARROW FACE	MIDDLE 1/3 OF LENGTH	1 3/8"	1 5/8"	2 1/8"	2 3/8"
		END ^[1]	2 3/4"	3 1/4"	4 1/4"	4 3/4"
		SUM IN MIDDLE 1/2 OF LENGTH ^[2]	11"	13"	17"	19
	WIDE FACE	EDGE KNOT N MIDDLE 1/3 OF LENGTH	1 3/8"	1 5/8"		
		EDGE KNOT AT END ^[1]	2 3/4" 7	3 1/4"		
		CENTERLINE	1 3/8"	1 7/8"	2 1/4"	2 7/8"
		SUM IN MIDDLE 1/2 OF LENGTH	5 1/2"	7 1/2"	9"	11 1/2"

^[1] But do not exceed the maximum allowable knot on the centerline of the wide face of the same piece.

^[2] But do not exceed 4 times the maximum allowable knot on the centerline of the wide face of the same piece.

- (5) Pressure treat posts and offset blocks as specified in 507.2.2.6. Use one of the oil-soluble preservatives or chromated copper arsenate conforming to 507.2.3. Use the same material for offset blocks and posts and treat material used in each continuous installation with the same type of preservative.

614.2.5.2 Steel Posts

- (1) Furnish steel posts conforming to AASHTO M270 Grade 36 and galvanized according to AASTHO M111.

614.2.5.3 Plastic Offset Blocks

- (1) Furnish plastic offset blocks from the department's approved products list.

614.3.1 General

Replace the entire text with the following effective with the July 2012 letting:

- (1) Paint the ends of cut-off galvanized posts, rail, bolts, cut or drilled surfaces of galvanized components, and areas of damaged zinc coating with 2 coats of zinc dust/zinc oxide paint. Clean the damaged and adjacent areas thoroughly before applying paint.
- (2) Apply 2 coats of wood preservative to cut surfaces of wood components. Use the same preservative originally used to treat that component or use a 2-percent solution of copper naphthenate conforming to AWWA Standard P8 or P36.

614.3.2.1 Installing Posts

Replace paragraph four with the following effective with the July 2012 letting:

- (4) Cut post tops to the finished elevation the plans show.

628.2.13 Rock Bags

Replace paragraph one with the following effective with the November 2012 letting:

- (1) Furnish rock bags made of a porous, ultraviolet resistant, high-density polyethylene or geotextile fabric that will retain 70% of its original strength after 500 hours of exposure according to ASTM D4355 and a minimum in-place filled size of 18-inches long by 12-inches wide by 6-inches high. Ensure that the fabric conforms to the following:

TEST REQUIREMENT	METHOD	VALUE
Minimum Tensile	ASTM D4632	
Machine direction		70 lb minimum
Cross direction		40 lb minimum
Elongation	ASTM D4632	
Machine direction		20% minimum
Cross direction		10 % min
Puncture	ASTM 4833	65 lbs minimum
Minimum Apparent Opening		0.0234 inches (No. 30 sieve)
Maximum Apparent Opening		0.0787 inches (No. 10 sieve)

639.2.1 General

Replace paragraph two with the following effective with the March 2013 letting:

- (2) For grout use fine aggregate conforming to 501.2.5.3 and type I, IL, IS, or IP cement.

649.3.1 General

Replace paragraphs three and four with the following effective with the March 2013 letting:

- (3) For pavements open to all traffic, apply centerline and no-passing barrier line markings as follows:
- On intermediate pavement layers, including milled surfaces, on the same day the pavement is placed or milled.
 - On the upper layer of pavement, on the same day the pavement is placed unless the contractor applies permanent marking on the same day the pavement is placed.

If weather conditions preclude same-day application, apply as soon as weather allows. Do not resume next-day construction operations until these markings are completed unless the engineer allows otherwise.

- (4) If required to apply no passing zone temporary pavement marking, reference the beginning and end of all existing no-passing barrier lines. Apply temporary no-passing barrier lines at those existing locations. If the contract contains the Locating No-Passing Zones bid item, relocate permanent no-passing zones as specified in section 648.
-

701.4.2 Verification Testing

Replace paragraph two with the following effective with the December 2012 letting:

- (2) The department will sample randomly at locations independent of the contractor's QC tests and use separate equipment and laboratories. The department will conduct a minimum of one verification test for each 5 contractor QC tests unless specific QMP provisions specify otherwise.
-

715.2.3.1 Pavements

Replace paragraph two with the following effective with the March 2013 letting:

- (2) Provide a minimum cement content of 565 pounds per cubic yard, except if using type I, IL, or III cement in a mix where the geologic composition of the coarse aggregate is primarily igneous or metamorphic materials, provide a minimum cement content of 660 pounds per cubic yard.
-

715.3.1.3 Department Verification Testing

Replace paragraph one with the following effective with the December 2012 letting:

- (1) The department will perform verification testing as specified in 701.4.2 except as follows:
- Air content, slump, and temperature: a minimum of 1 verification test per lot.
 - Compressive strength: a minimum of 1 verification test per lot.
-

Errata

Make the following corrections to the 2013 edition of the standard specifications:

102.12 Public Opening of Proposals

Correct 102.12(1) errata by changing htm to shtm in the web link.

- (1) The department will publicly open proposals at the time and place indicated in the notice to contractors. The department will post the total bid for each proposal on the Bid Express web site beginning at 9:30 AM except as specified in 102.8. If a proposal has no total bid shown, the department will not post the bid. After verification for accuracy under 103.1, the department will post bid totals on the department's HCCI web site.

<http://roadwaystandards.dot.wi.gov/hcci/bid-letting/index.shtm>

107.22 Contractor's Responsibility for Utility Facilities, Property, and Services

Correct errata by eliminating references to the department. Costs are determined by statute.

- (3) If the contractor damages or interrupts service, the contractor shall notify the utility promptly. Coordinate and cooperate with the utility in the repair of the facility. Determine who is responsible for repair costs according to Wisconsin statutes 66.0831 and 182.0175(2).

204.3.2.2 Removing Items

Correct errata by changing the reference from 490.3.2 to 490.3.

- (5) Under the Removing Asphaltic Surface Milling bid item, remove and dispose of existing asphaltic pavement or surfacing by milling at the location and to the depth the plans show. Mill the asphaltic pavement or surfacing as specified for milling salvaged asphaltic pavement in 490.3.

501.2.9 Concrete Curing Materials

Correct errata by changing AASHTO M171 to ASTM C171.

- (4) Furnish polyethylene-coated burlap conforming to ASTM C171 for white burlap-polyethylene sheets.

506.2.6.5.2 Pad Construction

Correct errata by changing ASTM A570 to ASTM A1011.

- (4) For the internal steel plates use rolled mild steel conforming to ASTM A36, or ASTM A1011 grade

512.3.3 Painting

Correct errata by changing 511.3.5 to 550.3.11.3.

- (1) Paint permanent steel sheet piling as specified for painting steel piling in 550.3.11.3.

513.2.2.8 Toggle Bolts

Correct errata by changing ASTM A570 to ASTM A1011.

- (1) Use toggle bolts made of steel, conforming to the plans. Make the assembly from the material specified below:
- | | |
|---------------------------|--|
| Toggle bolt and pin | Cold finished steel heat-treated Brinell 311-363 ASTM A354. |
| Toggle washer | Hot rolled steel ASTM A1011. Manufacturer's standard washer. |
| Spacer nut | Grade 1213, ASTM A108. Cold finished steel heat-treated ASTM A325. |

614.2.1 General

Correct errata by changing the discontinued AASHTO M298 to ASTM B695.

- (4) Furnish steel nuts conforming to ASTM A563, washers conforming to ASTM F436, grade 1, and bolts conforming to ASTM A307. Ensure that the nuts, washers, and bolts are either hot-dip coated according to AASHTO M232 class C or mechanically coated according to ASTM B695 class 50.

643.3.1 General

Correct errata by eliminating the word "continuously".

- (6) Review all traffic signs and control devices furnished and erected for location, position, visibility, adequacy, and manner of use under specific job conditions immediately after each setup and at least once every 24 hours and more frequently as necessary, to ensure all the signs and control devices are in compliance with this section. Review the signs and devices from the same direction that approaching traffic views them.

660.2.1 General

Correct errata by changing section 511 to 550.

- (1) Furnish materials conforming to the following:
- | | |
|------------------------|-------------|
| Concrete | section 501 |
| Concrete bridges | section 502 |
| Luminaires | section 659 |

Steel piling	section 550
Steel reinforcement.....	section 505

660.3.2.3 Pile Type Foundations

Correct errata by changing section 511 to 550.

- (1) Drive piles as specified in for steel piling in section 550.

701.3 Contractor Testing

Correct errata by updating AASHTO T141 to AASHTO R60 and changing AASHTO T309 to ASTM C1064.

- (1) Perform contract required QC tests for samples randomly located according to CMM 8-30. Also perform other tests as necessary to control production and construction processes, and additional testing enumerated in the contractor's quality control plan or that the engineer directs. Use test methods as follows:

TABLE 701-2 TESTING STANDARDS

TEST	TEST STANDARD
Washed P 200 analysis	AASHTO T11 ^[1]
Sieve analysis of fine and coarse aggregate	AASHTO T27 ^[1]
Aggregate moisture	AASHTO T255 ^[1]
Sampling freshly mixed concrete	AASHTO R60
Air content of fresh concrete	AASHTO T152 ^[2]
Concrete slump	AASHTO T119 ^[2]
Concrete temperature	ASTM C1064
Concrete compressive strength	AASHTO T22
Making and curing concrete cylinders	AASHTO T23
Standard moist curing for concrete cylinders	AASHTO M201

^[1] As modified in CMM 8-60.

^[2] As modified in CMM 8-70.

ADDITIONAL SPECIAL PROVISION 7

- A. Reporting 1st Tier and DBE Payments During Construction
1. Comply with reporting requirements specified in the department's Civil Rights Compliance, Contractor's User Manual, Sublets and Payments.
 2. Report payments to all DBE firms within 10 calendar days of receipt of a progress payment by the department or a contractor for work performed, materials furnished, or materials stockpiled by a DBE firm. Report the payment as specified in A(1) for all work satisfactorily performed and for all materials furnished or stockpiled.
 3. Report payments to all first tier subcontractor relationships within 10 calendar days of receipt of a progress payment by the department for work performed. Report the payment as specified in A(1) for all work satisfactorily performed.
 4. All tiers shall report payments as necessary to comply with the DBE payment requirement as specified in A(2).
 5. Require all first tier relationships, DBE firms and all other tier relationships necessary to comply with the DBE payment requirement in receipt of a progress payment by contractor to acknowledge receipt of payment as specified in A(1), (2), (3) and (4).
 6. All agreements made by a contractor shall include the provisions in A(1), (2), (3), (4) and (5), and shall be binding on all first tier subcontractor relationships and all contractors and subcontractors utilizing DBE firms on the project.
- B. Costs for conforming to this special provision are incidental to the contract.

ADDITIONAL SPECIAL PROVISION 9
Electronic Certified Payroll Submittal

(1) Use the department's Civil Rights Compliance System (CRCS) to submit certified payrolls electronically. Details are available online through the department's highway construction contractor information (HCCI) site on the Labor, Wages, and EEO Information page at: <http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm>

(2) Ensure that all tiers of subcontractors, as well as all trucking firms, submit their weekly certified payrolls electronically through CRCS. These payrolls are due within seven calendar days following the close of the payroll period. Every firm providing physical labor towards completing the project is a subcontractor under this special provision.

(3) Upon receipt of contract execution, promptly make all affected firms aware of the requirements under this special provision and arrange for them to receive CRCS training as they are about to begin payrolls. The department will provide training either in a classroom setting at one of our regional offices or by telephone. Contact Tess Mulrooney at 608-267-4489 to schedule the training.

(4) The department will reject all paper submittals of forms DT-1816 and DT-1929 for information required under this special provision. All costs for conforming to this special provision are incidental to the contract.

(5) Firms wishing to export payroll data from their computer system into CRCS should have their payroll coordinator send several sample electronic files to Tess two months before a payroll needs to be submitted. Not every contractor's payroll system is capable of producing export files. For details, see pages 17-22 of the CRCS System Background Information manual available online on the Labor, Wages, and EEO Information page at: <http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/crc-basic-info.pdf>



GEOTECHNICAL BASELINE REPORT

ZOO INTERCHANGE RECONSTRUCTION

STRUCTURE C-40-101 (HONEY CREEK RECONFIGURATION)

MILWAUKEE COUNTY, WISCONSIN

WISDOT PROJECT I.D. 1060-33-78

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Southeast Region
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March 1, 2013

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APPENDICES

Appendix A Anticipated Tunneling Conditions

Appendix B Estimate of Tunnel Induced Ground Movement

1 INTRODUCTION AND PROJECT INFORMATION

1.1 Introduction

The Zoo Interchange Reconstruction Project is designed to reconfigure and reconstruct the Zoo Interchange and adjacent portions of Interstates I-94 and I-894, and USH 45 in Milwaukee County, WI. The project will improve the safety and ease traffic congestion. The Zoo Interchange Reconstruction Project includes new design of interchanges, new bridges, widening of roadways, and relocation/replacement of utilities.

As part of the Zoo Interchange reconstruction, a portion of the existing culvert system conveying Honey Creek will be reconfigured. The reconfiguration is due to the inadequate structural capacity of the existing culvert to accommodate anticipated loading of the proposed I-94 roadway and adjacent features.

1.2 Project and Site Description

The new Honey Creek culvert will change the horizontal alignment of the existing Honey Creek culvert. The proposed alignment of the Honey Creek culvert is located near South 84th St. and West Kearney St.

The new Honey Creek culvert reconfiguration involves construction of approximately 1,820 lineal feet of new culvert, consisting of a combination of box (structure B-40-892) and circular pipe (B-40-101) configurations. The portion of the new Honey Creek culvert that extends under and to the north of existing I-94 (approximately 338 feet) will be installed using a series of four 120-inch inside diameter (142-inch outside diameter) reinforced concrete pipes (RCPs). The remainder of the alignment will consist of a four-celled rectangular box structure, with each box having profile dimensions of 12 feet wide by 10 feet high, for a total structure cross-section of approximately 12 feet high and 52 feet wide.

The portion of the pipe alignment under existing I-94 (186 feet long) will be installed using trenchless technology (Honey Creek Tunnel). The remainder of the alignment will be installed using cut and cover methods, with the majority consisting of cast-in-place concrete structures.

The new Honey Creek Tunnel invert varies from elevation 686.95 to 687.26 ft. With the anticipated 12-inch thick wall of the pipe and 1.5-inch overcut of tunnel excavation, bottom of the tunnel excavation will vary from elevation 685.83 to 686.14 ft. The existing I-94 above the tunnel is on an existing embankment at approximate elevation 718 to 721 ft. The north and south sides of the embankment where the new pipes exit are slopes approximately at the slope ratio of 3.5H:1V.

1.3 Purpose and Use of the Geotechnical Baseline Report

1.3.4 Purpose

This Geotechnical Baseline Report (GBR) has been prepared for the Zoo Interchange Project and focuses on working shafts (for tunneling launching and receiving) and tunnel construction associated with the Honey Creek Tunnel. This GBR establishes baseline conditions and quantities, and discusses design and construction considerations for the Honey Creek Tunnel. The regional geology, results of the subsurface investigation and subsurface conditions for the Honey Creek Tunnel are presented in the Geotechnical Data Report (GDR).

The principal purposes of this GBR are to:

- Establish a contractual statement of the assumed geotechnical site conditions for use in bidding, designing, and performing the work.
- Establish a geotechnical baseline that will serve as the basis for identification and evaluation of differing site conditions as defined in other Contract Documents.

Secondarily, this GBR:

- Identifies important considerations, key project constraints, and select requirements that must be addressed by the Contractor during bid preparation and construction.
- Provides information to assist the Contractor in evaluating requirements for excavating and supporting the ground at the tunnels and working shafts.
- Provides guidance to the person or party responsible for administering the Contract and monitoring contractor performance.

This GBR is a part of the Contract Documents and is intended to complement the GDR, Plans, Specifications, Special Provisions, and other sections of the Contract Documents. When interpreting statements in this report, preference in resolving any inconsistencies must be based on the document priority, defined in the General Conditions of the Contract Documents.

1.3.5 Use of this Geotechnical Baseline Report

The geotechnical baseline report provides the basis for identifying geotechnical and geologic conditions that qualify as Differing Site Conditions article of Section 104, Scope of Work of the WisDOT Standard Specifications for Highway and Structure Construction. The geotechnical baseline conditions contained herein are not necessarily representative of actual field conditions. The baselines were developed using judgment to interpolate between borings and extrapolate beyond the boring logs and laboratory test data. The judgment applied in the interpolations

and extrapolations reflects the view of the Owner and the Owner's Design Engineer in describing the baselines. Bidders should use the baseline subsurface conditions and surface conditions that can be observed during a site visit as the basis for bids. The project design was based on assumed construction methods and levels of workmanship. The behavior of the geologic materials present in excavations will be influenced by the Contractor's selected equipment, means and methods.

The Contractor must not rely upon any geotechnical interpretation of the data, and conclusions and recommendations on design or construction contained in any other geotechnical report. This GBR is the sole document for geotechnical interpretation of the available data and contains information upon which the Contractor should rely upon in bidding the project. If there are disagreements or ambiguities between the geotechnical interpretations presented in this GBR and the data presented in any other geotechnical documents, this GBR takes precedence.

Bidders should have a geotechnical engineer or engineering geologist review and explain the information in the geotechnical baseline report to assure a complete understanding of the reported information as a basis for submitting a bid.

Certain plans and figures contained in other documents in the Contract facilitate an understanding of related site conditions and elements of the work. These plans and figures may be referenced, but are not reproduced in this report. Additional documents used to develop the geotechnical baseline report are listed in References section of this report. These documents are not incorporated as Contract Documents and are provided for reference only.

1.4 Risk Apportioning

Risks associated with subsurface conditions consistent with, or less adverse than, the baseline conditions are the responsibility of the Contractor. Risks associated with subsurface conditions more adverse than the baseline conditions are accepted by the Owner. The provision of a baseline condition in the Contract is not a warranty that the baseline conditions will be encountered. The baseline conditions are the contractual standards that the Owner and the Contractor will agree to use when interpreting the Differing Site Conditions article of Section 104, Scope of Work of the WisDOT Standard Specifications for Highway and Structure Construction. The Owner accepts the risks for subsurface conditions less favorable than the stated baseline conditions. The Owner will negotiate with the Contractor for additional compensation to the Contractor if three conditions exist:

- Actual subsurface conditions encountered are more adverse than the baseline conditions.

- The Contractor can document that the subsurface conditions are more adverse than those described in the baseline and that the conditions materially and significantly increased the cost or time required to complete the work.
- The Contractor has made diligent efforts to complete the work described in the Contract Documents, including changes to methods, equipment, labor, and materials made necessary by the more adverse conditions.

If all the foregoing conditions are satisfactorily met, additional compensation will be negotiated based on the provisions in the Differing Site Conditions article of Section 104, Scope of Work of the WisDOT Standard Specifications for Highway and Structure Construction.

2 PREVIOUS PROJECT EXPERIENCE

2.1 GENERAL

Relevant information was obtained from three adjacent microtunneling projects in the Milwaukee area: the Marquette Interchange Combined and Storm Sewer Tunnels – North Leg, Barclay/4th/Chase Metropolitan Interceptor Sewer Replacement, and I-94 Mitchell Interchange Storm Sewers. The following descriptions are provided for information only and do not imply any specific condition that may be encountered within the Honey Creek Tunnel alignment. The Contractor shall refer to Sections 3 through 5 for engineering interpretation and recommendation for the Honey Creek Tunnel.

2.2 Marquette Interchange Combined and Storm Sewer Tunnels – North Leg

Six storm sewer segments totaling approximately 5,400 feet of new 48, 60 and 72 inch diameter reinforced concrete pipe were installed as part of the Marquette Interchange Reconstruction Project in Milwaukee. The storm sewers were constructed along and below active freeway lanes using one-pass pipe jacking behind open-face and earth pressure balance capable tunnel boring machines. The project is part of an \$810 million Marquette Interchange Reconstruction Project being completed for the Wisconsin Department of Transportation (WisDOT) in Milwaukee. The project area extends northward approximately 4.7 km (2.9 miles) along I-43 from approximately the intersection of I-94/794 and I-43.

The sewer was installed by pipe jacking of 22 tunnel drives with lengths ranging from 40 to 548 feet. The total overcut, on diameter, ranged from 1-inch for the 48-inch pipe drives to 3-inches for the 60 and 72-inch drives. Ground conditions generally consisted of very stiff to hard silty clay to clayey silt glacial till with scattered cobbles and boulders interbedded with some pockets and channels of granular outwash and lacustrine clay, silt and sand.

A total of 20 boulder obstructions were encountered during tunneling. The boulders ranged in size up to 38 inches in diameter and were generally fractured by blasting and then removed using scraper cutter action at the heading. The approximate volume of these 20 boulders was calculated at 0.07 percent of the excavated tunnel volume, which is the value estimated from correlations to soil boring and adjacent tunneling data. The baseline value assumed a more conservative 0.20 percent of the excavated tunnel volume.

In general, the tunneling methods used were successful at limiting maximum surface settlements to the specified limits of 1 inch at active pavement locations and 1.5 inches at other locations. No pavement, structure or utility damage was reported. The generally very stiff to hard ground combined with full lubrication and prompt contact

grouting at the conclusion of tunnel drives are credited with the relatively small surface settlements for the low to moderate soil cover conditions involved.

One sinkhole developed during one of the short 90 feet Juneau Segment drives (J-2). The 2286 mm OD Lovat EPB capable TBM was being used in open-mode to jack 72-inch pipe. Fortunately, this drive was located in an area where the old roadway pavement had been removed and earthwork was being completed in preparation for new pavement. The sinkhole was promptly filled and disturbed ground stabilized without any significant impact to the earthwork operations. The sinkhole appears to have been caused by a water bearing pocket of cohesionless sand that was not shown on the soil profile, however, the GBR baselined the likely occurrence of water-bearing unstable sand pockets within the glacial till.

No issues related to toxic or explosive gas were experienced during shaft work or tunneling.

2.3 Barclay/4th/Chase Metropolitan Interceptor Sewer Replacement

Barclay/4th/Chase MIS Replacement project consists of about 10,736 feet of replacement sewer ranging in inner diameter (I.D.) from 48 to 72 inches. The sewer will replace the north/south leg of the Basin "A" MIS within Milwaukee. The project's tunnel elements include about 4,644 feet of 48-inch and 6,078 feet of 72-inch sewers.

The project site is located within and adjacent to the Kinnickinnic River valley, generally following the course of the Kinnickinnic River. It is within a region where postglacial deposits overlie glacial deposits from the Wisconsin Stage of the Quaternary Period. The primary glacial soils are silty clay tills, outwash sand and gravel, lacustrine silt and clay, and lacustrine silt and sand deposits. The postglacial soils include estuarine and alluvial deposits. The glacial till and outwash soils contain various amount of cobbles and boulders. In addition, a rock ridge is present along part of the alignment. About 300 feet of tunneling is expected performed within full face rock and about 200 within mixed-face soil/rock conditions. The project baselined 350 boulder obstructions ranging in dimension between 1 and 4 feet and provided a pay item for them. Dewatering is not allowed at some parts of the alignment because of a concern of dewatering induced drawdown settlements in highly compressible estuarine deposits. The specifications provide a pay item for three intermediate jacking stations to be installed during the longest drives.

The project design phase was completed in August 2007 and construction started in March 2008. The project 72-inch sewer alignment is currently being installed by one-pass jacked pipe following an Akkerman SL74 MTBM. The SL74 is used to install the 72-inch ID RCP with an excavated diameter of 90.0 inches (1.25 inch radial overcut). The specifications required an MTBM with a face access, but the contractor was allowed to use a machine without access. The exception was made because the MTBM was fitted with disc cutters to allow for boulder breakage during mining.

As of March 2009, five 72-inch and one 48-inch (Akkerman SL60 MTBM) tunneling segments have been completed (about 41 percent of total tunneling length). The tunneling has been progressing relatively well without major incidents. The bouldery till ground has been excavated without delays. A few instances were noted when mining progress was slowed down because of boulder obstructions. During those instances the advance rate was approximately half of the normal advance rate to allow for disc cutters to break boulders. During the longest drive of 1,068 feet the jacking pressures reached a high of 400 tons which was well within the pipe and main jacks capacities. After the pipe was installed for this drive, contact grouting was performed and some ground heave and frac-out were noted at the surface. This was attributed to presence of low weight organic soil above the tunnel crown.

Geotechnical instrumentation monitoring has not revealed any meaningful ground or utility settlements due to tunneling operations.

2.4 I-94 Mitchell Interchange Storm Sewers

I-94 Mitchell Interchange Storm Sewers were proposed as part of the Mitchell Interchange Reconstruction Project in Milwaukee, WI. The proposed storm sewers consist of six different storm sewer segments which extend along I-94 and I-894/I-43 from approximately Halsey Avenue in the South to West Bolivar Avenue in the North, and between South 13th Street in the East and South 24th Street in the West. The storm sewer segments include 48, 54, and 60-inch ID RCP with the total length of 8,111 feet. Among the proposed storm sewer segments, 258 feet of 54-inch ID (66.5-inch OD) RCP and 4903 feet of 60-inch ID (73.5-inch OD) RCP were installed by a slurry shield microtunnel machine.

A geotechnical baseline report was prepared for the I-94 Mitchell Interchange Storm Sewers. The microtunneled alignment was approximately 10 to 50 feet below ground surface (bgs), through glacial deposits which include geological units of Till 2, Lacustrine Deposits, and Outwash. The till was identified as a layer with greater cobbles and boulder frequency than other strata. Total 67 boulder obstructions which included 5 large boulders (3.5 feet), 14 medium boulders (2.5 feet), and 48 small boulders (1.5 feet) were baselined for the entire microtunnel alignment. With the assumption of 1.5-hour effort to remove each boulder, the bid item of boulder obstruction removal was established at 100 hours. The baseline report identified that two-thirds of the boulders were expected to be none native igneous rocks, such as granite and gabbro, and the rest of the boulders to be limestone and dolomite. During the subsurface investigation, one coring sample from a gabbro boulder encountered at the boring location was tested and the tested unconfined compressive strength was 11,800 psi. Other desk study done during the preparation of the baseline report suggested the possibility of higher strength boulder. Therefore, the unconfined compressive strength of the boulders was baselined at 43,000 psi for igneous origin and 45,000 psi for dolomite.

The microtunnel construction was completed in 2010 using an Akkerman 74-inch slurry MTBM. The launched MTBM cutterhead was equipped with disk cutters and clay scrappers. According to the conversation with the microtunnel contractor, the majority of tunnel excavation was in clay, as anticipated in the baseline report. Based on the superintendent's estimate, approximately 12 boulder events were encountered along the entire alignment and all encountered boulders were able to be mined through by the MTBM. Since there was no direct view of the excavated tunnel face from the machine, a boulder event was described as an event which significantly slowed down the normal production of the excavation. During the tunnel excavation, total 15 to 20 broken cutters were replaced due to the wear and tear from the boulder excavation.

3 GROUND CHARACTERIZATION AND BASELINE CONDITIONS

3.1 Subsurface Conditions

The subsurface conditions and groundwater conditions are presented in the GDR. The anticipated tunneling conditions are further discussed in Appendix A. The discussions of the anticipated tunneling conditions include the stand-up time, the tunnelman's ground classification, stability numbers, and characterization of boulder obstructions in fill and native soils.

3.2 Corrosivity Assessments

The results of corrosivity test (resistivity, Ph, chloride, and sulfate concentrations) are summarized in the GDR. AASHTO LRFD Bridge Design Specifications (2012), Section 10.7.5 and ACI 318-11, Section 4.2 provide guidelines for corrosion and deterioration for foundations and reinforced concrete, respectively. The resistivity test results show that the corrosion potential in some local areas is high (resistivity less than 2,000 ohm-cm) for metal. If the reinforcement of the proposed RCP has sufficient concrete cover (3 inches), the corrosion potential of the reinforcement should be negligible. The pH test results show the pH range of 7.6 to 8.1 which is considered neutral to negligible degree of corrosivity. The tested sulfate content show negligible level of corrosivity (less than 500 ppm per AASHTO or 0.1 % percent per ACI). The reinforcement corrosion protection of reinforced concrete design is classified as Category C2 per ACI 318 due to the presence of chloride.

According to the Facilities Development Manual, Section 13-1-17, current reinforced concrete pipe specified in the Specifications for storm sewer is resistant to corrosion. Therefore, no other corrosion protection, except specified in the Special Provisions, is needed for the proposed Honey Creek Tunnel.

3.3 Baseline Soil Parameters

The baseline parameters for soil layers are presented in Table 3-1. The parameters are summarized in the tables while the occurrence of particular soil layers or layer sequences at shaft and tunnel segment locations are depicted on the geologic plan and profile in Figure 3-1.

Table 3-1: Baseline Parameters for Soil Layer

Soil Layer Property	Fill	Silt & Clay (Medium Stiff to Stiff)	Silt & Clay (Very Stiff to Hard)	Silty Sand with Gravel	Sand
Total Unit Weight (pcf)	130	130	140	125	125
Effective Friction Angle (deg)	30	30	32	33	33
Effective Cohesion (ksf)	0	0.1	0.15	0.1	0
Undrained Shear Strength (ksf)	1.8	1.1	3.4	0	0
At-Rest Earth Pressure Coefficient	0.5	0.8	0.8	0.5	0.5

3.4 Baseline Groundwater Levels

The groundwater encountered in the Honey Creek Tunnel alignment is expected to be the groundwater table of the open aquifer. The baseline groundwater table for the proposed Honey Creek Tunnel is shown in Figure 3-1.

The available data are limited and do not necessarily represent seasonal variation. In some cases the available data provide only an approximation of the groundwater levels (e.g., wetness observation during drilling). Higher water levels may develop during periods of higher precipitation and higher infiltration. The groundwater levels as indicated by the baseline on the profiles are established based on the 2-yr high water level, elevation 693.61 feet (NVAD 88), of the Honey Creek culvert which is 1 to 8 feet above the currently measured groundwater levels. This is intended to account for variations in the groundwater levels during wet weather.

3.5 Baseline Soil Conditions along Tunnel Alignment

For baseline purposes, Table 3-2 shows the ground types anticipated to be encountered during tunneling.

Table 3-2: Baseline Soil Conditions along Honey Creek Tunnel

Description of Primary Tunnel Zone Soil Layers	Approximate Footage (ft)	Approximate %	Tunnelman's Classification
Medium stiff to very stiff silt and clay (Fill)	9	5	Firm
Medium stiff to very stiff clay and silty clay (Silt & Clay)	112	60	Firm
Loose to medium dense silty sand with gravel (Silty Sand with Gravel)	37	20	Cohesive running to rapid raveling
Medium dense silty sand(Sand)	28	15	Cohesive running to slow raveling

3.6 Baseline Obstructions

Man-made obstructions are defined as man-made debris such as bricks, timber, concrete blocks, and other debris that are larger than the baseline obstructions size. The term "boulder obstruction" is defined as a boulder encountered at the heading of a soft-ground tunnel that are larger than the baseline obstruction size.

A man-made or boulder obstruction for shield tunneling shall be defined as an object that has a size greater than 10 ft in diameter and cannot pass through the opening of the shield, if encountered at the heading of a tunnel. An obstruction for tunnel excavation by TBM shall be defined as an object that has a size greater than 90% of the TBM face opening, cannot be broken or split by the TBM cutter tools, and cannot pass through the TBM face opening, if encountered at the heading of a tunnel. Objects smaller than the defined sizes will not be considered obstructions. The baseline quantities of the obstructions are zero for open-face shield tunneling. The baseline quantities of the obstructions are 44 for tunnel excavation by a TBM.

4 DESIGN AND CONSTRUCTION CONSIDERATIONS

4.1 General

Excavation support systems are required for support of soil at working shafts (for tunnel launching and receiving). The methods of excavation and excavation support systems are the responsibility of the Contractor. However, excavation support systems should be designed and monitored in accordance with relevant Special Provisions. The excavation support systems should be designed to handle groundwater properly, to limit ground movements, and to minimize risk of damage to adjacent facilities and property. As the movement threshold limits are approached, defined in the Special Provision, Geotechnical Instrumentation, the Contractor must take action to prevent additional movements and minimize the risk of damage.

4.2 Groundwater Control and Damage Risk from Dewatering

Shaft and tunnel excavations are anticipated to extend below the water table along the entire Honey Creek Tunnel alignment. Given the baseline groundwater elevation 693.61 feet (Section 3.4), the groundwater table is generally 7 to 8 feet above the tunnel invert and 10 to 11 feet above the bottom of shaft excavation. Dewatering will be required to lower the groundwater table at least 2 feet below the lowest point of the excavation to improve ground stand-up time and slope stability. Especially the north portion of the tunnel will encounter granular deposits.

Dewatering is expected to be challenging due to the random deposits from the fine and granular soil layers that will be encountered in shafts and tunnel excavation. The Contractor's dewatering specialist should assess dewatering time required to achieve the necessary drawdowns.

The control of water measures should be designed to prevent loss of ground from erosion and piping of fines. Drainage systems and dewatering wells should be designed with well screens, filter fabric and filter zones to prevent piping of fines considering the amount of fines in the zone. Excavation support system lagging or sheeting should be sufficiently tight or include filter materials so that only clear water can seep through. Removal of silt and clay particles with groundwater seepage and drainage is a cause of lost ground and will likely lead to detrimental settlement damage to adjacent structures and facilities if not addressed.

Settlements from the drawdowns should be small because the soils present along the alignment generally have low compressibility. Large drawdowns over large areas are unlikely based on expected soil conditions.

4.3 Working Shaft Design and Construction Considerations

4.3.1 Geometry

Working shafts will serve as access shaft for tunneling operations and as space to construct the connection between the tunnel and open-cut installed culvert segments. Shaft dimensions will be controlled by the space needed for tunneling and tunnel lining operations.

Rectangular shafts are recommended for the Honey Creek Tunnel construction because a rectangular working shaft involves much less excavation volume than other shapes. The Shaft dimensions for the Honey Creek Tunnel construction are expected to be 40 feet in tunneling direction to accommodate systems for installing typical 8 to 10-foot lengths of 144-inch OD reinforced concrete pipe, and 85 feet in transverse direction. Larger working shafts would be required if longer pipe or longer than typical tunnel boring machines are used.

It is the Contractor's responsibility to select the shaft shape and dimensions within the available space to accommodate the selected shield/TBM, pipe, equipment, and excavation support system. The recommended shaft spaces are shown in the Plans as the base quantity for bidding purpose. Both shafts shown in the Plans are the same size and the Contractor may select the direction of tunneling. The Contractor should note that utility clearances and relocations are based on the shown shaft areas shown on the Plans. The Contractor should note that a number of existing utilities such as underground storm pipes, light poles, etc. are either within the recommended shaft areas or adjacent to the shafts.

4.3.2 Soil Excavation and Excavation Support Systems

The anticipated elevation of shaft excavation bottom is 683 feet. North shaft depths vary from 19 to 21 feet bgs and the south shaft depths vary from 31 to 35 feet bgs, based on the anticipated excavation elevation. The Fill at shaft locations is generally cohesive soil with occasional pockets or lenses of granular material above groundwater table. The shafts will also anticipate excavation through Silt & Clay layer in majority and random layers and pockets of Sand and Silty Sand with Gravel which thickness ranges from few inches to 5 feet. Part of these granular layers is below the baseline groundwater table. In order to excavate the shafts through the granular soil layers which may contain water, the Contractor will need to implement dewatering measures, as discussed in Section 4.2.

Where space permits, the Contractor may slope the excavation at the slope ratio no steeper than 2H:1V. Otherwise the Contractor shall design and construct excavation support system. With proper dewatering, feasible excavation support systems for the shafts include:

- Soldier piles and lagging with bracing

- Driven steel sheet piles with bracing

A comparison of these feasible excavation support systems for the shafts along with applicability are presented in Table 4-1. More detailed constructability considerations are presented below for soldier pile and lagging and driven sheet piling methods.

The Contractor should note that all utility relocations required for working shaft construction must be completed and properly backfilled prior to the construction of working shafts. The Plans shall be consulted for adjacent utilities.

Table 4-1: Comparison of Shafts Excavation Support Systems

Method	Drilled-in Soldier Piles and Laggings	Driven Steel Sheetpiles
Bracing	Wales and struts or walers and tie-backs required.	Walers and struts or walers and tie-backs required
Sheathing or Face Support	Horizontal timber lagging or steel liner plates.	Interlocked sheet piles.
Shape and Vertical Configuration	Generally rectangular or trapezoidal shaped with vertical walls full depth.	May be rectangular, circular or irregular shaped with generally vertical walls.
Utility Interference	May be constructed around some utility penetrations.	Utilities must be relocated or avoided.
Stability – Stand-up Time Requirements	Low risk of lost ground when dewatering is implemented.	Low risk of lost ground if sheeting interlocked and driven sufficiently ahead of excavation to provide a stable bottom.
Control of Water	Dewatering is required for this project.	Dewatering is required for this project.
System Stiffness	Relatively flexible; overcut voids from excavation for lagging tend to converge. Timber lagging tends to bend inward as stresses and arching develop.	Moderately stiff structurally. Stiffer with timely installation of bracing. Vibrations from driving and extraction may cause loose ground to densify and settle. Extraction may cause lost ground settlements.
Applicability Considerations (Contractor to select excavation support system)	Suitable for both shafts. Cobbly, bouldery ground may cause soldier pile drilling / alignment difficulty. See the report text for more discussion.	May be suitable for both shafts. Cobbly and bouldery ground may cause difficult driving.

Drilled-in Soldier Piles and Laggings

Soldier pile and lagging or liner plate system is feasible for excavation support for both launching and receiving shafts. Drilled-in method is preferred over driven method for soldier pile installation due to the frequency of cobbles and boulders that may be encountered during soldier pile installation. Drilled-in soldier piles can be installed by coring through the boulders, if encountered. The drilled-in soldier piles can be installed with little or no concern regarding vibration. The anticipated cohesive soil zones should have good stand-up time for lagging or liner plate installation.

Dewatering will help provide suitable stand-up time within wet granular zones. Dewatering and filtering of any inflows between laggings must be performed in a manner that prevents lost ground from flowing silt and sand and piping of fines.

Excavating to install lagging boards or liner plates generally results in overcutting and can result in local sloughing of the excavated face before support is placed. To reduce ground movements caused by voids, the space more between lagging boards or liner plates and the excavated face shall be filled properly in accordance with the Special Provision, Contact Grouting.

Soldier pile and lagging/liner plate systems have the following advantages:

- Flexibility to be installed around existing utilities and existing sewers not relocated.
- Practical elimination of vibration concerns. Drilling to install soldier piles should result in negligible vibrations.
- Elimination of void development and settlements from excavation support system removal because the soldier piles and lagging or liner plates are abandoned and left in place, except near the ground surface.

A disadvantage of soldier piles and lagging systems is their characteristically low stiffness, as compared to that of braced driven steel sheet piling and other more rigid systems. Lower stiffness increases risk of damaging adjacent ground movement. The risk of damaging adjacent ground movement should be low with proper dewatering , minimizing unsupported face exposure time and size, prompt backfilling or grouting of overcut voids, and preloading of bracing members.

Driven Steel Sheetpiles

Interlocked, driven steel sheetpiles that is properly braced or anchored should limit ground movements to help protect adjacent facilities. However, driving sheetpiles may be impractical due to presence of stiff to hard silty clay, glacial deposits. Hard driving or refusal of sheet piles, if chosen as an excavation support method, will become a problem for the south shaft which will encounter clay with blow count of 35 to 60 bpf below elevation 681 feet. In addition, occasional to frequent cobbles and boulders are likely to be present within the native soils. Interference with cobbles and boulders would significantly increase driving resistance and may lead to sheeting refusal and to bent sheet piles or split interlocks.

Hard driving resistance might be reduced by use of a telescoping support system where lower levels of sheeting are stepped in (at smaller dimensions) and overlapped with upper levels. This method results in larger excavation dimensions at shallower depths and a risk of seepage (if not dewatered) and instability at overlap zones. Seepage is not a concern herein due to the required dewatering for the shafts and tunnel excavation.

Vibrations generated during sheet pile driving can sometimes cause damage to adjacent property by direct transmission of vibrations, by densification of any very loose granular deposits that underlie facilities, or by inducing liquefaction in wet granular zones.

Even if vibration levels are maintained below those considered potentially damaging, neighbors are likely to hear and feel the vibrations, and they may complain and allege vibration damage. The Contractor should be prepared to respond to residential complaints if driven sheet piling is used.

Removal of driven sheeting will also cause ground movements and damage because of vibrations and lost ground. Lost ground and settlements may be caused by ground movement into space occupied by the removed sheets and by clay adhering to the sheeting bays. If backfill loosening and settlements develop within backfill zones at the shafts, remedial measures will be required. These measures include abandonment of remaining sheeting, stabilization of the backfill by grouting, use of jetting and vibrations to densify the granular backfill, or other means of void filling and deep backfill densification.

4.3.3 Working Shaft Bottom Stability

Designs for control of water, excavation, and excavation support systems must also consider bottom stability. Suitable bottom stability should not be difficult to achieve given the generally anticipated medium stiff to hard cohesive soils at the subgrade levels at both shaft excavations. However, small zones of granular materials are present at or near the excavated bottom of south shaft excavation. With proper dewatering, the bottom stability of the shafts should not be a concern.

4.3.4 Subgrade Preparation and Protection

Care should be exercised to minimize disturbance and degradation of subgrade soils for pipe bedding and areas to be filled. Water should not be allowed to pond on the surface of exposed subgrade soils, which leads to subgrade softening, particularly where subjected to construction traffic. Disturbed or softened subgrade soils should be replaced with a suitable undisturbed subgrade prior to pipe or new fill placement.

Wet subgrade conditions may result from precipitation, runoff and groundwater seepage through excavation walls and bottom. Excavation subgrade should be sloped to drainage ditches and sumps to minimize water accumulations from these sources. Runoff from adjacent areas should be eliminated by use of surface berms and ditches to channel water away. Groundwater seepage into the excavations below the water table should be minimized by use of dewatering systems such as wells, and/or groundwater isolation systems such as tight sheeting that is driven below the bottom level.

Moisture sensitive subgrade soils are expected where subgrades are within clay, silty clay, silt, and fine sand soils. Promptly after the subgrade is exposed, prepared and accepted, it should be covered with:

- Specified pipe bedding material.
- A lean concrete mud mat or controlled density fill (CDF or flowable fill).
- A geotextile covered by open-graded gravel fill.

A suitably designed gravel base course should help surcharge the subgrade and act as a drainage layer for removing water accumulations. When a finer-grained subgrade soil will be covered with open-graded gravel fill or pipe bedding material, a geotextile that is suitable for preventing fines migration should be placed on the subgrade before filling. Sump and pump systems or dewatering wells should be used to remove any accumulating water or water pressure in the gravel base course. If upward seepage is not flowing through the subgrade, then lean concrete or flowable fill mud mat may be placed directly on the subgrade. A mud mat should help to isolate water, provide surcharge against loosening, and provide a stable surface that is resistant to construction traffic disturbance.

In any areas where unsuitable subgrade conditions develop before protection measures are implemented or where pre-existing unsuitable subgrade is encountered, subgrade stabilization should be performed before new fill or pipe placement proceeds.

Prior to placement of pipe bedding material or foundations, the subgrade should be properly prepared and checked for suitability. In some cases, construction disturbance, traffic and weather affects may cause a previously acceptable subgrade area to degrade and require reworking. Subgrade preparation work is intended to eliminate unacceptable subgrade material and result in suitably dense or compact subgrade material that can support the backfill, pipeline and structures to be placed upon. Subgrade preparation may include one or more of the following activities:

- Compaction or re-compaction of loosened granular soil or fill material that is less than a foot thick. Compaction of softened cohesive soil should generally not be attempted because it would likely have a moisture content that is too high to be properly compacted. A compactor should be suitable for the subgrade material type (generally vibratory compactors for granular soil and sheepsfoot roller compactors for cohesive material). Compaction testing should be performed to confirm that adequate compaction has been achieved.
- Where loosened subgrade soil or fill material is more than a foot thick, but less than 3 feet thick, stabilization should be achieved either by use of a heavy compactor that can densify soil to depths of 3 feet or more, or by removal of the loosened material and backfilling with granular fill in compacted lifts.
- Removal of loosened or softened soil or fill material to an underlying firm, unyielding layer and replacement with compacted granular backfill.

4.3.5 Ground Movement

For typical open-cut excavations within soils of the type anticipated, the greatest ground movements are expected within a zone extending at 1 horizontal to 1 vertical from the bottom edge of the excavation to the ground surface which is the zone of influence for shaft excavation, as defined in the Special Provision, Geotechnical Instrumentation. This presumes that bottom instability and lost ground from face instability, erosion and piping of fines with groundwater inflows does not develop. Settlement and lateral ground movement magnitudes for long excavations, where plain strain conditions apply can be estimated by the methods outlined in Clough and O'Rourke (1990). For normal workmanship and ground support methods for excavations within stiff to hard clays and medium to dense sand and gravel, maximum settlements and horizontal movements will range from 0.1 to 0.3 percent of the maximum excavation depth adjacent to the excavation wall. Settlements and horizontal movements will decrease with the increase of distance from the wall. However significant settlements will likely develop if normal ground and groundwater control measures and care are not employed.

Lateral and vertical deformations of the excavation support systems must be limited to tolerable levels in order to maintain structural integrity during construction activities. Most importantly, the deformations should not result in settlement or lateral displacement, which causes damage to adjacent surface streets, highways or underground utilities.

4.3.6 Launching and Receiving Portals

Tunnel entry and exit locations at the working shafts require special attention. Excavation support system designs for the shafts should also consider opening slopes and adjacent ground stability at launching and receiving portals for tunnels. The risk of face instability, loss of ground and detrimental settlements are generally higher at portal locations than at other locations around the shaft. The Contractor and their excavation support system design engineer must consider these risks in their excavation support system design and portals.

Prior to shaft construction, the Contractor is recommended to perform stand-up time test by excavating a test pit in dry or dewatered condition to verify stand-up time that will enable the Contractor to remove ground support at the portal, temporarily exposing the soil, and promptly insert the tunnel boring machine. If the ground does not demonstrate sufficient stand-up time for adequate portal face stability, other ground treatment or temporary face support, to be designed by the Contractor, is needed prior to exposing the soil at the portals.

4.4 Tunnel Design and Construction Considerations

4.4.1 General

The majority of the anticipated ground condition along the Honey Creek Tunnel alignment is firm for tunneling. Small amount of the ground along the alignment is expected to encounter layers and pockets of cohesive running to slow raveling granular materials. The ground condition will require dewatering and a tunnel boring machine (TBM) with mechanical support or an open-face tunnel shield with breast plates. Pressurized-face mining methods such as earth pressure balance machine (EPBM) or slurry shield machine are not discussed herein as they are not like to be cost-effective mining solutions for the short tunnel.

4.4.2 Tunnel Boring Machine with Mechanical Support

TBM with mechanical support provide support of the working face by means of an almost fully closed cutterhead covered with excavation tools. The cutterhead of the mechanical support TBM is equipped with adjustable face openings (doors, guillotine, and the like) which can be adjusted to hold the spoil ahead of the cutterhead. The mechanical-support TBM does not have a working chamber behind the cutterhead. Spoil is entered through the adjustable opening at the cutterhead and transported by a conveyor belt, scraper belt or an auger.

Typically the mechanical-support TBM does not have a rock crusher or crushing chamber. Large pieces of boulders will be pushed around in the ground or milled by the cutting tools, such as disc cutters.

4.4.3 Open-Face Tunnel Shield with Breast Plates

The open-face tunnel shield is an open-faced shield machine in which soil is excavated by hand or small excavator. The breast plates can reduce the exposed area of the face and provide temporary support when the workers are not mining. The breast plate should always be closed and pushed against the ground in the non-working sections at the face. In consideration of the proposed tunnel size, the working platforms, if installed by the contractor, are recommended to be installed independently of the working face.

4.4.4 Boulder Excavation

Boulders may be excavated by combinations of:

- Digestion through the mucking system (small boulders).
- Removal by outside boulder access excavations (shafts or tunnels).
- Fracturing at the cutting head by TBM cutters or manual means (blasting, hydraulic splitting or jack hammering).

A TBM may be equipped roller cutters (single disc, multi-kerf carbide insert disc, button cutters) designed for boulder splitting at the cutting wheel. Such cutters are intended to split or break boulders into smaller size rock fragments that may pass through the cutting head doors and the muck handling system. However, in order for these cutters to work, the soil matrix that encompasses cobbles and boulders must be strong enough to hold them in place during cutting. Based on local project experience, glacial clay and silty clay soils with undrained shear strength of at least 2,000 psf should provide enough resistance to hold encountered cobbles and boulders in place and allow for fracturing with roller cutters. Use of roller cutters for fracturing cobbles and boulders is feasible if advance rates are consistent with cutter penetration rates for rock. If advance rates are too large, boulders will tend to dislodge before being cut or broken. The Contractor must make his own assessment of the viability of roller cutters for handling cobbles and boulders when mining.

Removal of boulder obstruction is relatively difficult in the TBM with mechanical support. The maximum acceptable size of cobbles and boulders depends on the opening size in the cutterhead. To minimize the soil deformation, the opening in the cutterhead and the contact between the machine and ground should be optimized, i.e. minimal opening and maximum contact. The boulder obstruction cannot be destroyed or broken into small pieces by the cutting tools or by hand to pass through the opening in the cutterhead.

Removal boulder obstruction is generally not a significant problem with open-face tunnel shield. The boulders can be identified because of the open view at the face and can be removed by hand.

4.4.5 One-pass Lining – Jacked Pipe

A one-pass tunnel lining system consisting of RCP jacked behind a TBM or a tunnel shield should be utilized for the proposed tunnel. With this method, the TBM or the open-face tunnel shield is generally followed by 8- to 10-foot lengths of pipe that are incrementally jacked in a string from the jacking shaft towards the receiving shaft. As the string becomes longer, side friction and jacking resistance increases. The tunneling system must be designed to resist the maximum feasible jacking stresses. This means that the pipe must have sufficient cross-sectional area and compressive strength to resist the jacking stress in addition to meeting the specified design criteria. Typically, the jacking stresses under some eccentric loading are the critical loading condition. In addition, hydraulic jacks, frames and reaction blocks must have the capability of providing sufficient thrust to overcome the total pipe and TBM string resistance. The shaft excavation support system and supporting soil must be capable of resisting the anticipated thrust block forces.

The discussion herein provides generalizations and estimates based on previous experience with similar ground conditions and anticipated construction methods. However, jacking stresses and jacking force cannot be accurately estimated without knowledge of the Contractor's selected means and methods for excavation and ground support.

The jacking force is a combination of the face pressure needed to advance the tunnel boring machine and the side resistance along the tunnel boring machine and pipe. In order to help reduce side friction, overcut is created by the TBM/shield and diameter reductions between the shield and pipe, and bentonite slurry is injected into the pipe string annulus to act as a filler and lubricant. During normal continuous jacking, the resistance is related to the remolded strength of the perimeter soil and injected slurry. During periods when jacking is stopped, this slurry and soil mix tends to gain strength or "set-up." The longer the delay period, the higher the strength gain. Jacking resistance may increase by 50 to 100 percent or more after delays of a half-day or more. The maximum total jacking force often occurs after a delay near the end of a tunnel drive. If set-up and high jacking forces begin to develop during delays between shifts, the Contractor should consider continuous jacking operations.

Side friction will vary depending on soil type and strength, extent of overcutting, amount of bentonite slurry injection, degree of dewatering, and drawdown achieved type of jacked pipe being used and control of line and grade. The Contractor needs to estimate the maximum jacking forces using his jacked pipe tunneling system with the anticipated subsurface conditions and drive lengths.

CH2M HILL estimates that each of the proposed 186-foot long RCP will require two intermediate jacking station with the assumption that the main jacking station and the intermediate jacking station both have allowable jacking capacity of 750 tons. This estimate also assumes that the RCP strength is adequate for at least 750-ton jacking force and the RCP string is fully lubricated during jacking.

4.4.6 Disposal of Excavated Materials

The granular soils not contaminated may be segregated from the fines and potentially be use during backfilling of other excavations provided that the materials meet the requirements of the Specifications and Special Provisions. However, these materials may require considerable conditioning prior to placement and compaction. Materials excavated as a result of shaft and tunnel construction activities that are unsuitable or not used for backfill will be removed from the site for disposal.

4.4.7 Ground Movements

Tunnel excavations will cause ground movements and a risk of damage to existing structures and facilities. The risk of damage is related to the magnitude of the movements and the strength and flexibility of the adjacent facilities. The estimate of tunnel induced ground movement is discussed in Appendix B. Based on the estimated ground movement, the greatest tunnel induced settlement will occur within a zone extending 1.5 horizontal to 1 vertical from the tunnel excavation spring line to the ground surface which is defined as the tunnel zone of influence.

4.5 Protection of Adjacent Property

Adjacent property damage can be minimized by:

- Proper face pressurization and face stability control.
- Designing appropriate control of water and ground support systems.
- Carefully performing the work as designed.
- Proper ground improvement at launch and reception portals.
- Frequent monitoring of groundwater levels and movements to allow prompt remedial action if necessary.

The impact to the existing facilities and utilities will depend upon the shaft excavation support system and tunneling method utilized by the Contractor. The Contractor is required to perform pre-construction assessment, and install and monitor geotechnical instrumentation as per Special Provisions.

In addition to the specified movement monitoring instrumentation, the Contractor may consider additional instrumentation including crack monitors, shaft diameter extensometers and other movement monitoring instrumentation to help determine if detrimental conditions develop during construction.

5 REFERENCES

Clough, W.C. and O'Rourke, T.D., 1990, Construction Induced Movements of Insitu Walls, Design and Construction of Earth Retaining Structures, American Society of Civil Engineers, New York, Geotechnical Special Publication No. 25, pp. 439–70.

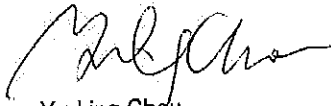
6 LIMITATIONS

This GBR has been prepared for the tunneling and shaft construction for the Zoo Interchange Project in Milwaukee, WI, in accordance with generally accepted geotechnical engineering practices common to the project area.

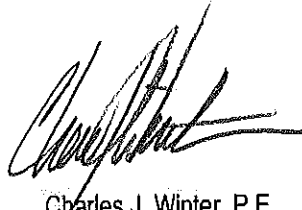
The anticipated conditions were developed with the standard of care commonly used as the state of the practice in the profession. No warranty is included, either expressed or implied, that the actual conditions encountered will conform exactly to the baseline conditions described herein.

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Appendix A – Anticipated Tunneling Conditions

A-1 Soft Ground Behavior Concepts

This section presents concepts used for characterizing tunnel behavior in soft ground, including:

- Stand-up Time
- Tunnelman's Ground Classification
- Stability Number

Stand-up time, Tunnelman's ground classification, and stability number provide an indication of the ground behavior that can be expected if the tunnel face is unsupported during excavation. These parameters are often used as guidelines in the selection of suitable excavating, tunneling, and excavation support systems. These parameters provide an indication of the potential ground instability when exposed and unsupported. An understanding of potential instability or stand-up time is important when selecting equipment, means, and methods for providing stability, face support and mitigation of settlement damage risks.

Stand-up Time

Stand-up-time is the approximate time available after exposure of soil in a shaft face, tunnel heading, or tunnel perimeter until significant inward soil movement (sloughing, squeezing, raveling, flowing, or collapse) occurs. The significant inward soil movement causes excess "lost ground" or mining of a significantly larger soil volume than the excavation volume replaced by the tunnel lining system. Stand-up time depends on a combination of many factors, including:

- Soil type.
- Soil density or degree of cementation for granular soils.
- Relative cohesion, overload factor or stability number, $N_t = \gamma H / S_u$ defined as ratio of the total vertical stress and a soil's undrained shear strength or cohesion.
- Groundwater head, hydraulic gradients, or seepage pressure acting on the soil exposed at the face.

Massive, non-jointed very stiff to hard cohesive soils generally have stand-up times of 30 hours or more. Very soft to medium cohesive soils with N_t values of 4 or more generally have low stand-up time as explained below.

Tunnelman's Ground Classifications

Figure 4-1 correlates Tunnelman's Ground Classifications with various granular soil types. General ground behavior descriptions based on Heuer and Virgens (1987) for Tunnelman's Ground Classifications are listed in Table A-1.

Stand-up time is the main concern before adequate ground support is applied to the exposed soil. Combinations of the following may provide ground support during tunneling:

- Pressure exerted on the cut soil at the heading by slurry or remolded soil (earth paste) during slurry shield or earth pressure balance mining.
- Heading resistance by closed doors of a TBM cutterhead or breasting in a shield when not mining.
- Perimeter resistance by the tunnel shield.
- Perimeter pressure from bentonite lubricant injected into the overcut annulus for lubrication and ground stabilization with pipe jacking.
- Perimeter resistance by the initial tunnel lining (pipe, precast concrete segments, liner plate, ribs and lagging, timber sets, etc.).
- Perimeter resistance by grout and the lining after contact grouting or after tail gap grouting associated with precast concrete segment lining installation.

Table A-1: General Ground Behavior and Tunnelman's Ground Classification

Classification	General Ground Behavior When Exposed in Tunnel
Firm	Heading can be advanced without initial support.
Raveling	Chunks or flakes of material begin to drop out of the arch or walls some time after the ground has been exposed. "Fast raveling" begins within a few minutes; otherwise the ground is "slow raveling."
Cohesive running	Material with sufficient cohesion to stand for a brief period of raveling before it breaks down and runs.
Running	Granular materials without cohesion are unstable at a slope greater than the angle of repose ($\pm 30^\circ$ to 35°). When exposed at steeper slopes they run like granulated sugar or dune sand until the slope flattens to the angle of repose.
Cohesive flowing	Material with sufficient cohesion to stand for a brief period of raveling before it breaks down and flows as a mixture of soil and water.
Flowing	A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances as it accumulates in the tunnel.

Stability Number

Ground movements and stability of exposed cohesive soil within a tunnel (or underground excavation) may be estimated by computing a stability number, N_t , using the equation

$$N_t = (\sigma_s + \gamma H - \sigma_T) / S_u$$

where:

σ_s = vertical surcharge pressure, where applicable

γH = total vertical stress from soil density acting at tunnel springline

σ_T = applied face pressure (from slurry, cut soil, cutting wheel face, or breasting)

S_u = undrained shear strength (half of unconfined compressive strength)

General behaviors of cohesive soil are listed in Table A-2

for ranges in N_t values based on Peck (1969) and Heuer

(1974). Cohesive soils with N_t values less than 2

generally have excellent stand-up time and may not excessively creep or move into the tunnel opening.

Cohesive soils with N_t values from 2 to 4 generally have

good stand-up time and generally do not excessively creep or move into the tunnel opening within a few hours.

Cohesive soils having N_t values from 4 to 6 generally have poor stand-up time and are likely to creep or move into the tunnel, particularly if left unsupported for more than a few hours. Cohesive soils with N_t values over 6 have little or no stand-up time and likely creep or move into the tunnel rapidly after exposure unless immediately supported.

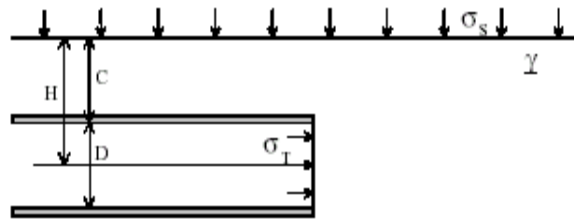


Table A-2: General Ground Behavior and Tunnelman's Ground Classification

Stability Number, N_t	General Cohesive Soil Behavior When Exposed in Tunnel
0 to 1	Very low overstress and creep (inward movement) potential. Little or no load will transfer to ground support system.
1 to 2	Low overstress and low creep potential. Some load may transfer to ground support system. Squeeze load should be considered.
2 to 4	Moderate overstress with some creep potential. Some load likely to transfer to ground support system. Squeeze load should be considered. Creep movements and load generally not large in first 24 hours after exposure.
4 to 6	Significant overstress and creep potential. Some load likely to transfer to ground support system. Squeeze load should be considered. Clay may squeeze rapidly enough to fill annular voids outside of shield and tunnel lining before the void space may be filled.
> 6	Dangerous overstress and high creep potential. Shear failure likely to occur ahead of tunnel face, causing large movements and subsidence. At $N_t > 7$, general shear failures and large ground movements and sloughing at the exposed face are likely, causing difficult tunneling and control of shield line and grade.

A-2 Cohesive Soil Stand-up Time and Stability

The predominant soil type anticipated within the proposed tunnel zone is medium stiff to very stiff clay and silty clay (cohesive glacial deposits). The stability or squeezing tendency of the clay to silty clay soil was analyzed by computing overload factor or stability numbers, N_t , as described herein. Error! Reference source not found.. The estimated stability number N_t for the Honey Creek Tunnel where cohesive soils are anticipated is 1.8. The rate of

diametrical closure (squeezing) or face instability generally does not begin to be a problem until N_t is over 4 and usually is not a serious problem until N_t exceeds 6. Therefore, squeezing problems are not anticipated during tunneling at these locations and predominantly firm face conditions with sufficient stand-up time for mining and lining are anticipated.

Based on the estimated stability number of 1.8, the cohesive soils are expected to be relatively stable in the tunnel heading. The amount of creep should be low if ground support is applied within hours after exposure.

A-3 Cohesionless Soil Stand-up Time and Stability

From tunneling perspective, granular material above groundwater table may possess some temporary apparent cohesion from negative pore water pressure. Layer and pockets of silty sand is expected in the Honey Creek Tunnel alignment. Control of water is necessary if the Honey Creek Tunnel is excavated by open-face methods, i.e. no face pressure applied. Discussion relating to groundwater control is in Section 4.

The granular material encountered in the Honey Creek Tunnel alignment is silty sand with various amount of gravel and the SPT N-values ranges from 9 to 20 bpf. According to Figure A-1, the encountered granular layer or pockets above ground water table will result in cohesive running to slow raveling. If not controlled, excessive lost ground could occur and voids could propagate to the ground surface and cause damaging settlements. The tunnel face can be supported by the mechanical method, such as face opening controlled tunnel boring machine (TBM), which is further discussed in Section 4.

A-4 Boulder Obstructions

Based on adjacent construction experience of shafts and tunnels completed in the same geology, it is anticipated that proposed tunnel excavation will encounter cobbles and boulders. Additionally, during the execution of the subsurface conditions, cobbles and boulders indications included observations of rough drilling/rig chatter, high SPT N values and refusals combined with low recoveries, and specific driller observations pointing to the likely presence of cobbles and boulders. The following paragraphs discuss the cobbles and boulders occurrence within the fill and native soils present along the tunnel alignment.

- **Fill** — It is difficult to assess the quantity and distribution of cobbles and boulders in the Fill due to its variable nature; however, cobbles and boulders have been known to be present in Fill deposits in the area. Additionally, there was observation of rig chattering and jumping in the Fill layer of boring EC-5, which is likely attributable to cobble and/or boulders. As a result, cobbles and boulders are anticipated within the Fill for this project.
- **Native Soils** — In general, scattered cobbles and boulders are known to be present within glacial deposits in Milwaukee area. Cobbles and boulders occur with greater frequency where the till directly overlies bedrock. In addition, boulder concentrations (nests and lag zones) are known to occur within the till and at till interfaces with

other geological units, and interfaces with bedrock. Bedrock interfaces were not encountered during the soil explorations conducted for the tunnel. While not explicitly sampled in the borings, rig chatter and spoon refusal (high blow counts), indications of potential cobbles and boulders were observed within the native soil in borings EC-4 through EC-6. The experience throughout the Milwaukee area also suggests that occasional to frequent cobbles and boulders should be expected.

A-5 References

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Tunnelman's Ground Classifications for Granular Soils

Firm	Slow Raveling	Rapid Raveling	Cohesive Running	Running	Above groundwater table
					Below groundwater table
Firm	Slow Raveling	Rapid Raveling	Cohesive Flowing	Flowing	

Notes:

1. Modified from Deere et. al., 1969
2. SM, SP, SC etc correspond to Unified Soil Classification System soil classifications.
3. Loose is STP N <10 blows/foot, Dense is STP N >30 blows/foot.
4. Behavior may be somewhat better above the groundwater level if material is moist and fine or silty due to apparent cohesion from capillary water tension.
5. Moderately to strongly cemented silt or sand will tend to behave like dense silt or sand.
6. U: coefficient of uniformity ($U = D_{60}/D_{10}$)

Figure A-1: Tunnelman's Ground Classifications

Appendix B – Estimate of Tunnel Induced Ground Movement

B-1 Settlement Trough Development

Soil above a soft-ground tunnel tends to settle in response to inward face movements, lost ground from face instability, stress redistributions, ground disturbance and diametrical closure (convergence) into voids created by overcutting. The amount of settlement and potential settlement impacts vary considerably from tunnel to tunnel, but tend to depend on combinations of the following factors:

- Stand-up time of the exposed soil.
- Strength, density and compressibility properties of the soil above the tunnel centerline.
- Remolded soil strength (sensitivity of soil).
- Extent of any ground improvement from grouting, ground freezing, reinforcement, etc.
- Extent of ground support provided by methods such as face support, bentonite lubrication and annular space grouting and the time elapsed before support is applied.
- Excavated diameter of the tunnel (larger tunnels tend to result in larger surface settlements).
- Overcut size.
- Depth of the tunnel or amount of tunnel cover (deeper tunnels with more cover generally result in less risk of settlement because a much larger volume of soil is available to dilate and consume an upward propagating void).
- Method, type and stiffness of tunnel initial linings.

Settlement troughs are typically shaped and defined as depicted in Figure B-1. The volume of the settlement trough is generally estimated as a percentage, P , of the excavated tunnel volume. P values can range from 0 to over 35 percent or more. Cording and Hansmire (1985), New & O'Reilly (1992) and Leca et al. (2000) provide guidance on typical P values. From these references, a summary of typical P values for various stiffness of cohesive soil and associated ranges of stability number, N_t , was prepared and is shown in Table B-1. The P value is 2 percent for open-face mining and stiff cohesive soils with N_t of 2.

Table B-1: Typical Settlement Trough Volume Percentages for Cohesive Soil

Soil Type	Face Support	Stability Number, N_t	Typical Settlement Trough Volume/ Excavated Volume, P (%)
Very stiff to hard cohesive soil	With or without face pressurization by TBM	< 2	0–1
Stiff cohesive soil	Open-face mining	2–4	2–10

Soil Type	Face Support	Stability Number, N_t	Typical Settlement Trough Volume/ Excavated Volume, P (%)
Very stiff to hard cohesive soil	With or without face pressurization by TBM	< 2	0–1
Stiff cohesive soil	Open-face mining	2–4	2–10
Stiff cohesive soil	With proper face pressurization by TBM	2–4	1–2
Firm to soft cohesive soil	Open-face mining	> 4	10–35
Firm to soft cohesive soil	With proper face pressurization by TBM	< 2	1–3

Table B-2: Typical Settlement Trough Volume Percentages for Cohesionless and Cemented Granular Soil

Soil Type	Tunnelman's Ground Classification	Face Support	Typical Settlement Trough Volume / Excavated Volume, P (%)
Moderately to highly cemented granular soil above water table	Firm to slow raveling	With face pressurization Open-face mining	0–0.5 0.5–1
Moderately to highly cemented granular soil below water table	Firm to slow raveling	With face pressurization Open-face mining	0–0.5 1–5
Cohesionless or slightly cemented granular soil above water table	Firm to slow raveling	With face pressurization Open-face mining	0.5–2 1–3
Cohesionless or slightly cemented granular soil below water table	Rapid raveling to cohesive running	With face pressurization Open-face mining	1–3 3–50

These references suggest that P values for tunneling through highly cemented granular soils (silt, sand and gravel combinations) may range from 0.5 to 1 percent in open-face mining (Table B-2). The table indicates that with open-face mining, the P value for cohesionless or slightly cemented granular soils varies from 1 to 3 percent for the case when the soils are above the water table.

The recommended tunneling method for Honey Creek Tunnel is non-pressurized machine with mechanical face support in dewatered ground condition. The P values for the proposed tunnel are expected to range from 1 to 3 percent.

B-2 Settlement Trough Width and Maximum Settlement Estimate

Two settlement trough cases (STA 23+75 and 24+50) were analyzed. The cases and analyses parameters are listed in Table B-3. Settlement trough width parameters, i , were estimated by New and O'Reilly method (1992). The results suggest that settlement trough half widths will range from approximately 21.8 to 42.3 feet and that maximum cumulative surface settlements should be less than 2.1 inches. Actual settlement trough width and maximum settlements will depend on the Contractor's means and methods and success at minimizing lost ground. If the lost

ground volume exceeds the percent of the tunnel excavated volume as assumed and shown in Table B-3, settlements are expected to be higher.

If ground instability occurs at the heading, resulting in significant loss of ground at the face, or if there is excessive overcutting or inadequate lubrication and contact grouting, then surface settlements estimated for the cases above may be several times greater with much greater risk of damage to buildings and facilities along the alignment.

Facilities that are founded within the settlement zone described above are at higher risk of settlement damage. The risk of damage increases as the magnitude of settlement within the trough increases. The Contractor should employ careful methods of groundwater control, mining, lining installation and contact grouting to minimize settlement damage.

Table B-3: Estimated Surface Settlements and Horizontal Strains

Case	Excavated Diameter (in.)	Depth to Springline (ft)	Settlement Trough Volume (%)	Half Width of Settlement Trough (ft)	Estimated Maximum Surface Settlement – Single pipe (in.)	Maximum Cumulative Surface Settlement – 4 pipes (in.)	Maximum Horizontal Tensile Strain – Single Pipe (in./in.)
STA 23+75 (grass area)	144	18	3.0	21.8	1.9	2.1	0.00396
STA 24+50 (pavement area)	144	27	3.0	42.3	1.0	2.0	0.00136

B-3 Horizontal Strain Estimate

The ground settlements estimated above are expected to result in horizontal strains within the settlement trough zone that are compressive from the centerline of the tunnel to distance i to tensile from i to $2.5i$. Estimated horizontal strains were calculated as part of the methodology described above to estimate settlement trough width.

Most studies concerning the impacts of horizontal tensile strains and differential settlements involve buildings that might be situated within the settlement trough. Boscardin and Cording (1989) indicate that horizontal strains in the range of 0.00050 to 0.00075 are very small and can be anticipated to cause negligible to very slight masonry building cracking. Horizontal strains in the range of 0.00075 to 0.00150 are considered small and result in a risk of slight to minor cracking of masonry buildings. Horizontal strains in the range of 0.00150 to 0.00300 are considered moderate and result in a risk of moderate to severe cracking of masonry buildings. Horizontal strains over 0.00300 are considered high and result in a risk of severe to very severe damage to masonry buildings.

Based the current assumptions of settlement trough development and pipe spacing (21 feet center to center), the cumulative tensile strain caused by tunneling of four pipes is no larger than the tensile strain caused by tunneling of single pipe. The estimated maximum horizontal tensile strain is about 0.00390 at STA 23+75 which results in high

risk of structure damage. The estimated maximum horizontal tensile strain of about 0.00134 at STA 24+50 which has small risk of structure damage. However, all utilities within zone of settlement trough, except for the existing lighting and water line at the pavement area of I-94, are to be relocated as indicated in the Plans. Therefore, small damage risk is expected to the existing lighting and water line.

This conclusion is based on certain assumptions, and the Contractor needs to prepare his own estimate based on his combination of TBM size and methods for tunnel excavation, lining, workmanship, mining speed and groundwater control. As noted above, the risk of damage increases as the magnitude of settlement within the trough increases. If the Contractor's control of face stability, ground support installation, lubrication and grouting results in higher lost ground than assumed in the CH2M HILL analyses, then settlements will be larger, strains will be higher and the risk of damage greater.

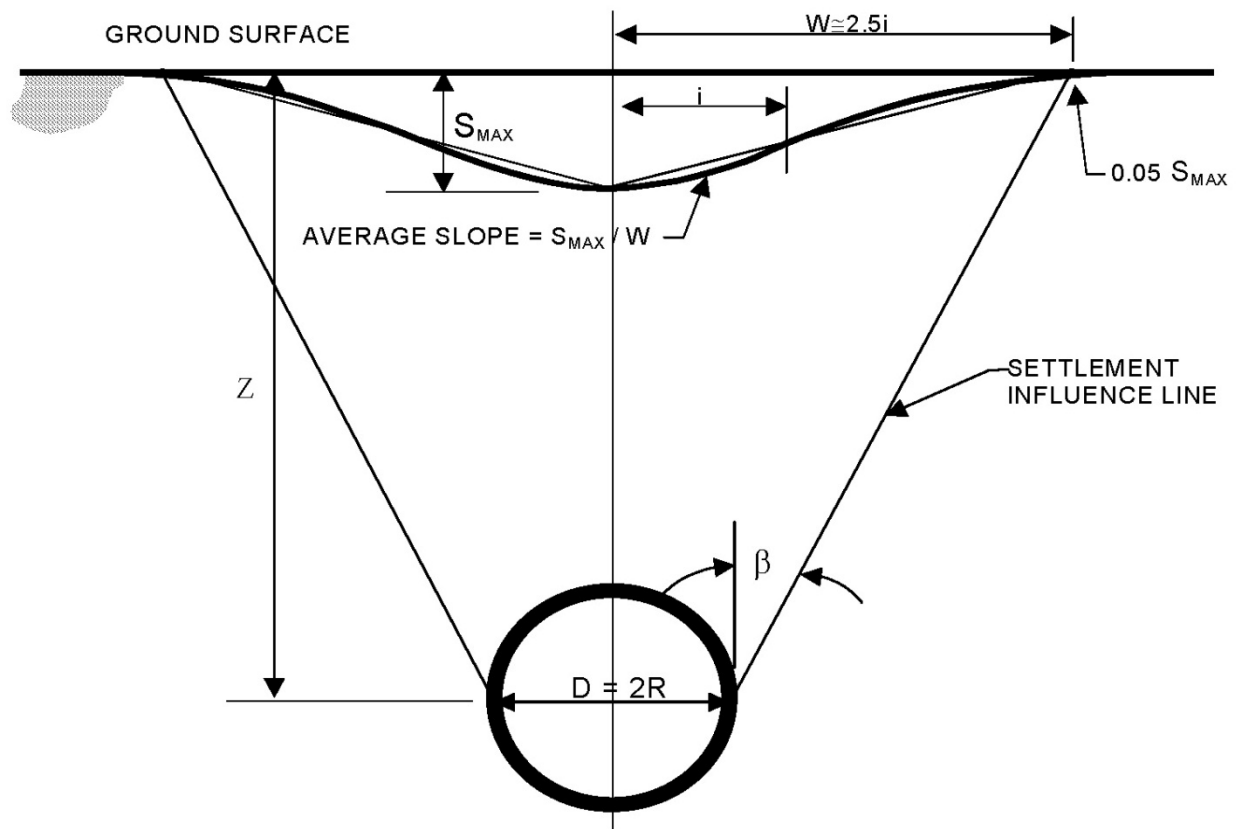
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New and O'Reilly, 1992, Tunneling Induced Ground Movements; Predicting Their Magnitude and Effects, Ground Movements and Structures. Geddes ed, Pentech Press, London, pp. 671–97.



$$W = Z \tan \beta + R$$

$$V_s = W S_{max}$$

V_s = VOLUME OF SETTLEMENT TROUGH

S_{max} = MAXIMUM SETTLEMENT OVER CENTERLINE OF TUNNEL

β IS DEPENDENT ON SOIL CONDITIONS

[NOT TO SCALE]

REFERENCES: CORDING ET AL (1975) , NEW AND O'REILLY (1992)

Figure B-1: Geometru of Tunnel Settlement Trough



GEOTECHNICAL DATA REPORT

ZOO INTERCHANGE RECONSTRUCTION

STRUCTURE C-40-101 (HONEY CREEK RECONFIGURATION)

MILWAUKEE COUNTY, WISCONSIN

WISDOT PROJECT I.D. 1060-33-78

Prepared for:

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APPENDICES

Appendix A Adjacent Boring Logs and Laboratory Test Results

General Notes

Unified Soil Classification System

Borings: EC-2, EC-3, EB-14, EB-16, ER-26

Laboratory Test Results

Appendix B Honey Creek Tunnel Boring Logs and Laboratory Test Results

General Notes

Unified Soil Classification System

Borings: EC-4 through EC-6

Laboratory Test Results

Appendix C Groundwater Monitoring Well Construction Forms

1 INTRODUCTION AND PROJECT INFORMATION

1.1 Introduction

The Zoo Interchange Reconstruction Project is designed to reconfigure and reconstruct the Zoo Interchange and adjacent portions of Interstates I-94 and I-894, and USH 45 in Milwaukee County, WI. The project will improve the safety and ease traffic congestion. The Zoo Interchange Reconstruction Project includes new design of interchanges, new bridges, widening of roadways, and relocation/replacement of utilities.

As part of the Zoo Interchange reconstruction, a portion of the existing culvert system conveying Honey Creek will be reconfigured. The reconfiguration is due to the inadequate structural capacity of the existing culvert to accommodate anticipated loading of the proposed I-94 roadway and adjacent features.

This Geotechnical Data Report (GDR) presents regional geology, subsurface exploration results, and subsurface information for the trenchless (tunneled) portion of the new Honey Creek culvert (referred as "Honey Creek Tunnel" in this report). The baseline conditions and quantities, and design and construction considerations for the Honey Creek Tunnel are presented in the Geotechnical Baseline Report (GBR). The open cut section of the Honey Creek reconfiguration is not part of the scope of the GDR and the GBR and is discussed in the Geotechnical Exploration and Culvert Design Report.

1.2 Project and Site Description

The new Honey Creek culvert will change the horizontal alignment of the existing Honey Creek culvert. The proposed alignment of the Honey Creek culvert is located near South 84th St. and West Kearney St.

The Honey Creek culvert reconfiguration involves the construction of approximately 1,820 lineal feet of new culvert, consisting of a combination of box structure (B-40-892) and circular pipe (B-40-101) arrangement. The portion of the new Honey Creek culvert that extends under and to the north of existing I-94 (approximately 338 feet) will be installed using a series of four 120-inch inside diameter (142-inch outside diameter) reinforced concrete pipes. The remainder of the alignment will consist of a four-cell rectangular box structure, with each box having inside dimensions of 12 feet wide by 10 feet high, for a total structure cross-section of approximately 12 feet high and 52 feet wide.

The portion of the pipe alignment under existing I-94 (186 feet long) will be installed using trenchless technology (Honey Creek Tunnel). The remainder of the alignment will be installed using cut and cover methods, with the majority consisting of cast-in-place concrete structures.

The new Honey Creek Tunnel invert varies from elevation 686.95 ft to 687.26 ft. With the anticipated 12-inch thick wall of the pipe and 1.5-inch overcut of tunnel excavation, bottom of the tunnel excavation will vary from elevation 685.83 to 686.14 ft. The elevation of the existing I-94 above the tunnel varies between elevations 718 to 721 ft. The north and south sides of the embankment where the new pipes exit are slopes approximately at the slope ratio of 3.5H:1V.

2 PROJECT GEOLOGIC SETTING

2.1 Sources of Geologic Information

Published literatures (Lasca, 1983; Mickelson et. al., 1974; Schneider, 1983; Singh, 1983; Mikulic, 1979; Syverson et. al., 2011; Mudrey et. al., 2007) on local geology are collected to study the project geological setting. The referenced literature includes discussions of area glacial and postglacial soil geology and rock geology. Several publications formalize the nomenclature for the Quaternary soil deposits of the area, and provide generalized discussions of soil composition. Singh et al. (1983) summarize the geotechnical properties of the soils in the Milwaukee area. The information is based on subsurface exploration programs and laboratory testing data accumulated from 1980 through 1983. The paper provides geologic characterizations for the primary soil units and summarizes their index and engineering properties. Mikulic (1979) addresses the rock stratigraphy in the area and includes considerable discussion of fieldwork performed by other researchers.

2.2 Regional Geology

Milwaukee County is an area of generally low topographic relief that ranges from flat to gently undulating to hilly. The shape of the present land surface is the combined result of the underlying bedrock topography, glacial landforms and changes caused by rivers, streams, Lake Michigan and man. Ground elevation within the County ranges from about 580 ft to 830 ft with respect to North American Vertical Datum of 1988 (NVGD 88).

2.2.1 Bedrock

The sedimentary bedrock was deposited during the Devonian Period and Silurian Period (345 to 425 million years old), as shown in Figure 2-1 (after Mudrey et. al., 2007). Most of the Devonian rock formations (consisting of shale, mudstone, dolomite and limestone rocks) have eroded away. They are present only within an area of northeast Milwaukee that extends from north of the Milwaukee County line to about Juneau Avenue along the south and to approximately 27th Street to Sherman Boulevard along the west. The remainder of the bedrock surface in Milwaukee County is Silurian Period dolomite rock of the Waubeka and Racine Formations. The Waubeka Formation occurs at the bedrock surface mainly in a relatively narrow band bordering the Devonian, with the Racine Formation comprising the rest of the Silurian portion of the bedrock surface.

The bedrock surface in Milwaukee County is a relatively flat to gently undulating surface that generally dips downward towards the east. However, there are areas of significant relief. The bedrock surface includes valleys that were likely eroded by rivers or streams and ridges and mounds remaining from ancient reefs. Glaciers have scoured the bedrock, and have mostly removed the uppermost rock. As a result, there is generally only modest weathering at

and below the bedrock surface. Figure 2-2 was extracted from a detailed bedrock surface contour map that was prepared for the Geotechnical Report for the MMSD's North Shore Interceptor project (I36G11 / I36G12). The contours suggest that the bedrock surface is near elevation 600 feet (NVGD 88).

2.2.2 Surficial Soil

The soils in the majority of Milwaukee County were deposited 13,000 to 14,500 years ago and are referred to as part of the Oak Creek Formation (Lasca, 1983; Mickelson, et. al., 1984; Syverson et. al., 2011). The Oak Creek formation typically consists of glacial deposits: a fine-grained silt and clay till with a variable mixture of sand, gravel, cobbles, and boulders. Interbedded lacustrine, outwash, and ice-margin deposits are common in the Oak Creek Formation.

North east Milwaukee County encounters Kewaunee Formation in which has occasional younger organic and alluvial deposits (post glacial deposits) overlaying glacial soils in river valleys (Lasca, 1983; Mickelson, et. al., 1984; Syverson et. al., 2011). Alluvial silt, sand and gravel with some cobbles and boulders accumulated within channels where higher stream water velocity existed. Where there was less current, fine-grained silt and clay was deposited. Estuarine deposits accumulated in shallow marshes or estuaries, and supported abundant vegetation. They consist of very soft to firm, highly compressible organic silts and clays. Along the shoreline, beach deposits occur at locations that mark both the present and former locations of the shoreline. The beach deposits tend to be similar in character to the alluvial deposits.

Geologic units were established for the Milwaukee area to help group and characterize the regional soils (Schneider, 1983; Syverson et. al., 2011). A summary of the units and typical characteristics are presented in Table 2-1 (CH2M HILL, 2009). These soil units were used to geologically characterize soils described in the boring logs. A typical sequence of soils overlying bedrock along Milwaukee-area river valleys is shown in Figure 2-3 (CH2M HILL, 2009).

The deepest and oldest glacial deposits overlying bedrock typically consist of a mixed granular and cohesive till called the New Berlin Till or Till 1 (Lasca, 1983; Mickelson, et. al., 1984; Singh, et. al., 1983; Syverson et. al., 2011). Where present above bedrock, Till 1 generally contains numerous angular dolomite cobbles, boulders and floating rock slabs. The soil matrix may vary from very hard stony silty clay to water bearing dense silt, sand and gravel. The glacial soils above the Till 1 unit generally consist of sequences of Till 2 (Oak Creek Till) and lacustrine, outwash and ice-margin deposits. A younger Till 3 unit is present within portions of northeastern Milwaukee County.

Till 2 generally consists of cohesive silty clay to clayey silt with a trace to some sand, gravel, cobbles and boulders. The till that deposited beneath glacial ice flows formed ground moraines while till deposited at a stagnant ice margin formed end moraines. Both ground moraines and end moraines are present in the area. The till sheets were generally compressed by the ice, which resulted in high strength and low compressibility.

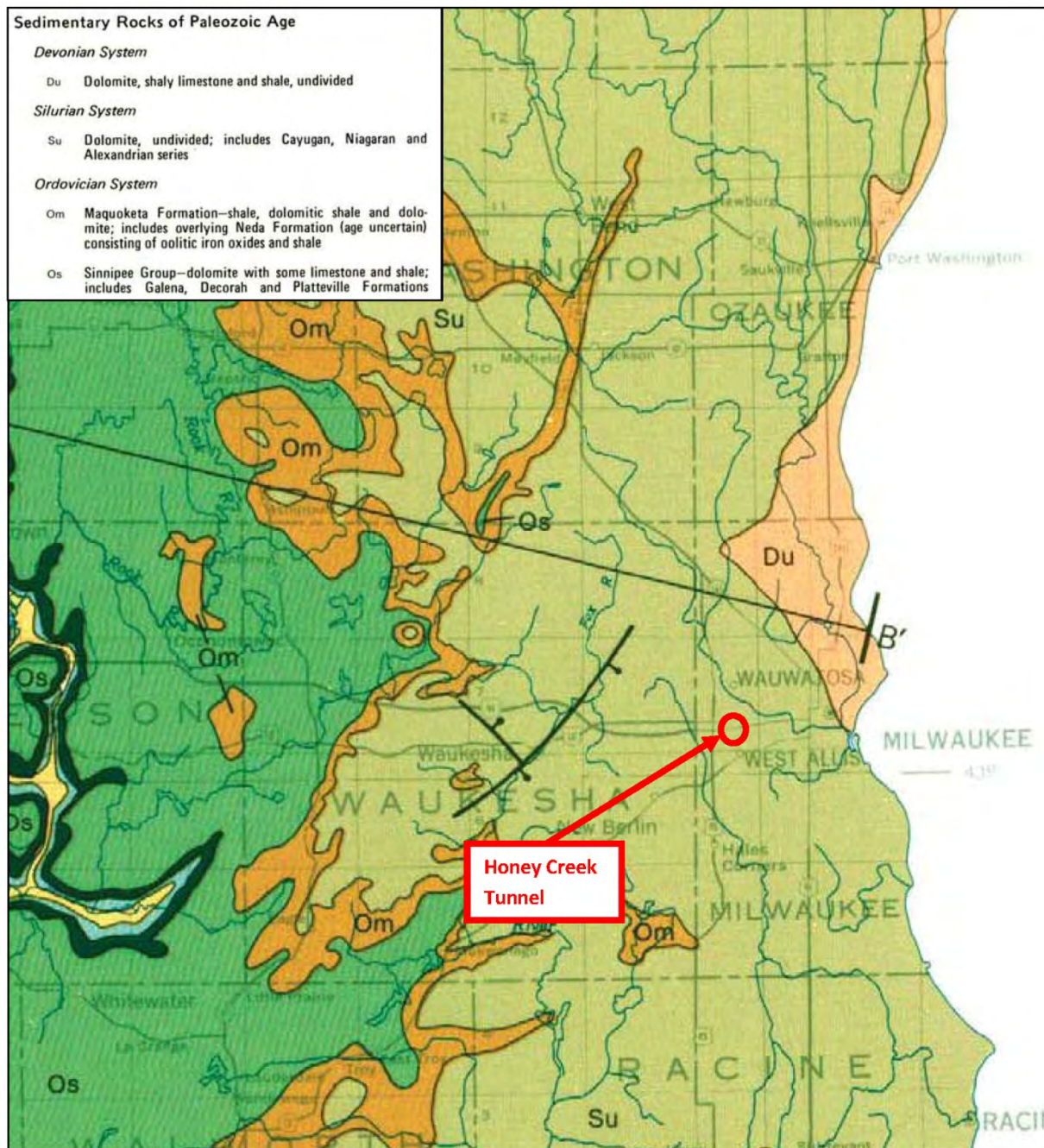
Table 2-1: Geologic Units and Characteristics (CH2M HILL, 2009)

Origin	Unit	Soil Composition	Density or Consistency	Typical Characteristics	Relative Permeability
Post-Glacial	Fill	Silty sand to silty clay with some sand and gravel pockets. May have debris and boulder-like obstructions	Mostly loose/soft to occasional dense/hard	Variable in composition, may contain man-made debris, and waste, generally discontinuous	Variable from low to high (often contains perched water above water table)
	Estuarine Deposits	Organic clay to organic silt to clayey silt with trace organic matter	Very soft to stiff	Relatively compressible, often contains methane gas	Low (typically an aquitard)
	Alluvium	Silty sand, sand, and gravelly sand, may contain cobbles and some boulders at interface with glacial deposits	Loose to very dense	Cohesionless, tends to "pipe" or flow with groundwater inflows. Tends to exist in continuous channels or layers below and sometimes within or above estuarine deposits. Often contains pockets of methane gas	Medium to high (typically an aquifer)
Glacial	Till 2	Silty clay to clayey silt with a trace of sand and gravel in matrix or pockets; scattered cobbles and boulders	Stiff to very hard but typically very stiff	Cohesive, low compressibility, may contain pockets of sand and gravel and isolated cobbles and boulders, locally continuous	Very low to low (typically an aquitard)
	Lacustrine Silt and Clay	Silt and clayey silt	Firm to hard but typically stiff to very stiff	Cohesive, low to moderate compressibility, tends to be continuous	Very low to low (typically an aquiclude)
	Lacustrine Silt and Sand	Silt, sandy silt and silty sand and fine sand	Medium dense to extremely dense	Cohesionless, tends to "pipe" or flow with groundwater inflows, tends to be continuous	Medium (typically an aquifer)
	Ice-Margin	Silty clay to silty sand and gravel with cobbles and boulders	Stiff to hard / medium dense to dense	Highly variable across short distances, often cohesionless- tends to "pipe" or flow with groundwater inflows	Low to high (may be an aquitard or aquifer))
	Outwash	Silty sand, sand, gravelly sand and sandy gravel with cobbles and some boulders	Medium dense to dense	Cohesionless, tends to "pipe" or flow with groundwater inflows, may contain cobble and boulder lags, generally discontinuous	Moderate to high (typically an aquifer)
	Till 1	Clayey to sandy silt with a some sand and gravel in matrix and in pockets or channels, abundant cobbles and boulders	Hard to very hard /very dense to extremely dense	Cohesive, low compressibility, may contain pockets of sand and gravel and isolated cobbles and boulders, locally continuous	Very low to low (typically an aquitard)

During periods of ice retreat, the end moraines acted like dams and allowed deposition of lacustrine sand, silt and clay behind them. Subsequent ice sheet advances often covered the lacustrine deposits and compressed them as well. Erosion between ice advances and runoff at the ice front resulted in end-moraines and outwash sand and gravel deposition within gullies, streams, rivers and valleys, particularly near and downstream from the end-moraines. Cobble and boulder “lag” deposits may be present within the outwash in these eroded features and at the interface between glacial strata. Younger sheets of till (Till 2 and Till 3) were generally deposited over the older lacustrine, outwash and till units. The shallower till deposits were less compressed by the ice and have somewhat lower strength and higher compressibility.

2.3 Project Site Geology

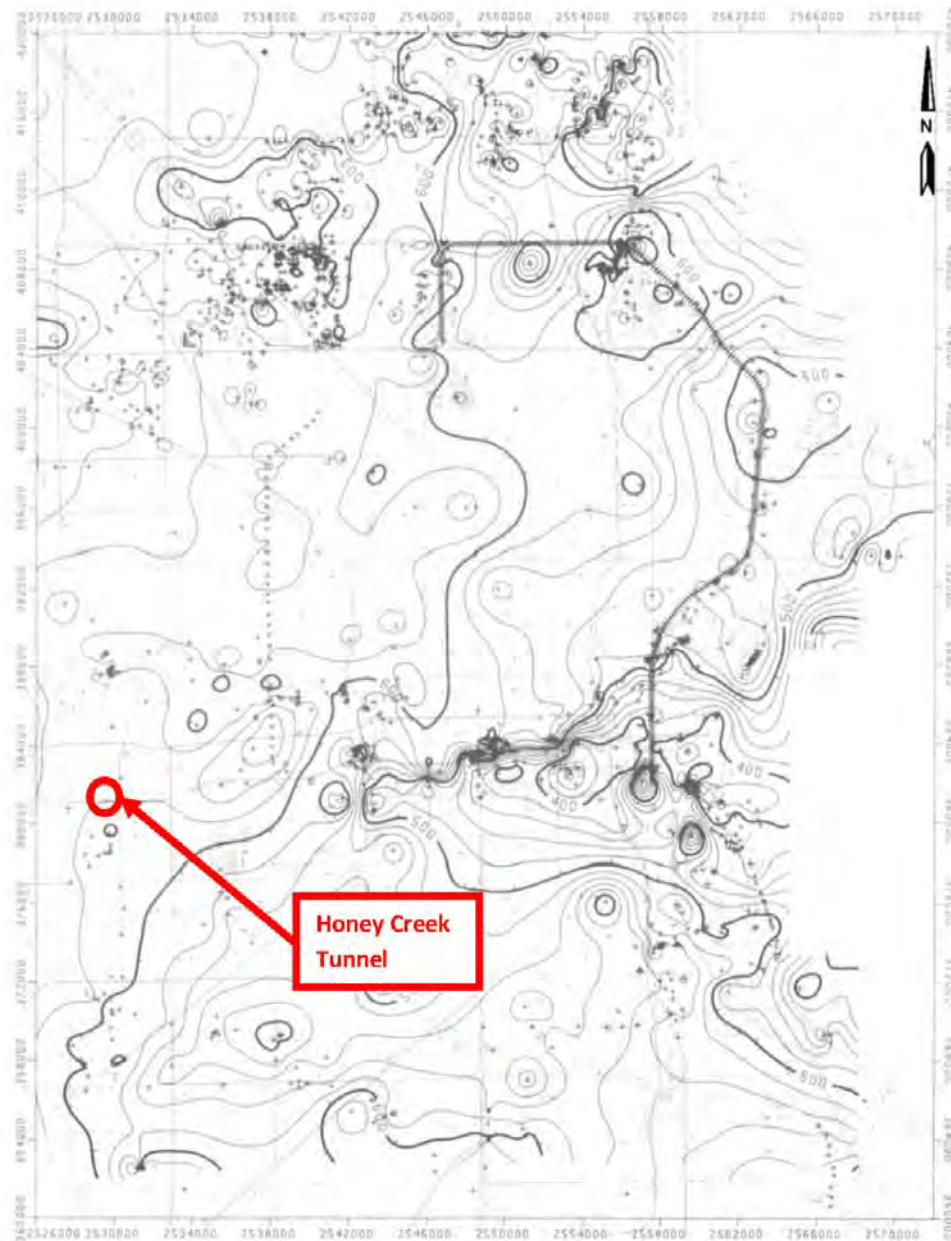
The project site of the proposed Honey Creek Tunnel is situated within a region containing a variable thickness layer of fills overlying glacial deposits. The primary glacial soils are silty clay and clayey silt tills, lacustrine silt and clay deposits, lacustrine silt and sand deposits and gravel and sand outwash deposits. The proposed tunnel zone is situated primarily within manmade fill, outwash, lacustrine deposits, and glacial till (Till 2).



(After Mudrey, M.G., Jr., Brown, B.A., and Greenberg, J.K., 2007)



FIGURE 2-1
REGIONAL BEDROCK GEOLOGY
EAST LEG STORM SEWER – HONEY CREEK TUNNEL

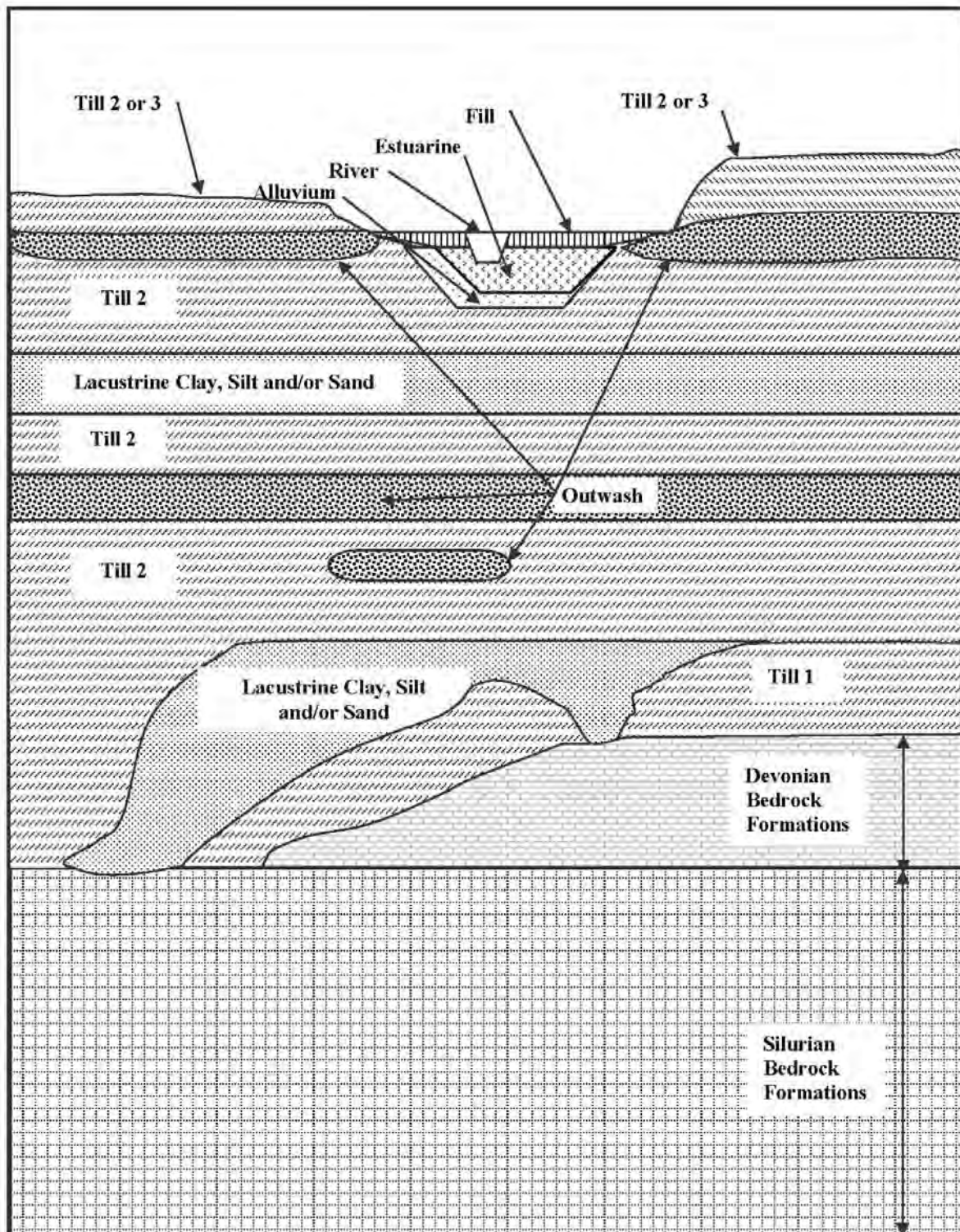


NOTES:

1. CONTOUR MAP FROM FIGURE 3-24 OF MMSD NORTH SHORE INTERCEPTOR GEOTECHNICAL REPORT.
2. THE ALIGNMENT SHOWN IS THE NORTH SHORE INTERCEPTOR (DEEP TUNNEL).
3. GRIDS ARE STATE PLANE COORDINATES IN FEET.
4. ELEVATIONS ARE IN FEET NATIONAL VERTICAL GEODEDIC DATUM (NVGD).
5. TOP OF ROCK CONTOUR INTERVAL IS 20 FEET.
6. TICK MARKS POINT DOWN SLOPE
7. + SYMBOLS INDICATE CONTROL POINTS SUCH AS BORINGS OR WELLS.



FIGURE 2-2
BEDROCK SURFACE ELEVATION CONTOURS
 EAST LEG STORM SEWER – HONEY CREEK TUNNEL



(CH2M HILL, 2009)



FIGURE 2-3
GENERAL GEOLOGIC STRATIGRAPHY
FAST LEG STORM SEWER – HONEY CREEK TUNNEL

2.4 Historical Information

Prior to construction of the existing highway in the mid 1960's the project site was part of a residential neighborhood, consisting of Adler Street and South 85th Street. F45 obtained a real estate plat map associated with the design of the existing freeway that indicates that approximately three residences and associated detached structures were present in the area of the south jacking pit, extending approximately to the centerline of the existing highway. An excerpt from this plat is provided in Figure 2-4. No additional information regarding these structures or other structures was available.

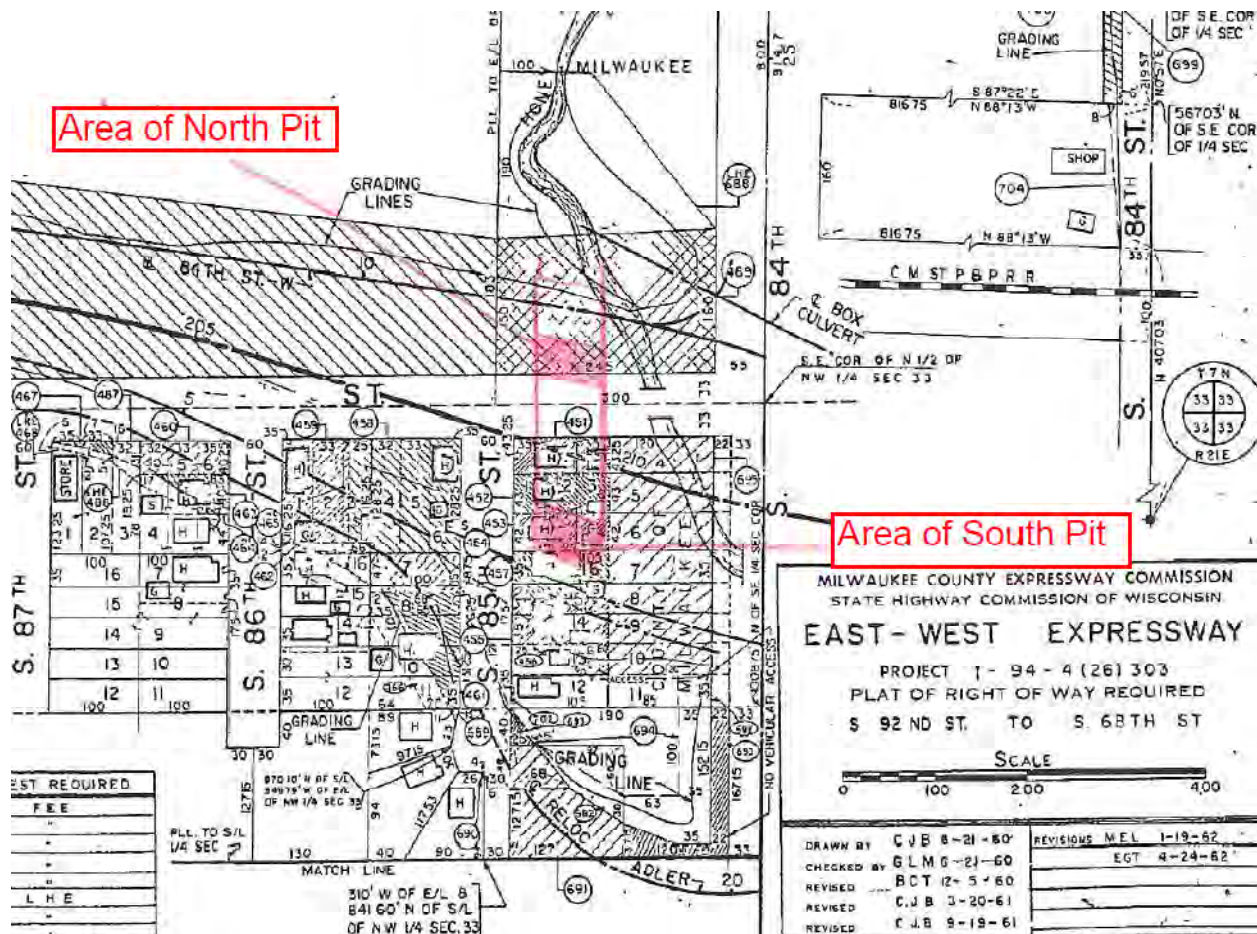


FIGURE 2-4
EXCERPT FROM HISTORICAL PLAT MAP
EAST LEG STORM SEWER – HONEY CREEK TUNNEL

3 SUBSURFACE EXPLORATION

3.1 Adjacent Subsurface Explorations

Five soil borings which were drilled for other structures of the Zoo Interchange Reconstruction Project are immediately adjacent to the proposed Honey Creek Tunnel. Locations of these borings are shown in Figure 3-1. These adjacent borings include ER-26, EC-3, EC-2, EB-14, and EB-16. The boring logs and laboratory test results are presented in Appendix A.

3.2 Subsurface Exploration and Testing Program Overview

3.2.1 Layout of Borings

A subsurface exploration program consisting of 3 borings, numbered EC-4 through EC-6, was recently performed along the proposed Honey Creek Tunnel alignment. Groundwater monitoring wells were installed at the off-set locations of boring EC-4 and EC-6. The boring locations are shown in Figure 3-1. The boring logs with corresponding monitoring well diagrams are included in Appendix B.

After completion of drilling and well installation, the boring locations and ground surface elevations were surveyed. The ground surface elevations and borings coordinates are included on the boring logs in Appendix B. Coordinates are based on Wisconsin Coordinate Reference Systems (WISCRS 2006) and elevations are reported with respect to the National Geodetic Vertical Datum (NGVD).

3.2.2 Drilling and Sampling Procedures

Borings of the subsurface exploration program for the proposed Honey Creek Tunnel were drilled by GESTRA Engineering, Inc. (GESTRA) of Milwaukee, Wisconsin. The exploration program involved Dietrich D50 All-Terrain-Vehicle (ATV) and CME 45 drill rigs. All soil borings were drilled using hollow-stem augers to depths of 11 to 32 ft bgs and then continued by mud-rotary drilling to the termination depths. The drilling work was performed under full-time supervision of a Forward 45, LLC. (F45) geotechnical engineer. Drilling depths, elevations, and hammer efficiency of the borings are summarized in Table 3-1.

Table 3-1: Summary of Subsurface Exploration

Boring No.	Ground Elev. (ft)	Termination Elev. (ft)	Drilling Depth (ft)	Hammer Efficiency
EC-4	717.4	647.9	69.5	80.9%
EC-5	719.2	668.4	50.8	83.9%
EC-6	719.8	650.8	69.0	80.9%

Soil sampling was performed continuously from 5 to 50 ft bgs for the tunnel zone and at least 1 diameter above/below the tunnel zone. Soil sampling for other depths were performed at 2.5-foot intervals. Samples were obtained by driving a split-spoon (SS) sampler during Standard Penetration Tests (SPT), in general accordance with ASTM D1586, using automatic hammers. The total number of blows required to penetrate the second and third 6 inches of an 18-inch or 24-inch split spoon sampler were recorded as the standard penetration resistance “N-value, in blows per foot (bpf)”. A few thin-walled Shelby Tube (“ST”) samples were obtained in cohesive soils, in general accordance with ASTM D1587. The soil boring logs are provided in Appendix B.

The field geotechnical engineer observed the drilling activities and sample collection in order to collect information about subsurface conditions, including groundwater occurrence, indications of cobbles and boulders, and relative drilling resistance (RDR). RDR values between SPT sample intervals in accordance with Table 3-2 were recorded in the field and presented in the final boring logs. These observations, along with information on drilling methods and sample depth, and descriptions of recovered samples were documented on field logs and subsequently transferred to the final logs presented in Appendix B.

Table 3-2: RDR Criteria

RDR	Term	Criteria	Typical Ground Condition
1	Very easy	No chatter, very little resistance, very fast and steady drill advance rate	Very soft to soft silts and clays; very loose to loose silts and sands; no gravel, cobbles, boulders or rubble
2	Easy	No chatter, some resistance, fast and steady drill advance rate	Firm to stiff silts and clays; loose to medium dense silts and sands; little or no gravel, no to very few cobbles, boulders or pieces of rubble
3	Moderate	Some chatter, firm drill resistance with moderate advance rate	Stiff to very stiff silts and clays; dense silts and sands; medium dense sands and gravel; occasional cobbles or rubble pieces (2 to 3 occurrences per 10 feet)
4	Hard	Frequent chatter and variable drill resistance, slow advance rate	Very stiff to hard silts and clays with some gravel and cobbles; very dense to extremely dense silts and sands with some gravel; dense to very dense sands and gravel; very weathered, soft bedrock; frequent cobbles and boulders or rubble pieces (3 to 4 per 10 feet)
5	Very hard	Constant chatter, variable and very slow drill advance, nearly refusal	Hard to very hard silts and clays with some gravel; very dense to extremely dense gravelly sand or sandy gravel; very frequent cobbles and boulders (at least 5 per 10 feet); weathered, very jointed bedrock

3.2.3 Groundwater Measurement and Borehole Abandonment

GESTRA installed groundwater monitoring wells EC-4W and EC-6W at off-set locations of boring EC-4 and EC-6, respectively. The wells were constructed using 2-inch inside diameter Schedule 40 PVC with factory-slotted screens.

The sensing or filter-pack zones are slightly longer than the screens. Table 3-3 summarizes the ground elevation and the sensing zone of each monitoring well. The wells are monitored on the weekly basis.

Details about the groundwater monitoring well construction and development can be found on copies of the completed Monitoring Well Construction and Development forms included in Appendix C. The well installations are also shown schematically on the boring logs in Appendix B. Observed groundwater levels are reported in Section 4 of this report.

Table 3-3: Summary of Groundwater Monitoring Well Sensing Zones

Well/Boring ID	Ground Elev. (ft)	Top of Sensing Zone – Elev./ Depth (ft)	Bottom of Sensing Zone – Elev./ Depth (ft)
EC-4W	717.4	700.4/ 17	678.4/ 39
EC-6W	719.8	701.8/ 18	679.8/ 40

All borings were abandoned at the conclusion of drilling in accordance with WDNR regulations. In general, each boring was grouted with bentonite chips or bentonite grout from the bottom of the boring to the ground surface.

3.2.4 Field and Laboratory Testing Procedures

Recovered SPT SS samples and ST samples were visually examined in the field by a geotechnical engineer to estimate the distribution of grain sizes, plasticity, consistency, moisture condition, color, presence of lenses and seams and ground characters (running, flowing or cemented) for granular samples. Ground characters for granular samples are based on Tunnel Man's Ground Classification for Soils (FHWA, 2009). Running refers to granular material run like granulated sugar or dune sand when exposed at steeper slopes. Cemented granular samples have some amount of binder (cohesive material) which gives some cohesion and most likely behave raveling in excavation. The unconfined compressive strengths of relatively undisturbed portions were estimated using a hand-held, calibrated pocket penetrometer. The soils were classified in the field using the Unified Soil Classification System (USCS).

After examination, representative sample material was placed in jars, which were then sealed and labeled. The samples were transported to the laboratory for further examination and testing. In the laboratory, the cohesive portions of both the split-barrel and Shelby tube samples were oven dried to determine their moisture content. The Shelby tube samples were trimmed and subjected to unconfined compression tests and unit weight determinations. Selected samples were tested for Atterberg limits and sieve analysis with hydrometer. The laboratory test results are included in Appendix B. Performed laboratory test quantities are summarized in Table 3-4.

Table 3-4: Summary of Laboratory Test Quantities

Number of Tests Performed	Test Type	Test Standard
4	Atterberg limits	ASTM D4318
3	Sieve analysis with hydrometer	ASTM D422
1	Sieve analysis without hydrometer	ASTM D422
All fine-grained samples	Moisture content	ASTM D2216
1	Corrosivity: pH, resistivity, sulfate, chloride	ASTM D4972; AASHTO T288, T290, T291
2	Unconfined compressive strength and dry unit weight of cohesive soils	ASTM D2166
1	Loss on Ignition	ASTM D7348

3.2.5 Boring Log Procedures

Similar soils from individual samples were grouped into the strata shown on the boring logs. Corresponding USCS classification symbols were also added. Note that the geotechnical engineer estimated the stratification depth lines between the soil types shown on the logs based on the available data. Actual transitions between soil types may not be as distinct. Furthermore, readers should recognize that subsurface conditions and water levels at locations between borings might differ from those encountered at the boring locations and that such conditions may change over time. These variables need proper assessment when using the information presented on the boring logs.

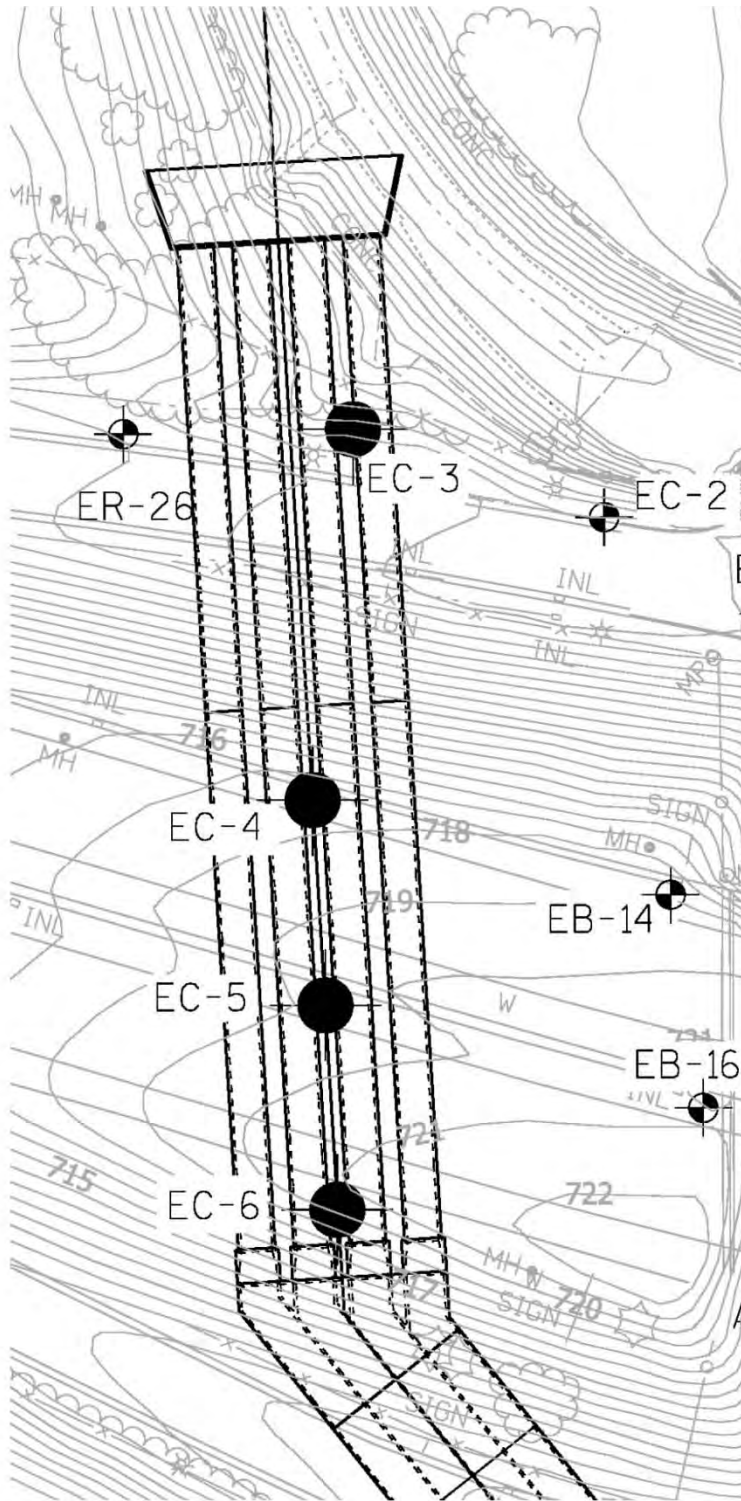


FIGURE 3-1
SOIL BORING LOCATION PLAN
 EAST LEG STORM SEWER – HONEY CREEK TUNNEL

4 SUBSURFACE CONDITIONS

4.1 General

The following is a generalized discussion of the subsurface conditions as encountered in the current subsurface exploration program for the proposed Honey Creek Tunnel and adjacent subsurface explorations. No interpretation regarding soil stratigraphy or composition at intermediate (non-sampled) locations, nor appropriate soil parameters or design groundwater elevations, is made in this document. The GBR should be consulted for interpretation of soil/groundwater conditions for construction or design.

4.2 Soil Conditions

Published geologic information (Section 2) along with the results of laboratory testing indicates that the native soils are almost exclusively deposited as part of the Oak Creek Formation, and consist predominantly of tills with occasional seams and interbedded layers of glacial lacustrine, and outwash deposits. For design purpose, the soils along the proposed Honey Creek Tunnel alignment are categorized in the following generalized strata. The boring logs which contain detailed descriptions of the soils are presented in Appendices A and B. The interpreted subsurface profile along the proposed Honey Creek Tunnel alignment is presented in the GBR.

- **Fill** — The existing I-94 above the proposed Honey Creek Tunnel is on an embankment. The estimated thickness of the Fill layer ranges from 4 to 17 feet. Few inches of topsoil encountered at the surface of the borings drilled in the grass is also considered fill. Fill is variable in character and includes both cohesive and granular components. The granular components vary from pavement base and loose to medium dense sand with some amount of clay. The cohesive component consists of soft to vary stiff, silty clay, clay with occasional traces of fine to coarse sands, gravels, cobbles, foundry, and concrete debris. The available information suggests that Fill also contains traces of organics and wood chips at various depths. Although not specifically encountered in this investigation, fill in the area should be expected to contain sporadic materials such as brick and possibly large concrete blocks. It should be noted that fuel odor in the retrieved SS sample of Fill was encountered at shallow depth of boring EC-2. The fuel odor may possibly be from the actual fuel spill from vehicle crashes.
- **Silt & Clay** — The Silt & Clay layer is the prevailing layer underlying the Fill layer. Based on available subsurface information, this layer is estimated to be over 50 ft and interbedded with relatively thin layers of Silty Sand with Gravel and Sand. The Silt & Clay layer are fine materials from Till and Lacustrine Silt and Clay. It consists of medium stiff to hard clay, silty clay and clayey silt with a trace to some fine to coarse sand and gravel, and a

trace of shale and limestone fragments. The Silt & Clay containing occasional to frequent cobbles and boulders has been observed during drilling of the soil borings.

- Silty Sand with Gravel — Silty Sand with Gravel was encountered in two borings and is generally loose to dense. Thickness of this stratum varies from 0 to 9 feet. This stratum is expected to contain few to occasional cobbles and boulders.
- Sand — The Sand layer typically consist of silty sand, clayey sand, and poorly graded sand. Occasionally trace of gravel is found within this Sand layer. The density of Sand is generally medium dense, except for the very-dense sand encountered below elevation 630 feet of boring EB-14. The anticipated Sand layer within tunnel alignment is expected to be less than 5 feet in thickness.

Note that the above soil layers are listed in no particular order. Not all the soil material types exist at the shafts locations or along all portions of the tunnel alignment.

Table 4-1 lists a summary of soil testing results for the soil layers that were encountered during subsurface exploration, based on adjacent borings and borings of Honey Creek Tunnel. Table 4-2 lists a summary of soil testing results for the soil layers encountered within the tunnel zone and one diameter above/below the tunnel zone.

Table 4-1: Summary of Soil Testing Results

Soil Unit Property	Fill	Silt & Clay	Silty Sand with Gravel	Sand
SPT N (bpf)	2-62 (13) [37, 11]	6-86 (31) [97, 19]	9-39 (20) [6, 11]	7-76 (25) [12, 18]
SPT N ₆₀ (bpf)	3-84 (18) [37, 15]	8-108 (41) [97, 25]	12-55 (27) [6, 16]	10-108 (34) [12, 25]
Pocket Penetrometer Reading, Q _p (tsf)	0-4.5 (2.8) [52, 1.3]	0.25-4.5 (3.0) [107, 1.3]	-	-
Unconfined Compressive Strength, Q _u (tsf) ⁵	1.1-2.3 (1.9) [4, 0.6]	0.5-4.9 (2.4) [3, 2.2]	-	-
Gravel Content, >#4 Sieve (%)	-	0-7 (4) [2, 5]	32 [1, -]	0 [1, -]
Sand Content, #4 - #200 Sieve (%)	-	34-47 (40) [2, 10]	48 [1, -]	72 [1, -]
Fines Content, <#4 Sieve (%)	-	53-59 (56) [2, 4]	21 [1, -]	28 [1, -]
Liquid Limit (%)	36-54 (42) [4, 8]	17-44 (26) [5, 11]	-	-

Soil Unit Property	Fill	Silt & Clay	Silty Sand with Gravel	Sand
Plasticity Index (%)	9-32 (21) [4, 9]	4-29 (13) [5, 10]	-	-
Moisture Content (%)	8-31 (18) [37, 5]	8-32 (17) [97, 5]	-	-
Dry Unit Weight (pcf)	86-113 (106) [4, 13]	109-132 (123) [3, 12]	-	-
Note: 1. Values are rounded. 2. Data represents: low-high (average value), [number of tests, standard deviation]. 3. $SPT N_{60} = SPT N * (\text{hammer efficiency}/60)$ 4. Pocket penetrometer values reported on boring logs as 4.0+ and 4.5+ were analyzed as 4.0 and 4.5 tsf respectively. 5. Unconfined compressive strength Q_u is obtained from unconfined compression test (ASTM D2166)				

Table 4-2: Summary of Soil Testing Results in the Tunnel Zone

Soil Unit Property	Fill	Silt & Clay	Silty Sand with Gravel	Sand
SPT N (bpf)	3-62 (15) [23, 13]	6-50 (20) [53, 12]	9-39 (20) [6, 11]	7-30 (20) [9, 8]
SPT N_{60} (bpf)	4-84 (20) [23, 18]	8-67 (27) [53, 17]	12-55 (27) [6, 16]	10-43 (28) [9, 11]
Pocket Penetrometer Reading, Q_p (tsf)	0.5-25 (3.4) [33, 4.1]	0.25-4.5 (2.6) [69, 1.2]	-	-
Unconfined Compressive Strength, Q_u (tsf) ⁶	1.1-2.3 (1.8) [3, 0.6]	0.5-4.9 (2.4) [3, 2.2]	-	-
Gravel Content, >#4 Sieve (%)	-	0-7 (4) [2, 5]	32 [1, -]	0 [1, -]
Sand Content, #4 - #200 Sieve (%)	-	34-47 (40) [2, 10]	48 [1, -]	72 [1, -]
Fines Content, <#4 Sieve (%)	-	53-59 (56) [2, 4]	21 [1, -]	28 [1, -]
Liquid Limit (%)	37-54 (44) [3, 9]	17-44 (26) [5, 11]	-	-
Plasticity Index (%)	9-32 (21) [3, 12]	4-29 (13) [5, 10]	-	-
Moisture Content (%)	8-31 (18) [22, 5]	8-32 (17) [54, 5]	-	-

Soil Unit Property	Fill	Silt & Clay	Silty Sand with Gravel	Sand
Dry Unit Weight (pcf)	86-113 (104) [3, 15]	109-132 (123) [3, 12]	-	-
Note: 1. Summarized values are from samples within tunnel zone and one diameter above/below tunnel zone. 2. Values are rounded. 3. Data represents: low-high (average value), [number of tests, standard deviation]. 4. $SPT N_{60} = SPT N * (\text{hammer efficiency}/60)$ 5. Pocket penetrometer values reported on boring logs as 4.0+ and 4.5+ were analyzed as 4.0 and 4.5 tsf respectively. 6. Unconfined compressive strength Q_u is obtained from unconfined compression test (ASTM D2166)				

4.3 Groundwater Conditions

Groundwater was encountered drilling in some of the borings (EC-2, EC-3, EB-14, and ER-26) which were drilled solely by hollow-stem augers. While drilling Honey Creek Tunnel borings (EC-4 through EC-6), drilling crew switched drilling method from hollow stem augers to mud rotary at 11 to 32 ft bgs. Groundwater was not observed in borings EC-4 through EC-6 in the depths drilled using hollow-stem augers. Introduction of drilling fluid as part of the mud-rotary drilling process obscured groundwater observations at greater depths in these borings. The depths below grade and corresponding elevations at which groundwater was first encountered are shown on the boring logs in Appendices A and B. The observations include groundwater levels during drilling and in some instances a short time period after completion of drilling.

Two groundwater monitoring wells (EC-4W and EC-6W) were installed by GESTRA at off-set locations of borings EC-4 and EC-6. Monitoring results performed between August and October 2012 are presented in Table 4-3.

Groundwater was encountered at relatively shallow depths in some borings and deeper in others. Often the groundwater encountered in the borings coincides with the presence of layers or seams of granular soils. The groundwater encountered at shallow depths is likely to represent the groundwater table of open aquifer and the groundwater table is likely influenced by the nearby Honey Creek water level. Note that the groundwater levels may fluctuate over time and seasonal change due to variations in precipitation, evaporation, surface water runoff, and local dewatering.

Table 4-3: Monitoring Results of Groundwater Monitoring Wells

Well/Boring ID	Ground Elev. (ft)	Sensing Zone – Elev./ Depth (ft)	Date	Groundwater Elev. (ft)	Depth to Groundwater (ft)
EC-4W	717.4	700.4-678.4/ 17-39	8/3/2012	693.0	25.0
			8/10/2012	692.4	25.6
			8/17/2012	692.3	25.7
			8/24/2012	692.2	25.8
			8/31/2012	692.1	25.9
			9/7/2012	691.9	26.0
			9/14/2012	691.9	26.1
			9/21/2012	691.9	26.1
			10/5/2012	691.7	26.3
			10/12/2012	691.5	26.4
			10/19/2012	691.5	26.5
			10/26/2012	691.6	26.4
			11/02/2012	691.0	26.3
			11/14/2012	690.8	26.5
			11/20/2012	691.0	26.3
			12/03/2012	691.0	26.3
			01/04/2013	691.5	25.8
EC-6W	719.8	701.8-679.8/ 18-40	8/3/2012	689.5	30.6
			8/10/2012	689.4	30.7
			8/17/2012	689.3	30.8
			8/24/2012	689.3	30.8
			8/31/2012	689.3	30.8
			9/7/2012	689.3	30.8
			9/14/2012	689.1	31.0
			9/21/2012	689.2	30.9
			9/28/2012	689.1	31.0
			10/5/2012	689.0	31.1
			10/12/2012	688.8	31.3
			10/26/2012	688.9	31.3
			11/02/2012	689.1	31.1
			11/14/2012	689.0	31.2
			11/20/2012	689.2	30.9
			12/03/2012	689.2	30.9
			12/21/2012	687.9	32.3
			01/04/2013	689.0	31.1

4.4 Corrosivity Test Results

Corrosivity tests were performed on soil samples obtained from boring EC-4. These tests included resistivity, Ph, chloride, and sulfate concentrations. Results from corrosivity tests are summarized in Table 4-4 and the test data sheets are included in Appendix B. The corrosivity assessment is discussed in the GBR.

Table 4-4: Summary of Corrosivity Test Results

Boring ID/ Sample No.	Sample Elev. (ft)	Resistivity (ohm-cm)	pH with Water Solution	Chloride (ppm)	Sulfate (Wt% SO ₄)
EC-4/ 12B	692.8-691.4	640	7.56	281 (combined samples)	0.028 (combined samples)
EC-4/ 13	691.4-689.4	2430	8.05		
EC-4/ 14	689.4-687.4	1535	8.09		

5 REFERENCES

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6 LIMITATIONS

This GDR has been prepared for the Honey Creek Tunnel for the Zoo Interchange Project in Milwaukee, WI, in accordance with generally accepted geotechnical engineering practices common to the project area. This report presents factual information of published geology information, adjacent and current subsurface explorations. GBR shall be consulted for engineering interpretation and recommendations. No warranty is included, either expressed or implied, that the actual conditions encountered will conform exactly to the subsurface conditions described herein.

Prepared by:

Forward 45, LLC.



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Geotechnical Engineer



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Principal Engineer

Appendix A Adjacent Boring Logs and Laboratory Test Results

General Notes

Unified Soil Classification System

Borings: EC-2, EC-3, EB-14, EB-16, ER-26

Laboratory Test Results

GESTRA ENGINEERING, INC. -- GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS		TEST SYMBOLS	
SYMBOL	DEFINATION	SYMBOL	DEFINATION
HSA	3 1/4" I.D. hollow Stem Auger	WC	Water Content - % of Dry Wt. – ASTM D 2216
RWB	Rotary Wash Boring (Mud Drilling)	OC	Organic Content - % of Dry Wt. – ASTM D 2974
_FA	4", 6" or 10" Diameter Flight Auger	DD	Dry Density – Pounds Per Cubic Foot
_HA	2", 4" or 6" Hand Auger	LL, PL	Liquid and Plastic Limit – ASTM D 4318
_DC	2 1/2" , 4" , 5" or 6" Steel Drive Casing		
_RC	Size A, B, or N Rotary Casing		Additional Insertions in Last Column
PD	Pipe Drill or Cleanout Tube	Qu	Unconfined Comp. Strength-psf – ASTM D 2166
CS	Continuous Split Barrel Sampling	Qp	Penetrometer Reading – Tons/Square Foot
DM	Drill Mud	Ts	Torvane Reading – Tons/Square Foot
JW	Jetting Water	G	Specific Gravity – ASTM D 854
SB	2" O.D. Split Barrel Sample	SL	Shrinkage Limits – ASTM D 427
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample	OC	Organic Content – Combustion Method
ST	2" or 3" Thin Walled Tube Sample	SP	Swell Pressure - Tons/Square Foot
3TP	3" Thin Walled Tube (Pitcher Sampler)	PS	Percent Swell
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)	FS	Free Swell – Percent
W	Wash Sample	pH	Hydrogen Ion Content. Meter Method
B	Bag Sample	SC	Sulfate Content – Parts/ Million, same as mg/L
P	Test Pit Sample	CC	Chloride Content - Parts/ Million, same as mg/L
_Q	BQ, NQ, or PQ Wireline System	C*	One Dimensional Consolidation – ASTM D 2453
_X	AX, BX, or NX Double Tube Barrel	Qc*	Triaxial Compression
CR	Core Recovery – Percent	D.S.*	Direct Shear – ASTM D 3080
NSR	No Sample Recovered, classification based on action of drilling, equipment and/or material noted in drilling fluid or on sampling bit.	K*	Coefficient of Permeability – cm/sec
		D*	Dispersion test
		DH*	Double Hydrometer – ASTM D 4221
		MA*	Particle Size Analysis – ASTM D 422
		R	Laboratory Receptivity, in ohm – cm – ASTM G 57
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.	E*	Pressuremeter Deformation Modulus – TSF
		PM*	Pressuremeter Test
		VS*	Field Vane Shear – ASTM D 2573
		IR*	Infiltrometer Test – ASTM D 3385
		RQD	Rock Quality Designation – Percent
▼	Water Level Symbol		

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

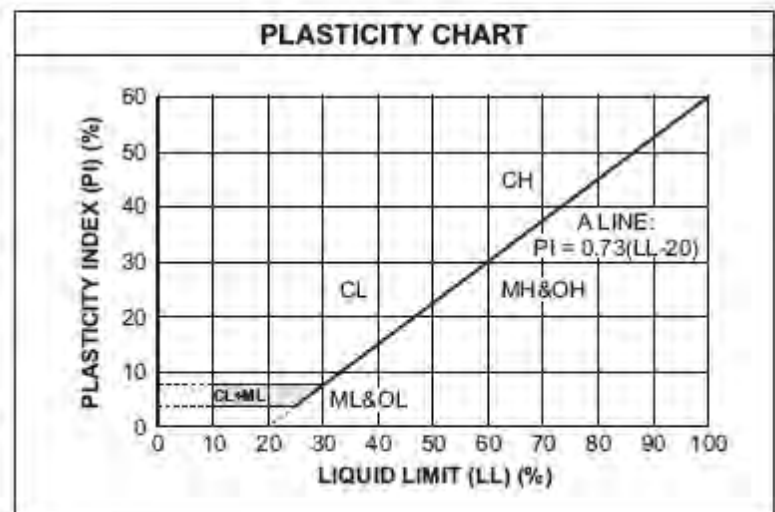
DENSITY TERM	"N" VALUE	CONSISTENCY TERM	qu /qp VALUE (tsf)	"N" VALUE	Lamination	
Very Loose	0-4	Very Soft	<0.25	0-2	Layer	Up to 1/2" thick stratum
Loose	4-10	Soft	0.25 - 0.49	2-4	Lens	1/2" to 6" thick stratum
Medium Dense	10-30	Medium Stiff	0.5 - 0.99	4-8	Varved	1/2" to 6" discontinuous stratum
Dense	30-50	Stiff	1.0 - 1.99	8-16	Dry	Alternating laminations
Very Dense	Over 50	Very Stiff	2.0 - 3.99	16-30	Moist	Powdery, no noticeable water
		Hard	4.0+	Over 30	Wet	Below saturation
					Water bearing	Saturated, above liquid limit
						Pervious soil below water
Standard "N" Penetration: per ASTM D1586						
Consistency term based in relative order on Qu result, Qp result, and lastly "N" value.						

RELATIVE GRAVEL PROPORTIONS			RELATIVE SIZES	
CONDITION	TERM	RANGE		
Coarse Grained Soils	trace of gravel	2-14%	Boulder	Over 12"
	with gravel	15-49%	Cobble	3" - 12"
			Gravel	
Fine Grained Soils			Coarse	3/4" - 3"
	15-29% + No. 200	2-14%	Fine	#4 – 3/4"
	15-29% + No. 200	15-29%	Sand	
			Coarse	#4 - #10
30% + No. 200	trace of gravel	2-14%	Medium	#10 - #40
30% + No. 200	with gravel	15-24%	Fine	#40- #200
30% + No. 200	gravelly	25-49%	Silt & Clay	- # 200, Based on Plasticity

Unified Soil Classification System (USCS)

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART			
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA		
GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	
Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 12 percent GM, GC, SM, SC 5 to 12 percent Borderline cases requiring dual symbols		



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WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-2	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 2	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 1/30/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 1/30/12	
CREW CHIEF R. Jackson		DRILLING RIG CME 45		WisDOT STRUCTURE ID No	
FIELD LOG BY B. Naughton		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME	
LOG QC BY E. Jeske		HAMMER TYPE Auto		STATION	
		EFFICIENCY (6/2011) 84.3%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		EASTING 577025	
		RANGE		SURFACE ELEVATION 698.4 ft	
		SECTION			
		1/4 SECTION			
		1/4 SECTION			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (2")									
1 SS	8	6 5 8	13			0.2 (698.2) SANDY LEAN CLAY, dark brown, moist, very stiff, with foundry material, (FILL)	cl				3.50			11	Boring was offset 6' south, 1' east of staked location. No elevation difference was recorded No frost Fuel odor in sample SS-1
2 SS	8	4 6 5	11		695	3 (695.4) POORLY GRADED SAND WITH GRAVEL, brown, moist, medium dense, (FILL)	sp								
3 SS	12	1 1 2	3		5	5.5 (692.9) SANDY LEAN CLAY, dark gray with dark brown, moist, medium stiff, (FILL)	cl				0.50			19	
4 SS	18	2 3 5	8		690	8 (690.4) LEAN CLAY WITH SAND, gray with brown, moist, stiff to very stiff	cl				1.0-2.0			13	
5 SH	24					12 (686.4) SANDY LEAN CLAY, gray, wet, soft to medium stiff									
6 SS	18	2 4 5	9		15	Sand seam in sample SS-6	cl				0.25-0.5			16	
7 SS	15	3 4 7	11			15.5 (682.9) CLAYEY SAND, gray, moist, medium dense Silty seams in sample SS-7	sc								
8 SS	18	15 17 18	35		680	18 (680.4) SANDY SILT, gray, moist to wet, dense 1/2" thick clay seam in sample SS-8	ml							16	

WATER & CAVE-IN OBSERVATION DATA			
	WATER ENCOUNTERED DURING DRILLING:	15ft.	CAVE DEPTH AT COMPLETION: 40ft.
	WATER LEVEL AT COMPLETION:	15ft.	CAVE DEPTH AFTER 0 HOURS: NMR
	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10\ZOO INTERCHANGE\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 2/8/12

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WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-3	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 2	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/23/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/23/12	
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892	
FIELD LOG BY A. Glowbig		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME Honeycreek Tunnel under I-94	
LOG QC BY E. Jeske		HAMMER TYPE Auto		STATION	
		EFFICIENCY (7/2012) 80.9%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		SURFACE ELEVATION 701 ft	
		RANGE		1/4 SECTION	
		SECTION		1/4 SECTION	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					700	TOPSOIL (6")									
1 SS	13	7 11 12	23			SILT, brown, moist, medium dense, (FILL)	ml							8	
2 SS	14	5 6 5	11			SANDY SILTY CLAY, dark brown, moist, very stiff, (FILL)	cl-ml				2.50			12	LOI = 2.6%
				5											
					695	LEAN CLAY WITH GRAVEL, brown to dark brown, moist, hard	cl								
3 SS	12	2 3 4	7			SILT WITH SAND, gray, moist, loose to medium dense					4.5+			17	
4 SS	17	3 5 6	11				ml							18	
				10											
					690										
5 SH						LEAN CLAY, gray, moist, medium stiff to very stiff									
6 SS	18	4 4 4	8		15						0.50			12	
					685										
7 SS	18	7 3 5	8				cl				2.00			11	
8 SS	10	6 10 9	19		20						2.00			11	

WATER & CAVE-IN OBSERVATION DATA			
	WATER ENCOUNTERED DURING DRILLING:	28ft.	CAVE DEPTH AT COMPLETION: NMR
	WATER LEVEL AT COMPLETION:	NMR	CAVE DEPTH AFTER 0 HOURS: NMR
	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME Zoo Interchange		 BORING LOG 		BORING No		EC-3			
WisDOT PROJECT ID No 1060-33-01				PAGE No 2 of 2					
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/23/12		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/23/12		LATITUDE			
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892		LONGITUDE			
FIELD LOG BY A. Glowbig		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME Honeycreek Tunnel under I-94		NORTHING 295704			
LOG QC BY E. Jeske		HAMMER TYPE Auto		EFFICIENCY (7/2012) 80.9%		STATION		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION	
								SURFACE ELEVATION 701 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
				680		LEAN CLAY, gray, moist, medium stiff to very stiff									
9 SS	18	9 12 12	24								1.50			8	Driller lost tube down borehole when attempting to push. Driller had to offset 4' west of initial attempt and blind drill down to 21' and continue drilling
10 SS	18	4 7 6	13			With sand seams in sample SS-9	cl				2.00			11	
				25											
				675											
11 SS	18	4 5 6	11								2.50			11	
						▽ 28 (673) POORLY GRADED SAND, gray, wet, medium dense	sp								
12 SS	18	3 5 11	16			29.5 (671.5) LEAN CLAY, gray, moist, very stiff to hard					2.00			14	
				30											
				670			cl								
13 SS	18	10 16 42	58								4.5+			9	
				35											
				665											
						36.8 (664.2) POORLY GRADED SAND, gray, wet, medium dense	sp								
14 SS		5 8 13	21			39.3 (661.7) LEAN CLAY, gray, moist, very stiff	cl				3.50				Driller didn't note exact change in soil stratification in sample SS-14
				40		40 (661) End of Boring at 40.0 ft.									Recovery was not recorded on field log

WATER & CAVE-IN OBSERVATION DATA

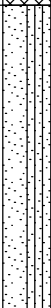
	WATER ENCOUNTERED DURING DRILLING: 28ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐
	WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐
	WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	WET ☐

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GSTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EB-14								
WisDOT PROJECT ID No 1060-33-01						PAGE No 1 of 5										
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 10/25/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88								
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 10/25/11		LATITUDE										
CREW CHIEF A. Woerpel		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-863/ 864		LONGITUDE										
FIELD LOG BY B. Brown		DRILLING METHOD / HOLE SIZE 3 1/4" HSA		ROADWAY NAME I-94 / 84th St.		NORTHING 295564										
LOG QC BY R. Haque		HAMMER TYPE Auto		EFFICIENCY (6/2011) 85.1%		STATION		OFFSET								
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION								
								1/4 SECTION								
								SURFACE ELEVATION 719.2 ft								
Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments		USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
1 SS	18	4 5 2	7			ASPHALT, (5")										
						CONCRETE, (6")										
						BASE COURSE, (10")										
2 SS	15	3 15 4	19	5	715	POORLY GRADED SAND, brown and black, moist, medium dense, trace gravel and clay (FILL)		sp								
						POORLY GRADED SAND WITH CLAY, dark brown and gray, moist, medium dense, trace gravel with clay seams		sp-sc								
						LEAN CLAY, dark brown and black, moist, very soft to very stiff		CL								
3 SS	18	2 1 1	2			Color change to gray at 8'		CL				0.00			26	
4 SH	20			10	710	LEAN CLAY, dark brown and black, moist, medium stiff to very stiff, trace to little sand and gravel, trace organic matter, (FILL)						3.75 (2.3)	40	22	20	Dry Wt = 113 pcf
5 SS	18	4 3 2	5									2.75			16	
6 SS	18	2 7 8	15	15	705			CL				3.50			20	
7 SS	18	2 3 4	7									2.00			16	
8 SH	12			20	700	With gravel in sample SH-8						4.50 (2)			19	Dry Wt = 112 pcf
WATER & CAVE-IN OBSERVATION DATA																
	WATER ENCOUNTERED DURING DRILLING: 33.5ft.					CAVE DEPTH AT COMPLETION: NMR				WET ☐ DRY ☐						
	WATER LEVEL AT COMPLETION: NMR					CAVE DEPTH AFTER 0 HOURS: NMR				WET ☐ DRY ☐						
	WATER LEVEL AFTER 0 HOURS: NMR				NE = Not Encountered; NMR = No Measurement Recorded											
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.																

\\GSTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EB-14								
WisDOT PROJECT ID No 1060-33-01				PAGE No 2 of 5												
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 10/25/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88								
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 10/25/11		LATITUDE										
CREW CHIEF A. Woerpel		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-863/ 864		LONGITUDE										
FIELD LOG BY B. Brown		DRILLING METHOD / HOLE SIZE 3 1/4" HSA		ROADWAY NAME I-94 / 84th St.		NORTHING 295564										
LOG QC BY R. Haque		HAMMER TYPE Auto		EFFICIENCY (6/2011) 85.1%		STATION		OFFSET								
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION								
								1/4 SECTION								
								SURFACE ELEVATION 719.2 ft								
Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments		USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
9 SS	18	3 6 5	11	25	695	LEAN CLAY, dark brown and black, moist, medium stiff to very stiff, trace to little sand and gravel, trace organic matter, (FILL)		CL				2.00			15	LOI = 4.6%
10 SH	16			30	690	28.8 (690.4) POORLY GRADED SAND, gray, moist to wet, medium dense, trace to little silt and gravel						0.75	37	9	29	
11 SS	18	3 6 14	20	35	685	Wet at 33.5'		sp								
12 SS	18	7 12 35	47	40	680	36.8 (682.4) SILTY CLAY, gray, moist, with sand seams		cl-ml							15	
WATER & CAVE-IN OBSERVATION DATA																
	WATER ENCOUNTERED DURING DRILLING: 33.5ft.						CAVE DEPTH AT COMPLETION: NMR					WET ☐		DRY ☐		
	WATER LEVEL AT COMPLETION: NMR						CAVE DEPTH AFTER 0 HOURS: NMR					WET ☐		DRY ☐		
	WATER LEVEL AFTER 0 HOURS: NMR					NE = Not Encountered; NMR = No Measurement Recorded										
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.																

\\GESTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EB-14	
WisDOT PROJECT ID No 1060-33-01				PAGE No 3 of 5	
CONSULTANT Forward 45		CONSULTANT PROJECT No	DATE STARTED 10/25/11	HORIZONTAL DATUM WISCRS (2006)	VERTICAL DATUM NAVD 88
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10	DATE COMPLETED 10/25/11	LATITUDE	
CREW CHIEF A. Woerpel		DRILLING RIG CME 75 (International)	WisDOT STRUCTURE ID No B-40-863/ 864	LONGITUDE	
FIELD LOG BY B. Brown		DRILLING METHOD / HOLE SIZE 3 1/4" HSA	ROADWAY NAME I-94 / 84th St.	NORTHING 295564	
LOG QC BY R. Haque		HAMMER TYPE Auto	EFFICIENCY (6/2011) 85.1%	STATION	OFFSET
COUNTY 40-Milwaukee		TOWNSHIP	RANGE	SECTION	1/4 SECTION
					1/4 SECTION
		SURFACE ELEVATION 719.2 ft			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY CLAY, gray, moist, with sand seams	cl-ml								
						41.8 (677.4)									
13 SS	18	6 10 13	23	675	45	LEAN CLAY, gray, moist, stiff to hard, with occasional silt lenses	cl				1.50-4.50			21	
14 SS	18	10 13 15	28	670	50						3.50			18	
						51.8 (667.4)									
						SILT, gray, wet, very dense, with clay seams	ml							16	
15 SS	18	28 30 27	57	665	55										
						56.8 (662.4)									
						LEAN CLAY, gray, moist, very stiff to hard, trace gravel, occasional silt seams	cl							12	
16 SS	18	10 20 25	45	660	60						4.50				

WATER & CAVE-IN OBSERVATION DATA					
☒	WATER ENCOUNTERED DURING DRILLING: 33.5ft.		☒	CAVE DEPTH AT COMPLETION: NMR	
☒	WATER LEVEL AT COMPLETION: NMR		☒	CAVE DEPTH AFTER 0 HOURS: NMR	
☒	WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded		
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.					

\\GSTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EB-14	
WisDOT PROJECT ID No 1060-33-01		CONSULTANT PROJECT No		DATE STARTED 10/25/11		PAGE No 4 of 5		HORIZONTAL DATUM WISCRS (2006)	
CONSULTANT Forward 45		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 10/25/11		VERTICAL DATUM NAVD 88		LATITUDE	
DRILLING CONTRACTOR Gestra		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-863/ 864		LONGITUDE			
CREW CHIEF A. Woerpel		DRILLING METHOD / HOLE SIZE 3 1/4" HSA		ROADWAY NAME I-94 / 84th St.		NORTHING 295564			
FIELD LOG BY B. Brown		HAMMER TYPE Auto		EFFICIENCY (6/2011) 85.1%		STATION		EASTING 577048	
LOG QC BY R. Haque		TOWNSHIP		RANGE		SECTION		1/4 SECTION	
COUNTY 40-Milwaukee								SURFACE ELEVATION 719.2 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff to hard, trace gravel, occasional silt seams	cl								
17 SS	18	3 6 6	12	65.5	64 (655.2)	SILT, gray, wet, medium dense to dense, with silt lenses	ml				2.50			16 14	
18 SS	18	18 22 22	44	70	650									18	
19 SS	18	13 20 23	43	75	645	SILT, gray, moist, medium dense to dense, with alternating lean clay layers	cl / ml				4.00			19	
20 SS	18	12 17 25	42	80	640						4.00			18	

WATER & CAVE-IN OBSERVATION DATA			
	WATER ENCOUNTERED DURING DRILLING:	33.5ft.	 CAVE DEPTH AT COMPLETION: NMR
	WATER LEVEL AT COMPLETION:	NMR	 CAVE DEPTH AFTER 0 HOURS: NMR
	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GSTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EB-14	
WisDOT PROJECT ID No 1060-33-01						PAGE No 5 of 5			
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 10/25/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 10/25/11		LATITUDE			
CREW CHIEF A. Woerpel		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-863/ 864		LONGITUDE			
FIELD LOG BY B. Brown		DRILLING METHOD / HOLE SIZE 3 1/4" HSA		ROADWAY NAME I-94 / 84th St.		NORTHING 295564			
LOG QC BY R. Haque		HAMMER TYPE Auto		EFFICIENCY (6/2011) 85.1%		STATION		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION	
								1/4 SECTION	
								SURFACE ELEVATION 719.2 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILT, gray, moist, medium dense to dense, with alternating lean clay layers									
21 SS	18	9 16 13	29	85	635		cl / ml				4.50			14	
						SILT, gray, wet, very dense, little sand									
22 SS	18	9 17 26	43	90	630		ml							15	
						POORLY GRADED SAND, gray, wet, very dense									
23 SS	18	19 24 30	54	95	625										
						Trace to little gravel, with clay seams in sample SS-24	sp								
24 SS	16	22 34 42	76	100	620										
						End of Boring at 100.0 ft.									

WATER & CAVE-IN OBSERVATION DATA															
☒	WATER ENCOUNTERED DURING DRILLING: 33.5ft.				☒	CAVE DEPTH AT COMPLETION: NMR				WET ☐			DRY ☐		
☒	WATER LEVEL AT COMPLETION: NMR				☒	CAVE DEPTH AFTER 0 HOURS: NMR				WET ☐			DRY ☐		
☒	WATER LEVEL AFTER 0 HOURS: NMR					NE = Not Encountered; NMR = No Measurement Recorded									

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GSTRASERVER-1\REPORTS\1\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EB-16	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 3	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 11/07/11	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 11/08/11	
CREW CHIEF B. Sargent		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-864	
FIELD LOG BY D. Ashford		DRILLING METHOD / HOLE SIZE 4 1/4 HSA, w/ RWB		ROADWAY NAME 84th St. Bridge	
LOG QC BY E. Jeske		HAMMER TYPE Auto		STATION	
		EFFICIENCY (6/2011) 85.1%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		SURFACE ELEVATION 720.87 ft	
		RANGE			
		SECTION			
		1/4 SECTION			
		1/4 SECTION			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					720	ASPHALT									
						0.7 (720.17)									
						BASE COURSE									
						1.5 (719.37)									
1 SS	18	3 3 5	8			LEAN CLAY WITH SAND, brown and dark brown, moist, medium stiff to hard, trace gravel, (FILL) With gravel in sample SS-1					2.5-3.75			18	
2 SS	18	4 6 6	12				cl				2.75			24	
					5										
					715										
3 SH	19										4.00 (4.3)	36	19	19	Dry Wt = 117 pcf
						7 (713.87)									
						SILT, brown, moist, medium dense, (FILL)	ml								
						8 (712.87)									
						LEAN CLAY WITH SAND, brown and dark brown, moist, medium stiff to very stiff, trace gravel, (FILL)									
4 SH	11				10						3.75 (2.3)			18	Dry Wt = 111 pcf
					710										
5 SS	18	2 4 5	9				cl				2.75			16	
6 SS	14	3 3 3	6		15						1.50			25	
					705										
7 SS	10	0 3 3	6			Color change to gray at 16.0'					0.50			20	Dry to 16.0'. Driller converted to mud rotary at 16.0'.
						17.7 (703.17)									
						SANDY SILTY CLAY, brown with gray, very moist to wet, with 1/2" to 1" thick silt seams, trace gravel	cl-ml								
8 SS	18	4 6 10	16		20									21	Samples SS-8 and SS-9 disturbed unable to get Q_p

WATER & CAVE-IN OBSERVATION DATA			
☒	WATER ENCOUNTERED DURING DRILLING:	NMR	CAVE DEPTH AT COMPLETION: NMR
☒	WATER LEVEL AT COMPLETION:	NMR	CAVE DEPTH AFTER 0 HOURS: NMR
☒	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME Zoo Interchange				BORING LOG 			BORING No		EB-16	
WisDOT PROJECT ID No 1060-33-01							PAGE No		2 of 3	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 11/07/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88		
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 11/08/11		LATITUDE				
CREW CHIEF B. Sargent		DRILLING RIG CME 75 (International)		WisDOT STRUCTURE ID No B-40-864		LONGITUDE				
FIELD LOG BY D. Ashford		DRILLING METHOD / HOLE SIZE 4 1/4 HSA, w/ RWB		ROADWAY NAME 84th St. Bridge		NORTHING 295495				
LOG QC BY E. Jeske		HAMMER TYPE Auto		EFFICIENCY (6/2011) 85.1%		STATION		OFFSET		
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION		
								1/4 SECTION		
								SURFACE ELEVATION 720.87 ft		

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft) Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
				700	SANDY SILTY CLAY, brown with gray, very moist to wet, with ½" to 1" thick silt seams, trace gravel									
9 SS	18	3 5 8	13	25		cl-ml							20	
				695										
					26.8 (694.07)									
10 SS	18	9 10 12	22	30	POORLY GRADED SAND WITH SILT, gray, wet, dense	sp-sm								
				690										
					31.8 (689.07)									
11 SS	18	8 7 11	18	35	LEAN CLAY, gray, moist, very stiff	cl				3.25		14		
				685										
					36.8 (684.07)									
					POORLY GRADED SAND, gray, wet, dense	sp								
12 SS		10 14 14	28	40										
														Recovery not recorded on field log for samples SS-12

WATER & CAVE-IN OBSERVATION DATA

WATER & GASE IN OBSERVATION DATA				
	WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
	WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
	WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

G:\ESTR\SERVER-1\REPORTS\11GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No ER-26	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 3	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 12/19/11	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 12/19/11	
CREW CHIEF R. Jackson		DRILLING RIG CME 75 (F700)		WisDOT STRUCTURE ID No R-40-551	
FIELD LOG BY D. Ashford		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME WB I-94, W abut to 84th St. bridge	
LOG QC BY E. Jeske		HAMMER TYPE Auto		STATION	
		EFFICIENCY (6/2011) 61.3%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		SURFACE ELEVATION 702 ft	
		RANGE		1/4 SECTION	
		SECTION		1/4 SECTION	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (4")									
1 SS	14	4 9 8	17		700	0.3 (701.7) SANDY LEAN CLAY WITH GRAVEL, brown with black, moist, stiff to very stiff, (FILL)	cl				2.0-3.0				
2 SS	14	5 3 3	6		5						1.00				
3 SS	14	4 5 6	11		695	5.5 (696.5) LEAN CLAY, dark gray to black, moist, stiff, trace sand and gravel, (FILL)	cl				1.25-1.75				
4 SH	18				10	8.5 (693.5) FAT CLAY WITH GRAVEL, brown, moist, stiff, with gray mottling	CH				1.75 (1.1)	54	32	31	Dry Wt = 86 pcf
5 SS	18	5 7 8	15		690	10.5 (691.5) LEAN CLAY WITH SAND, brown, moist, very stiff	cl				2.75				
6 SS	18	4 7 9	16		15	13 (689) LEAN CLAY, gray, moist, very stiff	cl				3.50				
7 SS	14	7 14 17	31		685	Sand seam in sample SS-7					2.25				
8 SH	22				20	17.8 (684.2) SILTY CLAY, gray, moist, stiff to hard, trace sand and gravel	CL-ML				2.75-4.5 (1.8)	17	4	11	Dry Wt = 132 pcf

WATER & CAVE-IN OBSERVATION DATA			
	WATER ENCOUNTERED DURING DRILLING: 40ft.		CAVE DEPTH AT COMPLETION: NMR
	WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR
	WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GSTRSERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No ER-26	
WisDOT PROJECT ID No 1060-33-01						PAGE No 2 of 3			
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 12/19/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 12/19/11		LATITUDE			
CREW CHIEF R. Jackson		DRILLING RIG CME 75 (F700)		WisDOT STRUCTURE ID No R-40-551		LONGITUDE			
FIELD LOG BY D. Ashford		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME WB I-94, W abut to 84th St. bridge		NORTHING 295713			
LOG QC BY E. Jeske		HAMMER TYPE Auto	EFFICIENCY (6/2011) 61.3%	STATION		OFFSET	EASTING 576870		
COUNTY 40-Milwaukee		TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION 702 ft		

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY CLAY, gray, moist, stiff to hard, trace sand and gravel	CL-ML								
9 SS	18	8 9 11	20	25	680	LEAN CLAY WITH SAND, gray, moist, stiff, trace gravel	cl				1.25				
10 SS	18	5 8 10	18	30	675		cl				1.25				
					670	LEAN CLAY, gray, moist, very stiff									
11 SS	18	7 8 12	20	35			cl				2.50				
					665										
12 SS	18	9 11 13	24	40							2.50				

WATER & CAVE-IN OBSERVATION DATA						
	WATER ENCOUNTERED DURING DRILLING:	40ft.		CAVE DEPTH AT COMPLETION:	NMR	WET ☐
	WATER LEVEL AT COMPLETION:	NMR		CAVE DEPTH AFTER 0 HOURS:	NMR	WET ☐
	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded			WET ☐

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-1\REPORT\2011\GEO-MILWAUKEE-10\11039-10\ZOO INTERCHANGE\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No ER-26								
WisDOT PROJECT ID No 1060-33-01						PAGE No 3 of 3										
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 12/19/11		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88								
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 12/19/11		LATITUDE										
CREW CHIEF R. Jackson		DRILLING RIG CME 75 (F700)		WisDOT STRUCTURE ID No R-40-551		LONGITUDE										
FIELD LOG BY D. Ashford		DRILLING METHOD / HOLE SIZE 3 1/4 HSA		ROADWAY NAME WB I-94, W abut to 84th St. bridge		NORTHING 295713										
LOG QC BY E. Jeske		HAMMER TYPE Auto		EFFICIENCY (6/2011) 61.3%		STATION		OFFSET								
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION								
								1/4 SECTION								
								SURFACE ELEVATION 702 ft								
Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments		USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff		cl								
						41.8 (660.2)										
13 SS	18	21 25 30	55		660	SILTY CLAY, gray, moist, very stiff, trace to some gravel						2.5-3.75				
				45				cl-mi								
					655											
14 SS	18	20 37 49	86		50	50 (652)						3.75				
End of Boring at 50.0 ft.																
WATER & CAVE-IN OBSERVATION DATA																
	WATER ENCOUNTERED DURING DRILLING: 40ft.						CAVE DEPTH AT COMPLETION: NMR					WET ☐		DRY ☐		
	WATER LEVEL AT COMPLETION: NMR						CAVE DEPTH AFTER 0 HOURS: NMR					WET ☐		DRY ☐		
	WATER LEVEL AFTER 0 HOURS: NMR					NE = Not Encountered; NMR = No Measurement Recorded										
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.																











UNCONFINED COMPRESSION TEST (ASTM D2166)

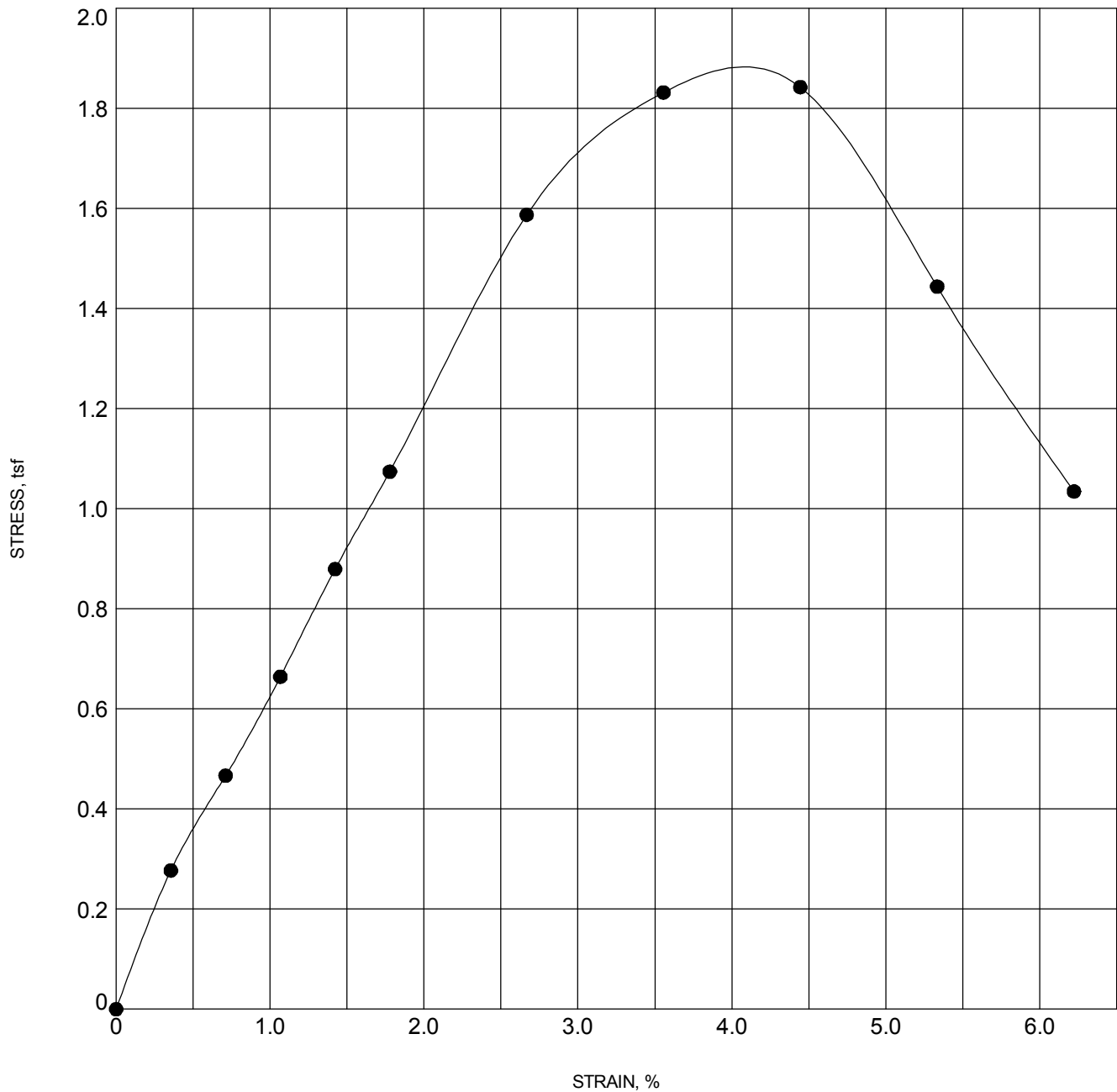


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● ER-26	SH-8	18.0'	11	1.84	132	J. Bruesewitz	E. Jeske
COMMENTS:							



UNCONFINED COMPRESSION TEST (ASTM D2166)

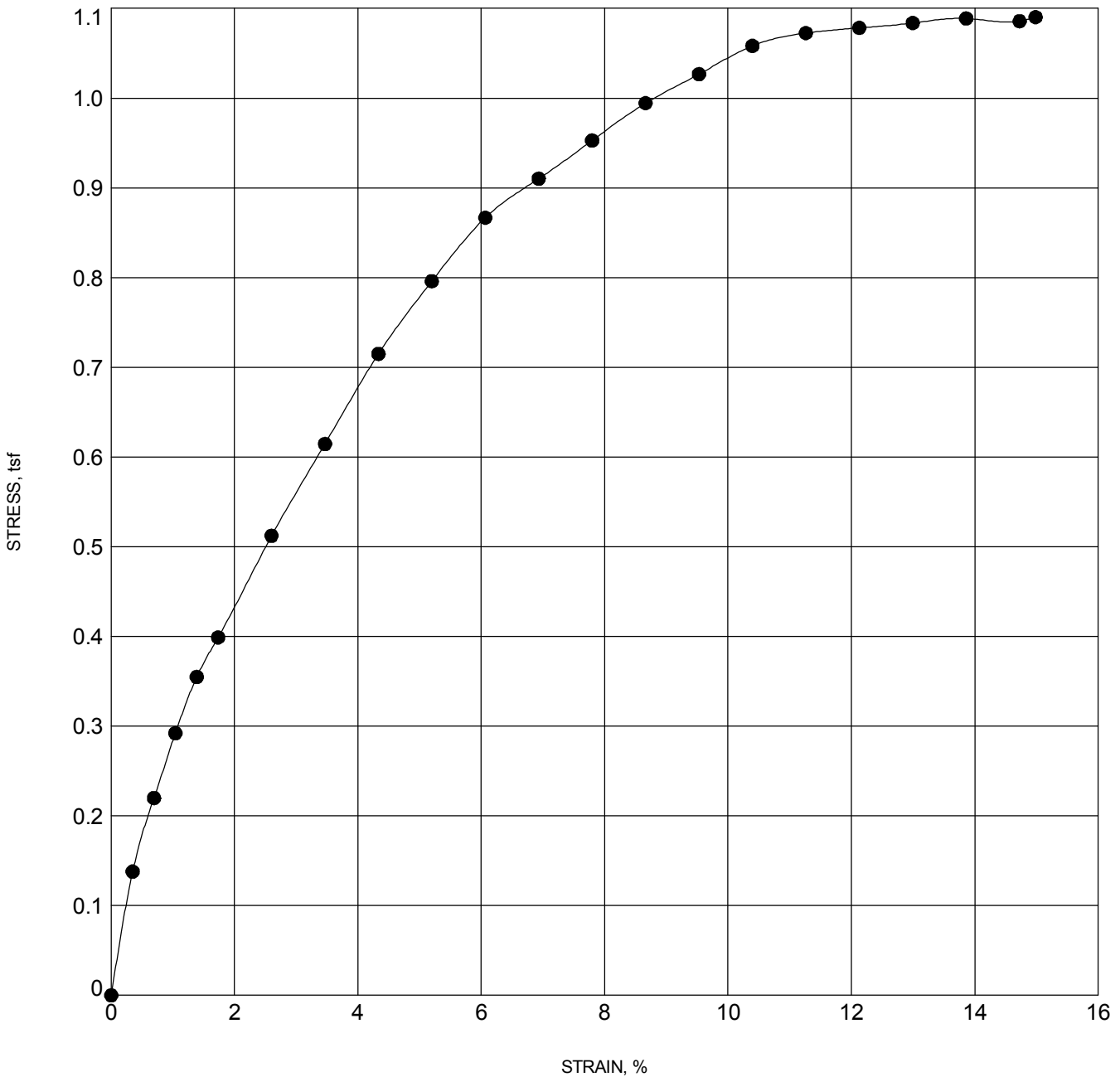


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● ER-26	SH-4	8.0'	31	1.09	86	C. Brown	E. Jeske
COMMENTS: Test sample failed around a large gravel piece							



UNCONFINED COMPRESSION TEST (ASTM D2166)

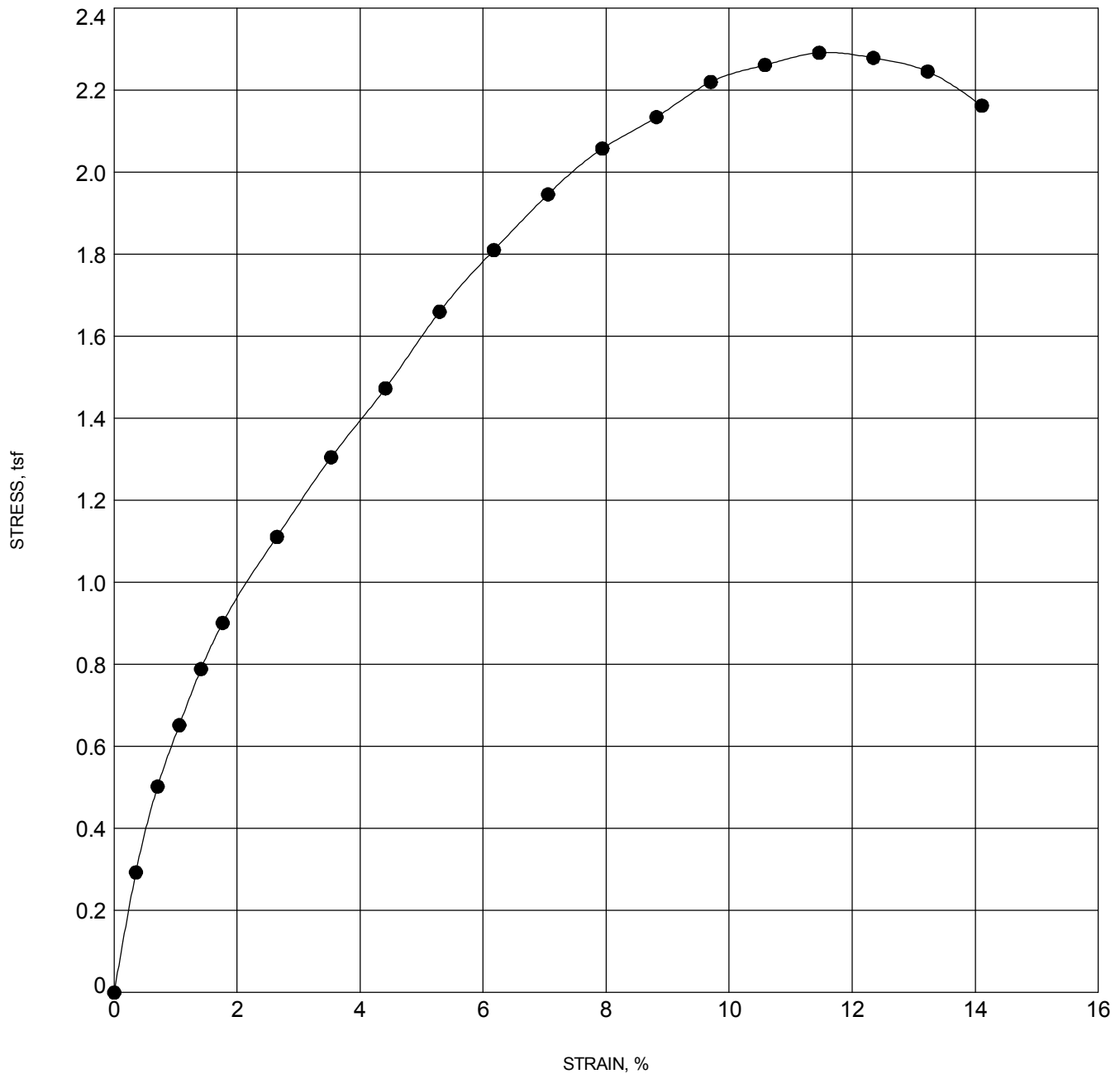


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● EB-16	SH-4	8.5'	18	2.29	111	D. Born	E. Jeske
COMMENTS:							



UNCONFINED COMPRESSION TEST (ASTM D2166)

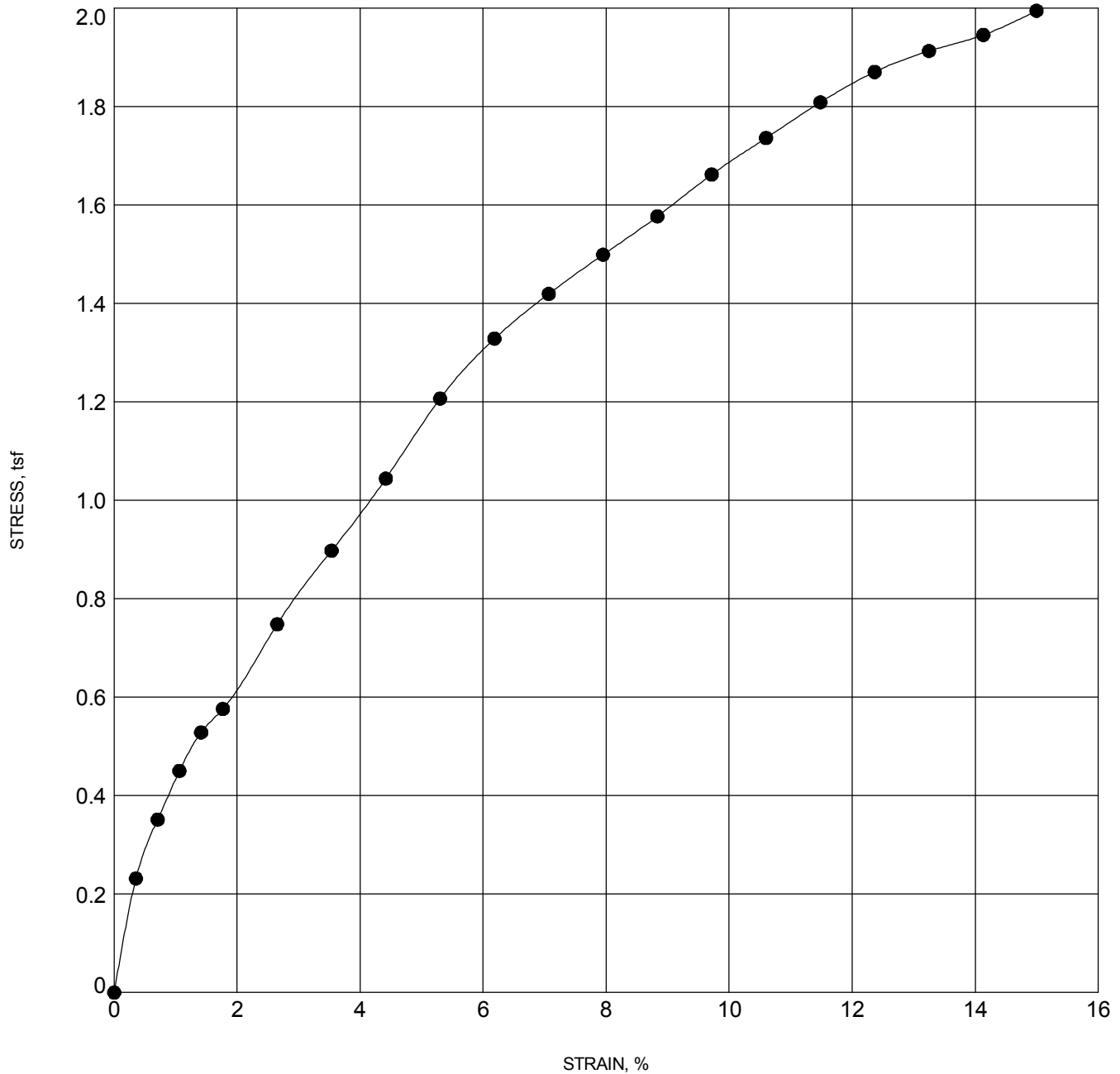


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● EB-14	SH-8	18.0'	19	2	112	D. Born	E. Jeske
COMMENTS:							



UNCONFINED COMPRESSION TEST (ASTM D2166)

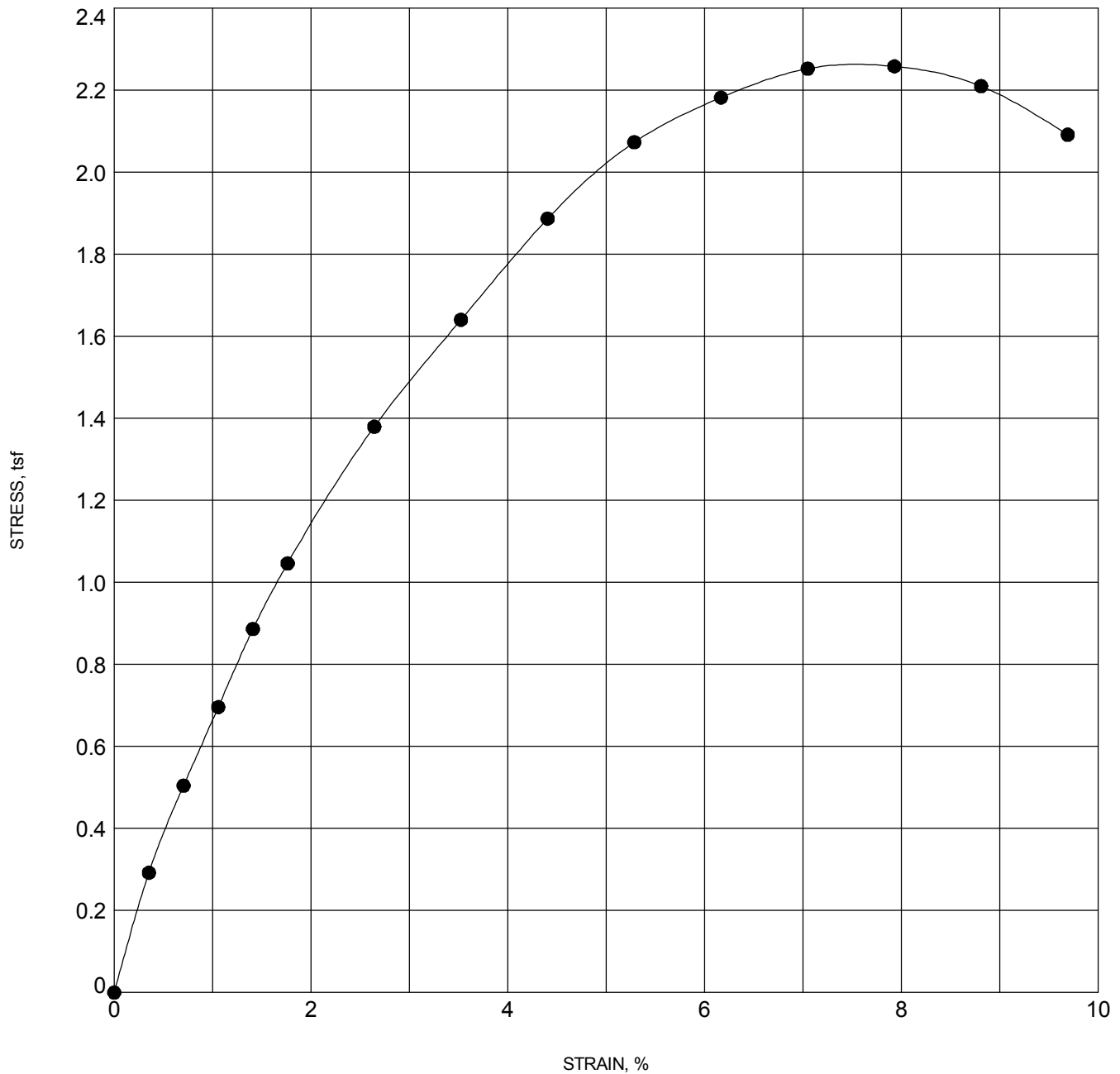


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● EB-14	SH-4	8.0'	20	2.26	113	D. Born	E. Jeske
COMMENTS:							

Appendix B Honey Creek Tunnel Boring Logs and Laboratory Test Results

General Notes

Unified Soil Classification System

Borings: EC-4 through EC-6

Laboratory Test Results

GESTRA ENGINEERING, INC. -- GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS		TEST SYMBOLS	
SYMBOL	DEFINATION	SYMBOL	DEFINATION
HSA	3 1/4" I.D. hollow Stem Auger	WC	Water Content - % of Dry Wt. – ASTM D 2216
RWB	Rotary Wash Boring (Mud Drilling)	OC	Organic Content - % of Dry Wt. – ASTM D 2974
_FA	4", 6" or 10" Diameter Flight Auger	DD	Dry Density – Pounds Per Cubic Foot
_HA	2", 4" or 6" Hand Auger	LL, PL	Liquid and Plastic Limit – ASTM D 4318
_DC	2 1/2" , 4" , 5" or 6" Steel Drive Casing		
_RC	Size A, B, or N Rotary Casing		Additional Insertions in Last Column
PD	Pipe Drill or Cleanout Tube	Qu	Unconfined Comp. Strength-psf – ASTM D 2166
CS	Continuous Split Barrel Sampling	Qp	Penetrometer Reading – Tons/Square Foot
DM	Drill Mud	Ts	Torvane Reading – Tons/Square Foot
JW	Jetting Water	G	Specific Gravity – ASTM D 854
SB	2" O.D. Split Barrel Sample	SL	Shrinkage Limits – ASTM D 427
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample	OC	Organic Content – Combustion Method
ST	2" or 3" Thin Walled Tube Sample	SP	Swell Pressure - Tons/Square Foot
3TP	3" Thin Walled Tube (Pitcher Sampler)	PS	Percent Swell
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)	FS	Free Swell – Percent
W	Wash Sample	pH	Hydrogen Ion Content. Meter Method
B	Bag Sample	SC	Sulfate Content – Parts/ Million, same as mg/L
P	Test Pit Sample	CC	Chloride Content - Parts/ Million, same as mg/L
_Q	BQ, NQ, or PQ Wireline System	C*	One Dimensional Consolidation – ASTM D 2453
_X	AX, BX, or NX Double Tube Barrel	Qc*	Triaxial Compression
CR	Core Recovery – Percent	D.S.*	Direct Shear – ASTM D 3080
NSR	No Sample Recovered, classification based on action of drilling, equipment and/or material noted in drilling fluid or on sampling bit.	K*	Coefficient of Permeability – cm/sec
		D*	Dispersion test
		DH*	Double Hydrometer – ASTM D 4221
		MA*	Particle Size Analysis – ASTM D 422
		R	Laboratory Receptivity, in ohm – cm – ASTM G 57
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.	E*	Pressuremeter Deformation Modulus – TSF
		PM*	Pressuremeter Test
		VS*	Field Vane Shear – ASTM D 2573
		IR*	Infiltrometer Test – ASTM D 3385
		RQD	Rock Quality Designation – Percent
▼	Water Level Symbol		

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

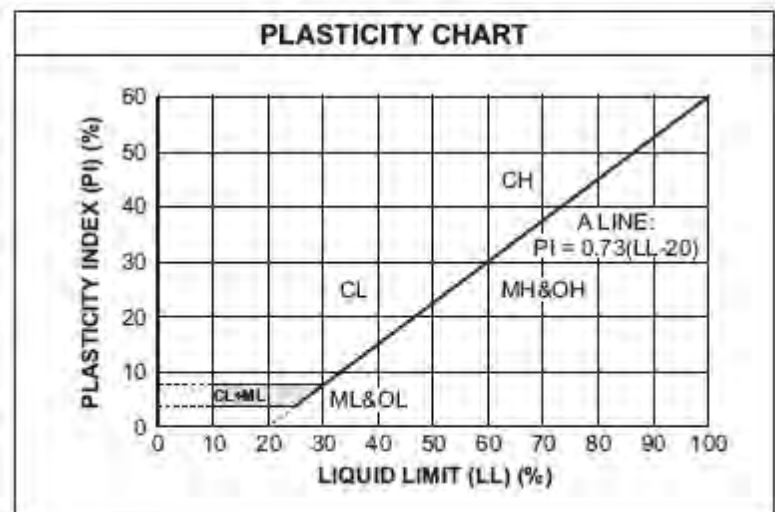
DENSITY TERM	"N" VALUE	CONSISTENCY TERM	qu /qp VALUE (tsf)	"N" VALUE	Lamination	
Very Loose	0-4	Very Soft	<0.25	0-2	Layer	Up to 1/2" thick stratum
Loose	4-10	Soft	0.25 - 0.49	2-4	Lens	1/2" to 6" thick stratum
Medium Dense	10-30	Medium Stiff	0.5 - 0.99	4-8	Varved	1/2" to 6" discontinuous stratum
Dense	30-50	Stiff	1.0 - 1.99	8-16	Dry	Alternating laminations
Very Dense	Over 50	Very Stiff	2.0 - 3.99	16-30	Moist	Powdery, no noticeable water
		Hard	4.0+	Over 30	Wet	Below saturation
					Water bearing	Saturated, above liquid limit
						Pervious soil below water
Standard "N" Penetration: per ASTM D1586						
Consistency term based in relative order on Qu result, Qp result, and lastly "N" value.						

RELATIVE GRAVEL PROPORTIONS			RELATIVE SIZES	
CONDITION	TERM	RANGE		
Coarse Grained Soils	trace of gravel	2-14%	Boulder	Over 12"
	with gravel	15-49%	Cobble	3" - 12"
			Gravel	
Fine Grained Soils			Coarse	3/4" - 3"
	15-29% + No. 200	2-14%	Fine	#4 – 3/4"
	15-29% + No. 200	15-29%	Sand	
			Coarse	#4 - #10
30% + No. 200	trace of gravel	2-14%	Medium	#10 - #40
30% + No. 200	with gravel	15-24%	Fine	#40- #200
30% + No. 200	gravelly	25-49%	Silt & Clay	- # 200, Based on Plasticity

Unified Soil Classification System (USCS)

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART			
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	
	Gravels with fines (More than 12% fines)		
	GM	Silty gravels, gravel-sand-silt mixtures	
	GC	Clayey gravels, gravel-sand-clay mixtures	
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
	SW	Well-graded sands, gravelly sands, little or no fines	
	SP	Poorly graded sands, gravelly sands, little or no fines	
	Sands with fines (More than 12% fines)		
	SM	Silty sands, sand-silt mixtures	
	SC	Clayey sands, sand-clay mixtures	
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	OL	Organic silts and organic silty clays of low plasticity	
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
	CH	Inorganic clays of high plasticity, fat clays	
	OH	Organic clays of medium to high plasticity, organic silts	
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils	

LABORATORY CLASSIFICATION CRITERIA		
GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	
Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 12 percent GM, GC, SM, SC 5 to 12 percent Borderline cases requiring dual symbols		



G:\GSTRASERVER-1\REPORTS\11GEO-MILWAUKEE-1011039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/17/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-6	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 4	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/26/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/27/12	
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94	
LOG QC BY H. Knai		HAMMER TYPE Auto		EFFICIENCY (7/2012) 80.9%	
COUNTY 40-Milwaukee		TOWNSHIP		RANGE	
		SECTION		1/4 SECTION	
				1/4 SECTION	
				SURFACE ELEVATION 719.8 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL									
						0.7 (719.1)									
1 SS	18	6 7 9 10	16			LEAN CLAY WITH SAND AND GRAVEL, brown, moist, very stiff to hard, with organic material and gray mottling, (FILL)				2	4.5+			13	
2 SS	16	8 5 6 5	11			Laminations of fine sand, gray, moist in sample SS-2				2	4.5+			11	
3 SS	10	13 16 5 6	21			5" seam of gravel and sand, light gray, moist at 5'				4	4.5+			18	LOI = 4.0%
4 SS	20	3 5 7 9	12				cl			2	3.5-4.0			18	
5 SS	22	5 6 10 12	16							2	3.0-4.5+			16	
6 SS	20	3 4 9 12	13			Wood chips in sample SS-6				2	3.5-4.5+			16	
7 SH	8					LEAN CLAY, brown, moist, stiff to hard				1	3.0-4.0 (4.9)	44	29	19	Dry Wt = 109 pcf
8 SS	22	5 6 9 11	15				CL			1	3.50			22	
9 SS	22	4 6 10 21	16			Sand laminations at 18' to 18.5'				2	4.5+			31	
10						5" seam of sand, brown, moist, dense at 18.5'					1.5-2.0			27	
						20 (699.8)									

WATER & CAVE-IN OBSERVATION DATA			
▼	WATER ENCOUNTERED DURING DRILLING: NMR	☐	CAVE DEPTH AT COMPLETION: NMR
▼	WATER LEVEL AT COMPLETION: NMR	■	CAVE DEPTH AFTER 0 HOURS: NMR
▼	WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

G:\ESTRASERVER-1\REPORTS\11GEO-MILWAUKEE-10111039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/17/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-6	
WisDOT PROJECT ID No 1060-33-01				PAGE No 2 of 4	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/26/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/27/12	
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94	
LOG QC BY H. Knai		HAMMER TYPE Auto		STATION	
		EFFICIENCY (7/2012) 80.9%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		SURFACE ELEVATION 719.8 ft	
		RANGE		1/4 SECTION	
		SECTION		1/4 SECTION	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
SS	22	5 11 16 13	27			SILTY SAND, brown, moist, dense, trace gravel, weakly cemented 20.9 (698.9)	sm			2					
11 SS	17	6 7 11 20	18			SANDY SILT, brown, moist, medium dense, trace gravel 2" rock fragment at 22' 22.7 (697.1)	ml			3	1.25-1.5			16	
12 SS	22	3 4 8 8	12			LEAN CLAY, gray, moist, stiff to very stiff, little sand and gravel 1 1/2" seam of sand, gray, moist at 24.5' 27.6 (692.2)	cl			2	1.5-2.0			12	
13 SH	24									2	3.00				
14 SS	11	5 4 6 13	10			LEAN CLAY, gray, moist, very stiff to hard, with 1-4" seams of silty sand, gray, wet 27.6 (692.2)				2					Sample SS-14 disturbed due to gravel pieces in cutting shoe Dry to 27'. Driller converted to mud rotary drilling at 27'
15 SS	18	8 8 9 10	17				CL				2.5-3.5	27	15	14	
16 SS	20	6 9 13 19	22							2	4.50			15	
17 SS	19	6 8 12 13	20			SILTY SAND, gray, wet, medium dense, thinly layered silty sand and silt, weakly cemented 32.9 (686.9)	SM			2	2.00			12	Fines = 28%
18 SS	20	9 6 10 14	16			LEAN CLAY, gray, moist, very stiff to hard, with seams of clayey sand, gray, wet 34.8 (685)	cl				3.50			19	
19 SS	22	7 7 11 26	18			SILT, gray, wet, dense 37.7 (682.1)	ml			2	4.50			13	
20						LEAN CLAY, gray, moist, hard 38.9 (680.9)	cl								

WATER & CAVE-IN OBSERVATION DATA			
☒	WATER ENCOUNTERED DURING DRILLING:	NMR	☒ CAVE DEPTH AT COMPLETION: NMR
☒	WATER LEVEL AT COMPLETION:	NMR	☒ CAVE DEPTH AFTER 0 HOURS: NMR
☒	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

G:\ESTRASERVER-1\REPORTS\11039-10\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/17/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-6	
WisDOT PROJECT ID No 1060-33-01				PAGE No 3 of 4	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/26/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/27/12	
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94	
LOG QC BY H. Knai		HAMMER TYPE Auto		EFFICIENCY (7/2012) 80.9%	
COUNTY 40-Milwaukee		TOWNSHIP		RANGE	
		SECTION		1/4 SECTION	
				1/4 SECTION	
				SURFACE ELEVATION 719.8 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
SS	22	11 14 26 31	40			LEAN CLAY, gray, moist, hard 3" seam of dense silt at 40.5'	cl			2	4.5+			18	
21 SS	21	20 20 18 3	38			SILT WITH SAND, gray, wet, very dense LEAN CLAY, gray, moist, hard, with silt seams	ml				4.5+			17	
22 SS	22	12 13 22 21	35							2	4.5+			15	
23 SS	22	10 16 21 32	37				cl			2	4.5+			19	
24 SS	22	11 19 23 31	42							2	4.5+			18	
25 SS	22	9 20 40 50	60	45	675	4" seam of silty sand, gray, wet dense at 44.5'				2	4.5+			19	
26 SS	21	24 37 43 47	80	50	670					2	3.0-4.5			14	
27 SS	20	20 25 27 39	52	55	665	1" seam of hard clay at 52.5'	ml			2	1.50			17	
28 SS	22	9 10 28 26	38							1.5-4.5+				17	
						LEAN CLAY WITH GRAVEL, gray, moist, very stiff to hard	cl			4				9	
										3	3.0-4.5+			24	
						SILT WITH SAND AND GRAVEL, gray, moist, very dense	ml			4				10	
				60	660						4.5+				

WATER & CAVE-IN OBSERVATION DATA			
☒	WATER ENCOUNTERED DURING DRILLING: NMR	☒	CAVE DEPTH AT COMPLETION: NMR
☒	WATER LEVEL AT COMPLETION: NMR	☒	CAVE DEPTH AFTER 0 HOURS: NMR
☒	WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-1\REPORTS\1\GEO-MILWAUKEE-10\11039-10\ZOO INTERCHANGE\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/17/12

WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EC-6		
WisDOT PROJECT ID No 1060-33-01				PAGE No 4 of 4						
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/26/12		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88		
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 7/27/12		LATITUDE				
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892		LONGITUDE				
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94		NORTHING 295462				
LOG QC BY H. Knai		HAMMER TYPE Auto		EFFICIENCY (7/2012) 80.9%		STATION		OFFSET		
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION		
								1/4 SECTION		
								SURFACE ELEVATION 719.8 ft		
Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments		USCS / AASHTO	Graphic	
29 SS		16 21 25 28	46							
30 SS		16 17 19 40	36							
31 SS	20	17 23 29 39	52	65	655					
32 SS	18	16 18 22 26	40							
End of Boring at 69.0 ft.										
WATER & CAVE-IN OBSERVATION DATA										
☒	WATER ENCOUNTERED DURING DRILLING: NMR					☒	CAVE DEPTH AT COMPLETION: NMR			WET ☐ DRY ☐
☒	WATER LEVEL AT COMPLETION: NMR					☒	CAVE DEPTH AFTER 0 HOURS: NMR			WET ☐ DRY ☐
☒	WATER LEVEL AFTER 0 HOURS: NMR						NE = Not Encountered; NMR = No Measurement Recorded			
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.										

\\GSTRASERVER-1\REPORTS\1\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/24/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-5	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 3	
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 8/30/12	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 8/31/12	
CREW CHIEF A. Woerpel		DRILLING RIG CME 45		WisDOT STRUCTURE ID No B-40-892	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94	
LOG QC BY H. Knai		HAMMER TYPE Auto		STATION	
		EFFICIENCY (7/2012) 83.9%		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		SURFACE ELEVATION 719.2 ft	
		RANGE			
		SECTION			
		1/4 SECTION			
		1/4 SECTION			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q _u or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
PAVEMENT AND SUBGRADE															
						1.5 (717.7)									
						LEAN CLAY WITH SAND AND GRAVEL, brown and dark gray, moist, stiff to very stiff, (FILL)									
1 SS	14	5 6 5 8	11		715		cl			2	1.50			13	
2 SS	11	3 4 4 4	8		710					1	2.00			21	
3 SS	13	2 4 39 50/3"	R	10		10" cobble at 10'				4	1.0-1.5			19	Rig chatter and jumping at 10' to 12'
4 SS	9	38 10 4 5	14			12.4 (706.8)				4	1.00				Driller converted to mud rotary at 11'
5 SH	24				705	LEAN CLAY, light brown mottled gray, moist, very stiff to hard									
6 SS	18	13 19 27 35	46				cl			3	4.5+			20	
7 SS	22	6 10 12 13	22		700	1" thick silt seam at 18'				3	3.50			25	
8					20										

WATER & CAVE-IN OBSERVATION DATA			
☒	WATER ENCOUNTERED DURING DRILLING:	NMR	CAVE DEPTH AT COMPLETION: NMR
☒	WATER LEVEL AT COMPLETION:	NMR	CAVE DEPTH AFTER 0 HOURS: NMR
☒	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GSTRASERVER-1\REPORTS\11039-10\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/24/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-5	
WisDOT PROJECT ID No 1060-33-01				PAGE No 2 of 3	
CONSULTANT Forward 45		CONSULTANT PROJECT No	DATE STARTED 8/30/12	HORIZONTAL DATUM WISCRS (2006)	VERTICAL DATUM NAVD 88
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10	DATE COMPLETED 8/31/12	LATITUDE	
CREW CHIEF A. Woerpel		DRILLING RIG CME 45	WisDOT STRUCTURE ID No B-40-892	LONGITUDE	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB	ROADWAY NAME Honeycreek Tunnel under I-94	NORTHING 295528	
LOG QC BY H. Knai		HAMMER TYPE Auto	EFFICIENCY (7/2012) 83.9%	STATION	OFFSET
COUNTY 40-Milwaukee		TOWNSHIP	RANGE	SECTION	1/4 SECTION
					1/4 SECTION
		SURFACE ELEVATION 719.2 ft			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
SS	24	4 4 5 8	9			LEAN CLAY, light brown mottled gray, moist, very stiff to hard 21 (698.2)	cl			2	2.5-3.0			30	
9 SS	8	8 23 22 22	45			LEAN CLAY, gray, moist, stiff 21.7 (697.5)	cl				1.0-1.5				
10 SS	7	10 10 11 4	21		695	SANDY SILT, gray, moist, medium dense to dense	ML			2				22	
										2				15	Fines = 53%
11 SS	13	2 3 5 7	8			LEAN CLAY, gray, moist, medium stiff to very stiff, trace gravel				2					
12 SS	5	8 8 9 9	17		690		cl			2	1.00			14	
13 SS	15	1 2 4 6	6		30					2	0.75-1.5			13	
14 SS	17	4 6 7 9	13							2	1.5-2.0			13	
						33 (686.2)									
15 SH	21				685	SANDY LEAN CLAY, gray, moist, medium stiff to very stiff 3" sand seam at 33.3'	CL				1.5-2.0 (0.5)	20	8	13	Dry Wt = 127 pcf Fines = 59%
					35	35.3 (683.9)					4.5+				
16 SS	19	2 3 4 7	7			SILTY SAND, gray, wet, loose, weakly cemented	sm			2				13	
						36.8 (682.4)									
17 SS	3	5 5 6 12	11			LEAN CLAY, gray, moist, very stiff	cl				2.50				
						38.1 (681.1)				2				12	
					680	SILTY SAND WITH GRAVEL, gray, wet, medium dense to dense, running	sm								
18					40										

WATER & CAVE-IN OBSERVATION DATA			
☒	WATER ENCOUNTERED DURING DRILLING:	NMR	☒ CAVE DEPTH AT COMPLETION: NMR
☒	WATER LEVEL AT COMPLETION:	NMR	☒ CAVE DEPTH AFTER 0 HOURS: NMR
☒	WATER LEVEL AFTER 0 HOURS:	NMR	NE = Not Encountered; NMR = No Measurement Recorded

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME Zoo Interchange				BORING LOG 			BORING No EC-5		
WisDOT PROJECT ID No 1060-33-01							PAGE No 3 of 3		
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 8/30/12		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88	
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10		DATE COMPLETED 8/31/12		LATITUDE			
CREW CHIEF A. Woerpel		DRILLING RIG CME 45		WisDOT STRUCTURE ID No B-40-892		LONGITUDE			
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/2 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94		NORTHING 295528			
LOG QC BY H. Knai		HAMMER TYPE Auto		EFFICIENCY (7/2012) 83.9%		STATION		OFFSET	
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION	
								SURFACE ELEVATION 719.2 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
SS	12	6 9 16 19	25			SILTY SAND WITH GRAVEL, gray, wet, medium dense to dense, running				2				15	
19 SS	17	16 20 19 16	39				sm			2					
20 SS	14	5 10 12 12	22		675	43.7 (675.5)				4	3.5-4.0			16	Rig chatter at 43' to 45'
21 SS	18	14 17 25 30	42		45					3	4.5+			13	
22 SS	17	23 24 36 39	60				cl			3	4.5+			19	
23 SS	14	14 19 36 50/4"	R	50	670	50.8 (668.4)					4.5+			19	

\\GSTRASERVER-1\REPORTS\11GEO-MILWAUKEE-10111039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/18/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-4																																																																																																																																																																																																																	
WisDOT PROJECT ID No 1060-33-01				PAGE No 1 of 4																																																																																																																																																																																																																	
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample No / Type</th> <th>Sample Recovery (in)</th> <th>Blow Counts</th> <th>N - Value</th> <th>Depth (ft)</th> <th>Elevation (ft)</th> <th>Soil / Rock Description and Geological Origin for Each Major Unit / Comments</th> <th>USCS / AASHTO</th> <th>Graphic</th> <th>Well Diagram</th> <th>RDR</th> <th>Unconfined Comp. Strength Q_u or (Q_u) (tsf)</th> <th>Liquid Limit (%)</th> <th>Plasticity Index (%)</th> <th>Moisture Content (%)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>TOPSOIL (9")</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">0.8 (716.6)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1 SS</td> <td>15</td> <td>2 2 2</td> <td>4</td> <td></td> <td>715</td> <td>LEAN CLAY, brown, moist, stiff to hard, little sand and organic material, trace gravel, (FILL)</td> <td></td> <td></td> <td></td> <td>2</td> <td>1.0-1.5</td> <td></td> <td></td> <td>23</td> <td></td> </tr> <tr> <td>2 SS</td> <td>14</td> <td>1 1 3 4</td> <td>4</td> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td>2.5-3.0</td> <td></td> <td></td> <td>18</td> <td></td> </tr> <tr> <td>3 SS</td> <td>19</td> <td>3 2 4 6</td> <td>6</td> <td></td> <td>710</td> <td></td> <td>cl</td> <td></td> <td></td> <td>2</td> <td>2.5-3.0</td> <td></td> <td></td> <td>17</td> <td></td> </tr> <tr> <td>4 SS</td> <td>18</td> <td>2 4 5 7</td> <td>9</td> <td>10</td> <td></td> <td>2" seam of soft dark gray clay at 9.5'</td> <td></td> <td></td> <td></td> <td>2</td> <td>4.0-4.5</td> <td></td> <td></td> <td>21</td> <td></td> </tr> <tr> <td>5 SS</td> <td>18</td> <td>2 5 9 10</td> <td>14</td> <td></td> <td>705</td> <td>4" seam of medium stiff, dark gray clay with organics at 11'</td> <td></td> <td></td> <td></td> <td>2</td> <td>3.5-4.0</td> <td></td> <td></td> <td>18</td> <td></td> </tr> <tr> <td>6 SS</td> <td>22</td> <td>5 9 11 14</td> <td>20</td> <td></td> <td></td> <td style="text-align: right;">13 (704.4)</td> <td></td> <td></td> <td></td> <td>2</td> <td>4.00</td> <td></td> <td></td> <td>19</td> <td>Dry Wt = 109 pcf</td> </tr> <tr> <td>7 SS</td> <td>17</td> <td>5 15 47 15</td> <td>62</td> <td>15</td> <td></td> <td style="text-align: right;">14.7 (702.7)</td> <td>cl</td> <td></td> <td></td> <td></td> <td>4.50</td> <td></td> <td></td> <td>13</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>CONCRETE</td> <td></td> <td></td> <td></td> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td>Moderate rig chatter from 15' to 16'</td> </tr> <tr> <td>8 SS</td> <td>11</td> <td>7 7 6 4</td> <td>13</td> <td></td> <td>700</td> <td>SILTY SAND WITH GRAVEL, light brown, moist, medium dense, running</td> <td></td> <td></td> <td></td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9 SS</td> <td>10</td> <td>4 5 4 5</td> <td>9</td> <td>20</td> <td></td> <td style="text-align: right;">16 (701.4)</td> <td>SM</td> <td></td> <td></td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q_u or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes							TOPSOIL (9")																0.8 (716.6)										1 SS	15	2 2 2	4		715	LEAN CLAY, brown, moist, stiff to hard, little sand and organic material, trace gravel, (FILL)				2	1.0-1.5			23		2 SS	14	1 1 3 4	4	5						2	2.5-3.0			18		3 SS	19	3 2 4 6	6		710		cl			2	2.5-3.0			17		4 SS	18	2 4 5 7	9	10		2" seam of soft dark gray clay at 9.5'				2	4.0-4.5			21		5 SS	18	2 5 9 10	14		705	4" seam of medium stiff, dark gray clay with organics at 11'				2	3.5-4.0			18		6 SS	22	5 9 11 14	20			13 (704.4)				2	4.00			19	Dry Wt = 109 pcf	7 SS	17	5 15 47 15	62	15		14.7 (702.7)	cl				4.50			13								CONCRETE				4					Moderate rig chatter from 15' to 16'	8 SS	11	7 7 6 4	13		700	SILTY SAND WITH GRAVEL, light brown, moist, medium dense, running				2						9 SS	10	4 5 4 5	9	20		16 (701.4)	SM			2					
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WisDOT PROJECT NAME Zoo Interchange				BORING LOG				BORING No EC-4								
WisDOT PROJECT ID No 1060-33-01				PAGE No 2 of 4												
CONSULTANT Forward 45		CONSULTANT PROJECT No		DATE STARTED 7/24/12		HORIZONTAL DATUM WISCRS (2006)		VERTICAL DATUM NAVD 88								
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CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV		WisDOT STRUCTURE ID No B-40-892		LONGITUDE										
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB		ROADWAY NAME Honeycreek Tunnel under I-94		NORTHING 295605										
LOG QC BY H. Knai		HAMMER TYPE Auto		EFFICIENCY (7/2012) 80.9%		STATION		OFFSET								
COUNTY 40-Milwaukee		TOWNSHIP		RANGE		SECTION		1/4 SECTION								
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10 SS	10	5 6 5 5	11			SILTY SAND WITH GRAVEL, light brown, moist, medium dense, running										
11 SS	14	6 6 14 28	20		695		SM			4						
12 SS	23	10 4 5 7	9	25		24.6 (692.8) LEAN CLAY, red brown, moist, very stiff, trace gravel	cl			3	2.5-3.0			32	Rock fragments in toe of sample SS-11	
13 SS	22	8 9 11 9	20		690	LEAN CLAY WITH SAND, gray, moist, stiff to very stiff, with silt, trace gravel				2	2.00			13		
14 SS	6	4 6 7 9	13	30		1 1/2" seam of silty sand, wet at 27.5'				2				17	Rock fragment in cutting shoe, sample disturbed Q_p could not be measured	
15 SH	13				685					2	2.0-2.25	20	9	12		
16 SS	4	6 8 11 11	19				cl			2				15	Dry to 32'. Driller converted to mud rotary at 32' Rock fragment in cutting shoe, sample disturbed Q_p could not be measured	
17 SS	21	5 7 7 9	14	35						2	1.5-3.0			13		
18 SS	22	6 6 8 10	14		680					2	1.5-3.0			13		
19 SS	22	4 5 7 9	12	40		1" seam of silty sand, gray, wet at 39'				2	2.0-2.5			13		
						40 (677.4)										
WATER & CAVE-IN OBSERVATION DATA																
	WATER ENCOUNTERED DURING DRILLING: N/A						CAVE DEPTH AT COMPLETION: N/A					WET ☐ DRY ☐				
	WATER LEVEL AT COMPLETION: N/A						CAVE DEPTH AFTER 0 HOURS: N/A					WET ☐ DRY ☐				
	WATER LEVEL AFTER 0 HOURS: N/A					NE = Not Encountered; NMR = No Measurement Recorded										
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.																

G:\GSTRASERVER-1\REPORTS\11GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/18/12

WisDOT PROJECT NAME Zoo Interchange		BORING LOG		BORING No EC-4	
WisDOT PROJECT ID No 1060-33-01				PAGE No 3 of 4	
CONSULTANT Forward 45		CONSULTANT PROJECT No	DATE STARTED 7/24/12	HORIZONTAL DATUM WISCRS (2006)	VERTICAL DATUM NAVD 88
DRILLING CONTRACTOR Gestra		DRILLING CONTRACTOR PROJECT No 11039-10	DATE COMPLETED 7/25/12	LATITUDE	
CREW CHIEF B. Sargent		DRILLING RIG Diedrich D50 ATV	WisDOT STRUCTURE ID No B-40-892	LONGITUDE	
FIELD LOG BY H. Knai		DRILLING METHOD / HOLE SIZE 3 1/4 HSA, w/ RWB	ROADWAY NAME Honeycreek Tunnel under I-94		NORTHING 295605
LOG QC BY H. Knai		HAMMER TYPE Auto	EFFICIENCY (7/2012) 80.9%	STATION	OFFSET
COUNTY 40-Milwaukee		TOWNSHIP	RANGE	SECTION	1/4 SECTION
					1/4 SECTION
		SURFACE ELEVATION 717.4 ft			

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	RDR	Unconfined Comp. Strength Q _p or (Q _u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
20 SS	17	25 9 16 19	25			LEAN CLAY WITH GRAVEL, gray, moist, hard					3	4.50		20	
21 SS	7	26 50/5"	R		675		cl			4	4.50			19	Rig chatter and jumping at 42'
22 SS	20	12 19 19 27	38	45						3	4.5+			20	
23 SS	12	12 15 19 50/5"	R		670	46.7 (670.7) SANDY SILT, gray, wet, medium dense to very dense				4				20	Rig chatter at 46'
24 SS	20	22 33 35 43	68	50			ml			3				19	
25 SS	17	10 8 5 8	13			2" seam of lean clay, gray, moist, hard at 51'				2				17	
26 SS	8	4 13 6	19		665	52 (665.4) LEAN CLAY WITH GRAVEL, gray, moist, hard				4	4.5+			12	
27 SS	22	6 10 10 13	20	55		Several 1/2-1" seams of silt, gray, wet, dense in sample SS-27	cl			3	4.0-4.5			17	
28 SS	22	18 18 21 25	39		660	58.2 (659.2) SILT, gray, wet, dense, trace gravel	ml			4				22	
				60											

WATER & CAVE-IN OBSERVATION DATA					
☒	WATER ENCOUNTERED DURING DRILLING:	N/A	☒	CAVE DEPTH AT COMPLETION:	N/A
☒	WATER LEVEL AT COMPLETION:	N/A	☒	CAVE DEPTH AFTER 0 HOURS:	N/A
☒	WATER LEVEL AFTER 0 HOURS:	N/A	NE = Not Encountered; NMR = No Measurement Recorded		
NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.					

\\GSTRASERVER-1\REPORTS\1\GEO-MILWAUKEE-10\11039-10\ZOO INTERCHANGE\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/18/12

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GRAIN SIZE DISTRIBUTION (ASTM D422)

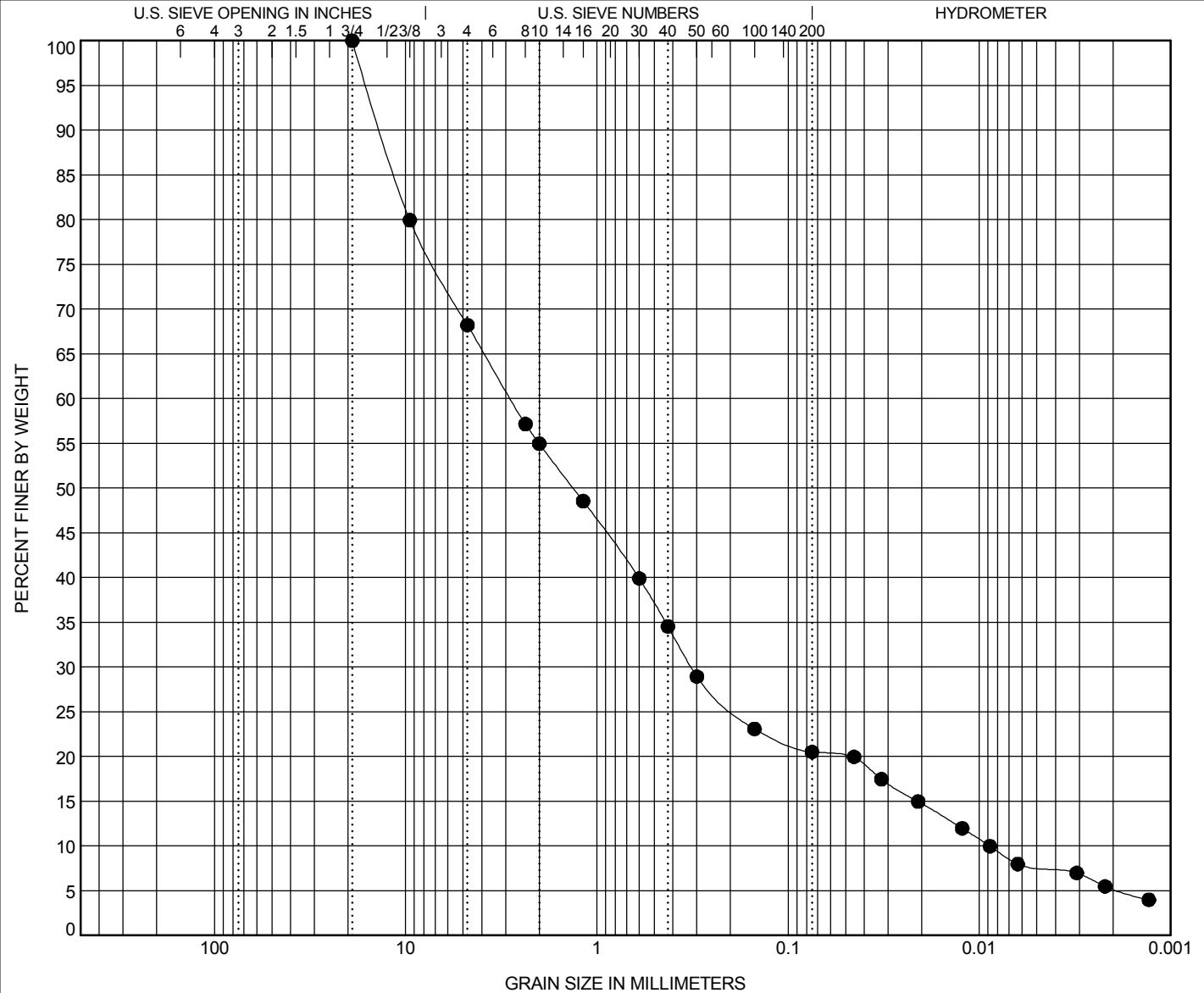


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● EC-4, SS-10	20.0'	SILTY SAND WITH GRAVEL(SM)				4.12	319.89

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● EC-4, SS-10	20.0'	19	2.824	0.321	0.009	31.8	47.7	12.8	7.7

PERFORMED BY: B. Bills

CHECKED BY: E. Jeske



GRAIN SIZE DISTRIBUTION (ASTM D422)

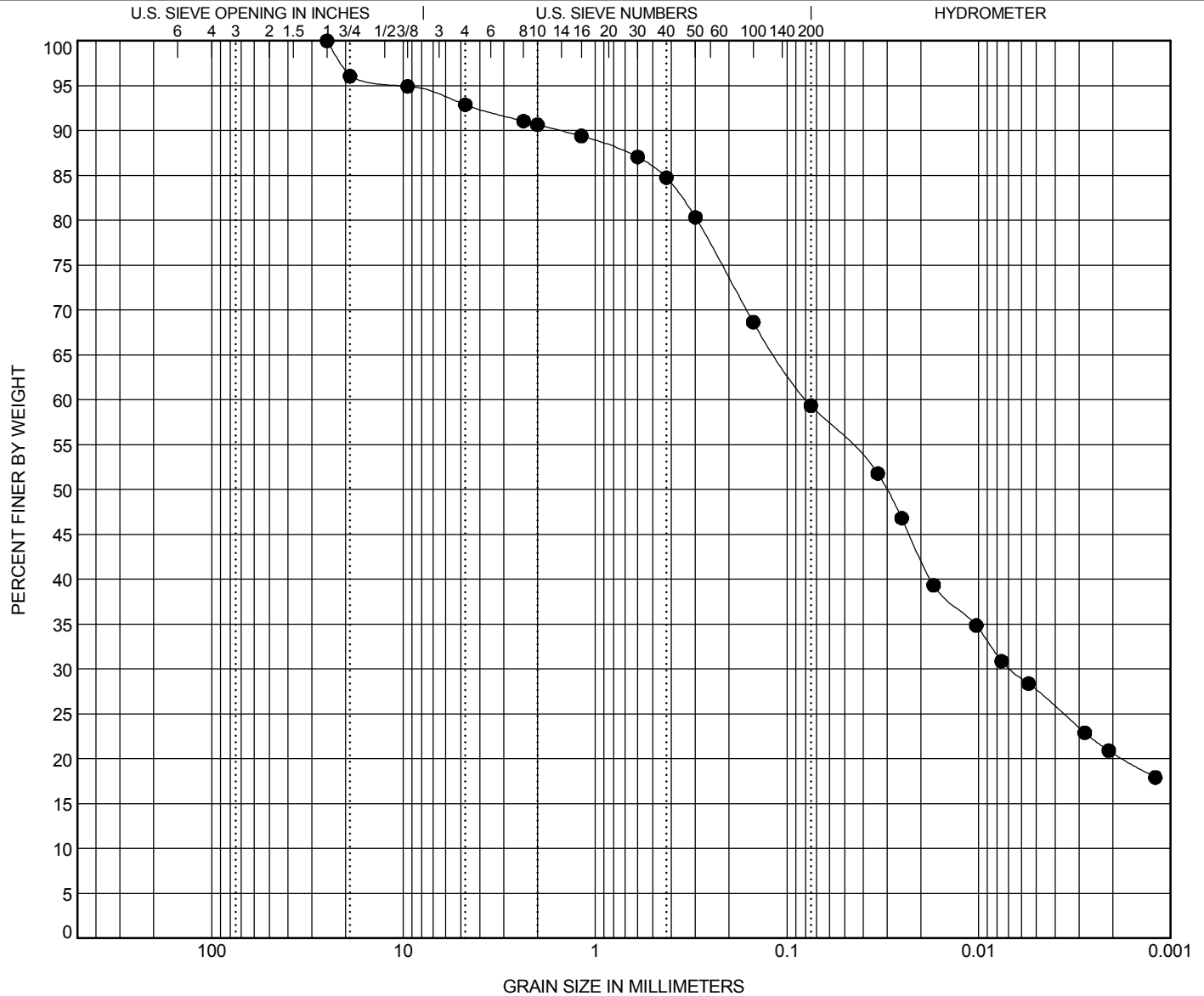


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● EC-5, SH-15	33.0'	SANDY LEAN CLAY(CL)	20	12	8		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● EC-5, SH-15	33.0'	25	0.079	0.007		7.1	33.5	31.7	27.6

PERFORMED BY: B. Bills

CHECKED BY: E. Jeske



GRAIN SIZE DISTRIBUTION (ASTM D422)

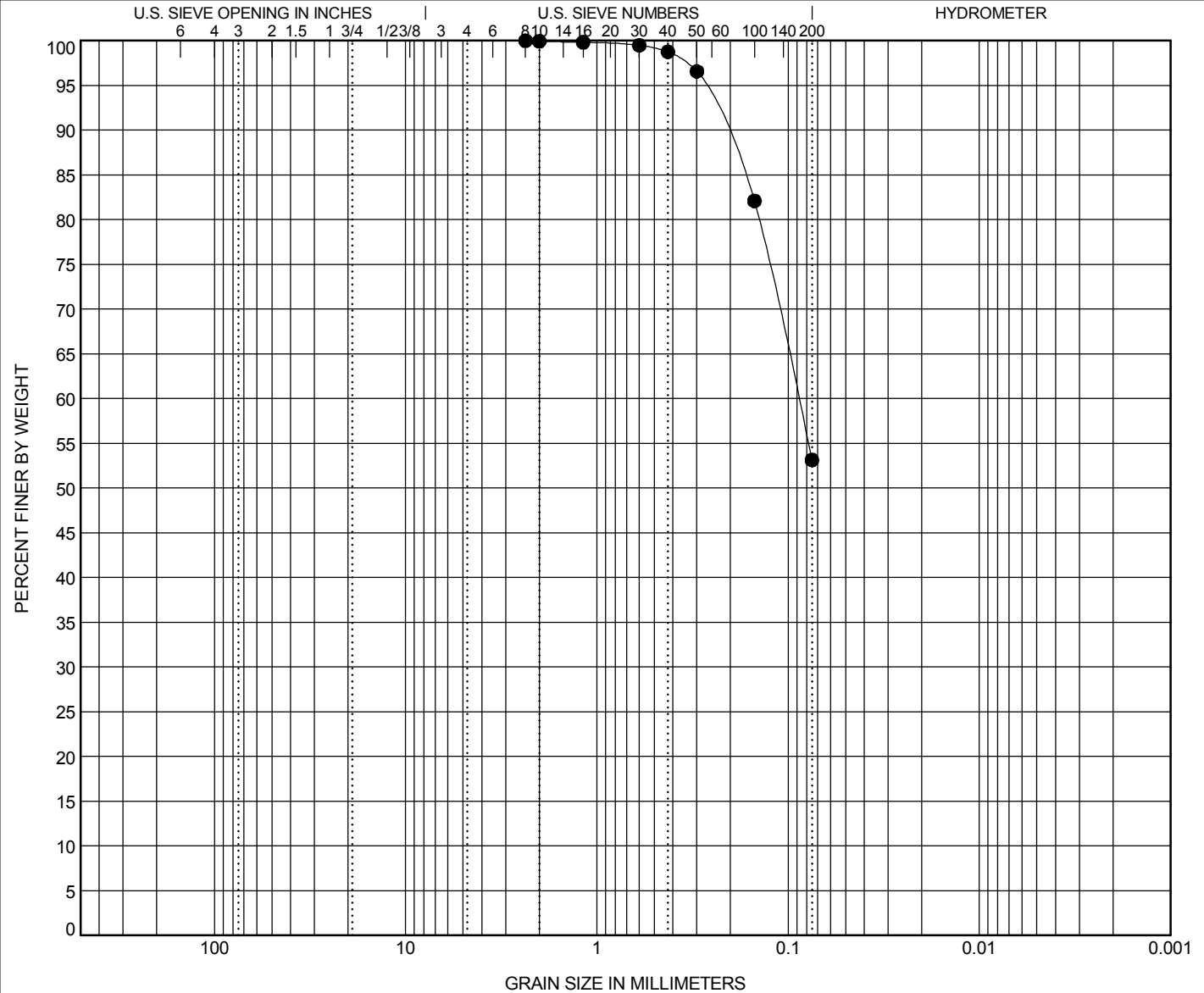


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● EC-5, SS-10	23.0'	SANDY SILT (ML)					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● EC-5, SS-10	23.0'	2.36	0.088			0.0	46.9	53.1	

PERFORMED BY: B. Bills

CHECKED BY: E. Jeske



GRAIN SIZE DISTRIBUTION (ASTM D422)

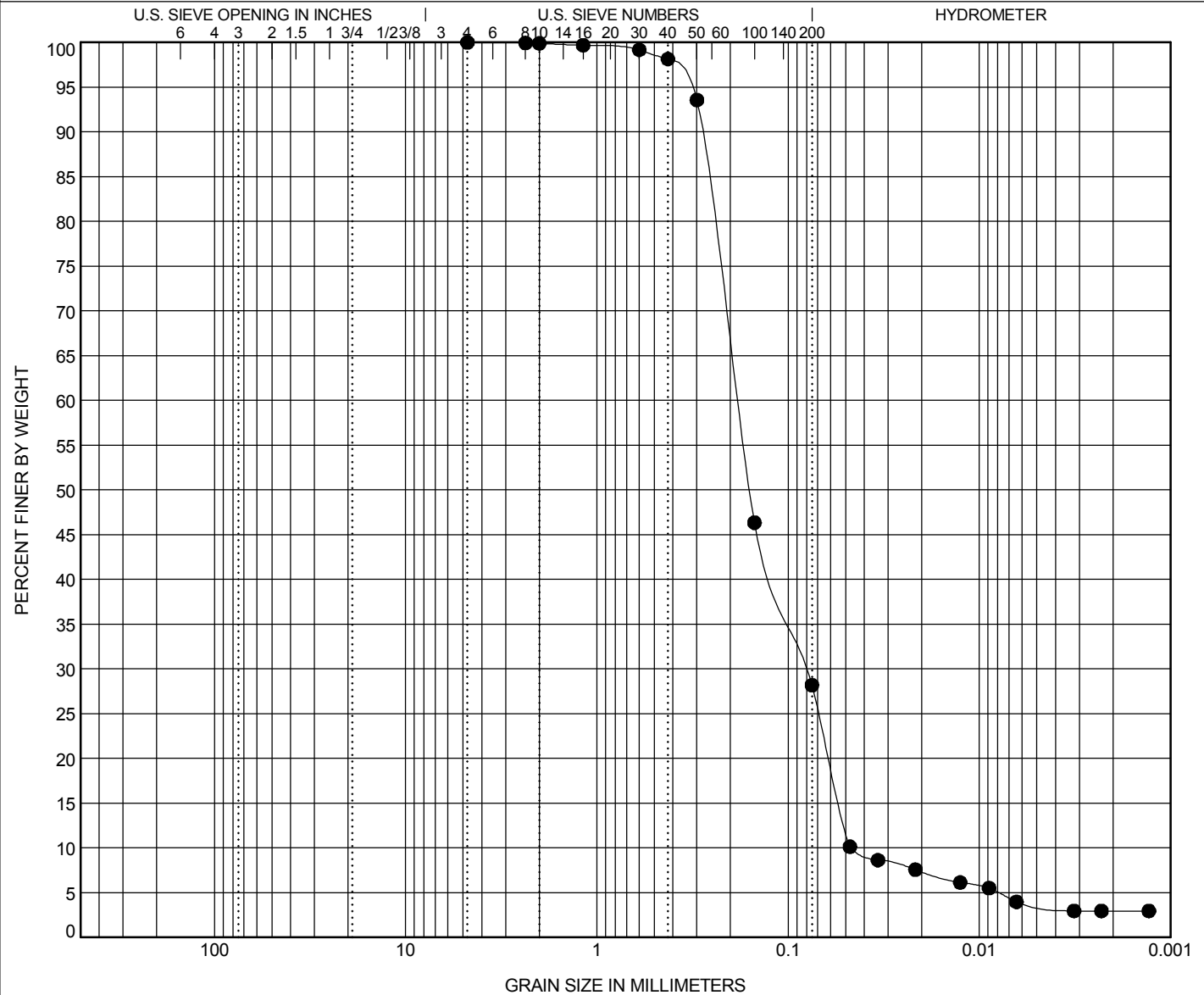


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra





UNCONFINED COMPRESSION TEST (ASTM D2166)

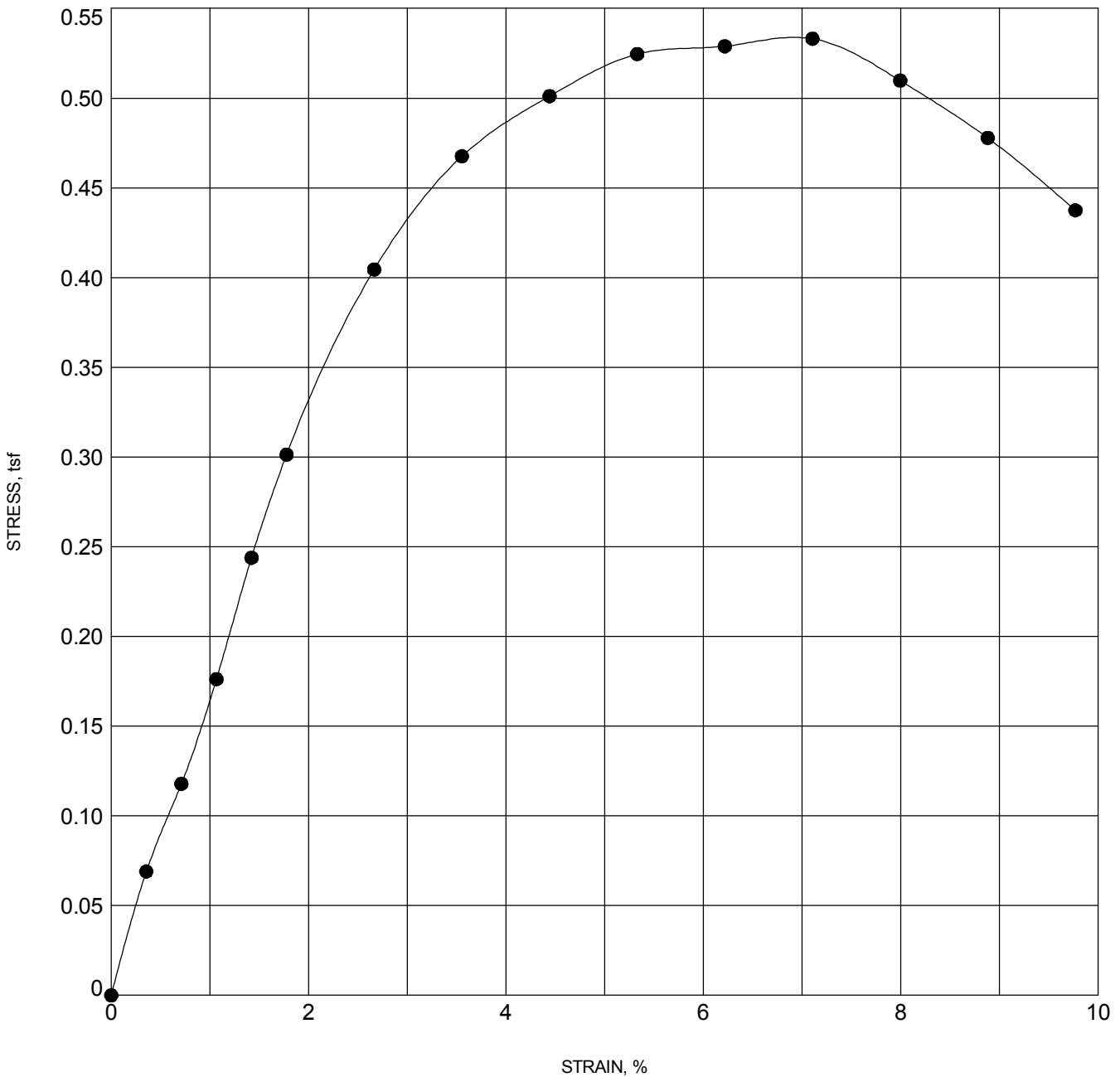


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● EC-5	SH-15	33.0'	13	0.53	127	R. Lollar	E. Jeske
COMMENTS:							



UNCONFINED COMPRESSION TEST (ASTM D2166)

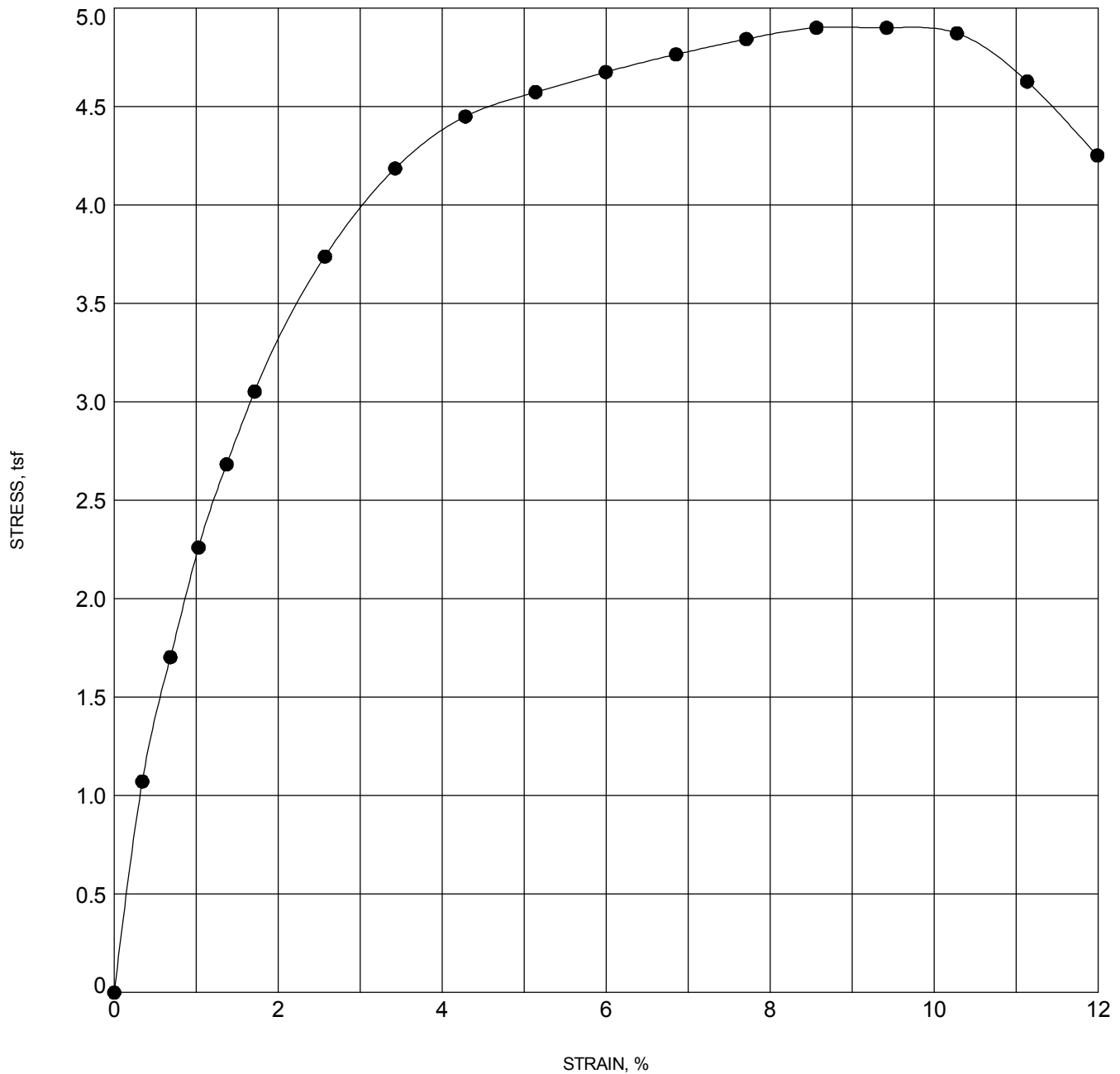


PROJECT NAME Zoo Interchange

CONSULTANT Forward 45

PROJECT No 1060-33-01

LAB TEST PERFORMED BY Gestra



BOREHOLE	SAMPLE	DEPTH	MC (%)	Q _u (tsf)	γ _d (pcf)	Performed By	Checked By
● EC-6	SH-7	13.0'	19	4.9	109	J. Bruesewitz	E. Jeske
COMMENTS:							



GESTRA Engineering, Inc

1626 W. Fond du Lac Avenue

Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of pH of Soils

Project Name: Zoo Interchange
Project Number: 11039-10
Project Location: Milwaukee, WI
ASTM Designation: D4972-Method A "pH meter"

Date: August 10, 2012
Report To: Forward 45

Boring Number	EC-4	EC-4	EC-4
Sample Number	12B	13	14
pH with Water Solution	7.56	8.05	8.09
pH with Calcium Chloride Solution	6.99	7.10	7.18

Performed by: ESJ

Reviewed By: SDM
GESTRA Engineering



GESTRA Engineering, Inc

1626 W. Fond du Lac Avenue

Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

**Laboratory Test Results of
Resistivity of Soil (McMiller Box)**

Project Name: Zoo Interchange
Project Number: 11039-10
Project Location: Milwaukee, WI
ASTM Designation: G57

Date: August 10, 2012
Report To: Forward 45

Boring Number	EC-4	EC-4	EC-4
Sample Number	12B	13	14
Temperature of Sample (°F)	80	80	80
Temperature of Sample (°C)	26.67	26.67	26.67
Resistivity Value (Ω *cm)	500	1900	1200
Corrected Resistivity Value (Ω *cm)	640	2430	1535

Performed by: E. Jeske

Reviewed By: SDM

GESTRA Engineering



Client: **Gestra Engineering**
Project: **Geotechnical Investigation**

Contact: **Scott Miller**
Submitter: **Scott Miller**
Date Received: **August 15, 2012**

CTL Project No: **401937**
CTL Project Mgr.: **Cyler Hayes**
Analyst: **G Isono**
Approved: **RW Stevenson**
Date Analyzed: **August 22, 2012**
Date Reported: **August 22, 2012**

REPORT of CHLORIDE ANALYSIS

Sample Identification		<u>Description</u>	Determined
<u>CTL ID</u>	<u>Client ID</u>		Water Soluble Chloride (Cl) (mg/Kg of sample)
3196401	EC-4	Soil	281

Notes:

1. This analysis represents specifically the samples submitted on a dry 45°C basis.
2. The results were determined by potentiometric titration following an AASHTO T 291-94 (2008) method A (section 13) extraction.
3. This report may not be reproduced except in its entirety.



Client: **Gestra Engineering**
Project: **Chemical Analysis**

Contact: **Scott Miller**
Submitter: **Scott Miller**
Date Received: **August 15, 2012**

CTL Project No: **401937**
CTL Project Mgr.: **Cyler Hayes**
Analyst: **Cecylia Wedzicha**
Approved: **RW STEVENSON**
Date Analyzed: **August 22, 2012**
Date Reported: **August 23, 2012**

REPORT OF WATER SOLUBLE SULFATE ANALYSIS

Sample Identification		<u>Description</u>	Determined Sulfate (as wt% SO ₄)
<u>CTL ID</u>	<u>Client ID</u>		
3196401	EC-4	Soil	0.028

Notes:

1. This analysis represents specifically the sample submitted on a dry (45 °C) basis.
2. Water soluble sulfate was determined according to AASHTO T290-95 (2007) Sec. 8-16.
3. This report may not be reproduced except in its entirety.

Appendix B Groundwater Monitoring Well Construction Forms

B-40-892
HoneyCreek Tunnel

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name <u>Zoo Interchange</u>		Local Grid Location of Well ft. ☐ N. ☐ E. ☐ S. ☐ W.		Well Name <u>EC-6W</u>	
Facility License, Permit or Monitoring No.		Local Grid Origin (estimated: ☐) or Well Location Lat. _____ "Long. _____ or _____		Wis. Unique Well No. <u>DNR Well ID No.</u>	
Facility ID		St. Plane _____ ft. N. _____ ft. E. S/C/N		Date Well Installed <u>08/01/2012</u>	
Type of Well		Section Location of Waste/Source 1/4 of _____ 1/4 of Sec. _____ T. _____ N. R. ☐ E ☐ W		Well Installed By: Name (first, last) and Firm <u>Bryan Sargent</u> <u>GESTRA</u>	
Well Code _____ / _____		Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known		Gov. Lot Number	
Distance from Waste/Source _____ ft.		Enf. Stds. Apply ☐			

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or _____ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☒ 41
Other ☐

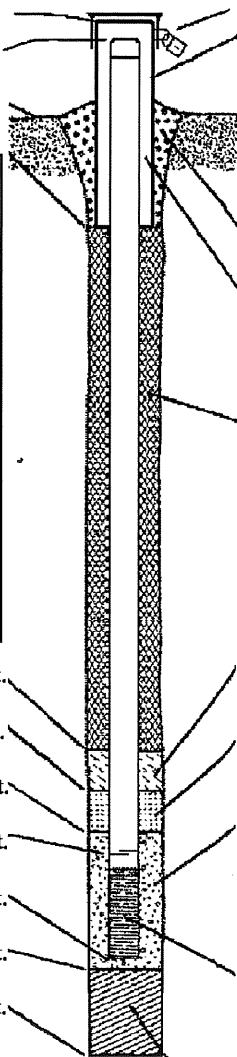
15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top _____ ft. MSL or 18 ft.
F. Fine sand, top _____ ft. MSL or _____ ft.
G. Filter pack, top _____ ft. MSL or 18 ft.
H. Screen joint, top _____ ft. MSL or 20 ft.
I. Well bottom _____ ft. MSL or 40 ft.
J. Filter pack, bottom _____ ft. MSL or 40 ft.
K. Borehole, bottom _____ ft. MSL or 40 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2.2 in.
N. I.D. well casing 2.0 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4 in.
b. Length: stand-pipe 4 ft.
c. Material: Steel ☒ 04
Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____
3. Surface seal: Bentonite ☒ 30
Concrete ☒ 01
Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ 30
Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 33
b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight ... Bentonite slurry ☐ 31
d. _____ % Bentonite ... Bentonite-cement grout ☐ 50
e. _____ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Sidley, Filter Sand #10-20
b. Volume added _____ ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23
Flush threaded PVC schedule 80 ☐ 24
Other ☐
10. Screen material: Sch. 40 PVC
a. Screen type: Factory cut ☒ 11
Continuous slot ☐ 01
Other ☐
b. Manufacturer MonoFlex
c. Slot size: 0.010 in.
d. Slotted length: 20 ft.
11. Backfill material (below filter pack): None ☒ 14
Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Scott Miller

Firm

GESTRA Engineering, Inc.

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

B-40-892
Honey Creek Tunnel

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name <u>Zoo Interchange</u>		Local Grid Location of Well ft. ☐ N. ☐ S. ☐ E. ☐ W.		Well Name <u>EC-4W</u>	
Facility License, Permit or Monitoring No.		Local Grid Origin (estimated: ☐) or Well Location Lat. _____ "Long. _____ or _____		Wis. Unique Well No. DNR Well ID No.	
Facility ID		St. Plane _____ ft. N. _____ ft. E. S/C/N		Date Well Installed <u>08/02/2012</u> m m d d y y v v v v	
Type of Well		Section Location of Waste/Source 1/4 of _____ 1/4 of Sec. _____ T. _____ N. R. ☐ E ☐ W		Well Installed By: Name (first, last) and Firm <u>Bryan Sargent</u>	
Well Code _____ / _____		Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known		Gov. Lot Number	
Distance from Waste/Source _____ ft.		Enf. Stds. Apply ☐			

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or 0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50
Hollow Stem Auger ☒ 41
Other ☐

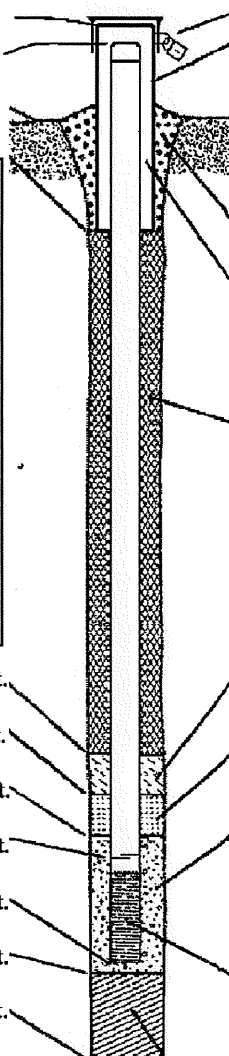
15. Drilling fluid used: Water ☐ 02 Air ☐ 01
Drilling Mud ☐ 03 None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis, if required):

E. Bentonite seal, top _____ ft. MSL or 17 ft.
F. Fine sand, top _____ ft. MSL or _____ ft.
G. Filter pack, top _____ ft. MSL or 17 ft.
H. Screen joint, top _____ ft. MSL or 19 ft.
I. Well bottom _____ ft. MSL or 39 ft.
J. Filter pack, bottom _____ ft. MSL or 39 ft.
K. Borehole, bottom _____ ft. MSL or 39 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2.2 in.
N. I.D. well casing 2.0 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 12 in.
b. Length: Flush Mount 1 ft.
c. Material: Steel ☒ 04
Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____
3. Surface seal: Bentonite ☒ 30
Concrete ☐ 01
Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ 30
Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 33
b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight ... Bentonite slurry ☐ 31
d. _____ % Bentonite ... Bentonite-cement grout ☐ 50
e. _____ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01
Tremie pumped ☐ 02
Gravity ☒ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Sidley Filter Sand #10-20
b. Volume added _____ ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23
Flush threaded PVC schedule 80 ☐ 24
Other ☐
10. Screen material: Sch 40 PVC
a. Screen type: Factory cut ☒ 11
Continuous slot ☐ 01
Other ☐
b. Manufacturer Monoflex
c. Slot size: 0.010 in.
d. Slotted length: 20 ft.
11. Backfill material (below filter pack): None ☒ 14
Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Scott Miller Firm GESTRA Engineering, Inc.

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

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

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

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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

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

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

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

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

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

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

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

SEPTEMBER 2002

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE
EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidder's attention is called to the "Employment Practices" and "Equal Opportunity Clause" set forth in the Required Contract Provisions, FHWA 1273.
2. The goals and timetables for minority and female participation expressed in percentage terms for the contractor's aggregate work force in each trade, on all construction work in the covered area, are as follows:

Goals for Minority Participation for Each Trade:

<u>County</u>	<u>%</u>	<u>County</u>	<u>%</u>	<u>County</u>	<u>%</u>
Adams	1.7	Iowa	1.7	Polk	2.2
Ashland	1.2	Iron	1.2	Portage	0.6
Barron	0.6	Jackson	0.6	Price	0.6
Bayfield	1.2	Jefferson	7.0	Racine	8.4
Brown	1.3	Juneau	0.6	Richland	1.7
Buffalo	0.6	Kenosha	3.0	Rock	3.1
Burnett	2.2	Kewaunee	1.0	Rusk	0.6
Calumet	0.9	La Crosse	0.9	St. Croix	2.9
Chippewa	0.5	Lafayette	0.5	Sauk	1.7
Clark	0.6	Langlade	0.6	Sawyer	0.6
Columbia	1.7	Lincoln	0.6	Shawano	1.0
Crawford	0.5	Manitowoc	1.0	Sheboygan	7.0
Dane	2.2	Marathon	0.6	Taylor	0.6
Dodge	7.0	Marinette	1.0	Trempealeau	0.6
Door	1.0	Marquette	1.7	Vernon	0.6
Douglas	1.0	Menominee	1.0	Vilas	0.6
Dunn	0.6	Milwaukee	8.0	Walworth	7.0
Eau Claire	0.5	Monroe	0.6	Washburn	0.6
Florence	1.0	Oconto	1.0	Washington	8.0
Fond du Lac	1.0	Oneida	0.6	Waukesha	8.0
Forest	1.0	Outagamie	0.9	Waupaca	1.0
Grant	0.5	Ozaukee	8.0	Waushara	1.0
Green	1.7	Pepin	0.6	Winnebago	0.9
Green Lake	1.0	Pierce	2.2	Wood	0.6

Goals for female participation for each trade: 6.9%

These goals are applicable to all the contractor's construction work, (whether or not it is federal or federally assisted), performed in the covered area. If the contractor performs construction work in the geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the Executive Order and the Regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the Regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of \$10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

As referred to in this section, the Director means:

Director
Office of Federal Contract Compliance Programs
Ruess Federal Plaza
310 W. Wisconsin Ave., Suite 1115
Milwaukee, WI 53202

The "Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

4. As used in this notice, and in the contract resulting from solicitation, the "covered area" is the county(ies) in Wisconsin to which this proposal applies.

APRIL 2013

ADDITIONAL FEDERAL-AID PROVISIONS

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible bid rigging, bidding collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

APRIL 2013

BUY AMERICA PROVISION

All steel and iron materials permanently incorporated in this project shall be domestic products and all manufacturing and coating processes for these materials from smelting forward in the manufacturing process must have occurred within the United States. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to the requirements of Buy America. The exemption of this requirement is the minimal use of foreign materials if the total cost of such material permanently incorporated in the product does not exceed one-tenth of one percent (1/10 of 1%) of the total contract cost or \$2,500.00, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the subject products as they are delivered to the project. The contractor shall take actions and provide documentation conforming to CMM 2-28.4 to ensure compliance with this "Buy America" provision.

<http://roadwaystandards.dot.wi.gov/standards/cmm/cm-02-28.pdf#cm2-28.4>

Upon completion of the project certify to the engineer, in writing using department form WS4567, that all steel, iron, and coating processes for steel or iron incorporated into the contract work conform to these "Buy America" provisions. Attach a list of exemptions and their associated costs to the certification form. Department form WS4567 is available at:

<http://roadwaystandards.dot.wi.gov/standards/forms/hidden/ws4567.doc>

**WISCONSIN DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS AND TRANSPORTATION FACILITIES**

SUPPLEMENTAL REQUIRED CONTRACT PROVISIONS

- I. Wage Rates, Hours of labor and payment of Wages
- II. Payroll Requirements
- III. Postings at the Site of the Work
- IV. Affidavits
- V. Wage Rate Redistribution
- VI. Additional Classifications

I. WAGE RATES, HOURS OF LABOR AND PAYMENT OF WAGES

The schedule of "Minimum Wage Rates" attached hereto and made a part hereof furnishes the prevailing wage rates that have been determined pursuant to Section 103.50 of the Wisconsin Statutes. These wage rates are the minimum required to be paid to the various laborers, workers, mechanics and truck drivers employed by contractors and subcontractors on the construction work embraced by the contract and subject to prevailing hours and wages under Section 103.50, Stats. If necessary to employ laborers, workers, mechanics or truck drivers whose classification is not listed on the schedule, they shall be paid at rates conformable to those listed for similar classifications. Apprentices shall be paid at rates not less than those prescribed in their state indenture contracts.

While the wage rates shown are the minimum rates required by the contract to be paid during its life, this is not a representation that labor can be obtained at these rates. It is the responsibility of bidders to inform themselves as to the local labor conditions and prospective changes or adjustments of wage rates. No increase in the contract price shall be allowed or authorized on account of the payment of wage rates in excess of those listed herein.

Pursuant to Section 103.50 of the Wisconsin Statutes, the prevailing hours of labor have been determined to be up to 10 hours per day and 40 hours per calendar week Monday through Friday. If any laborer, worker, mechanic or truck driver is permitted or required to work more than the prevailing number of hours per day or per calendar week on this contract, they shall be paid for all hours in excess of the prevailing hours at a rate of at least one and one-half (1 1/2) times their hourly rate of pay. All work on Saturday, Sunday and the following holidays is to be paid at time and a half: (1) January 1, (2) the last Monday in May, (3) July 4, (4) the first Monday in September, (5) the fourth Thursday in November, (6) December 25, (7) the day before if January 1, July 4 or December 25 falls on a Saturday and (8) the day following if January 1, July 4 or December 25 falls on a Sunday.

All laborers, workers, mechanics and truck drivers shall be paid unconditionally not less often than once a week. Persons who own and operate their own trucks must receive the prevailing truck driver rate for the applicable type of truck (i.e. 2 axle, 3 or more axle, articulated, eculid or dumptor) he or she operates, plus an agreed upon amount for the use of his or her truck. Every owner-operator MUST be paid separately for their driving and for the use of their truck.

For those projects subject to the requirements of the Davis-Bacon Act, the Secretary of Labor will also have determined "Minimum Wage Rates" for work to be performed under the contract. These rates are, for all or most of the labor, worker, mechanic or truck driver classifications, identical to those established under Section 103.50 of the Wisconsin Statutes. In the event the rates are not identical, the higher of the two rates will govern.

II. PAYROLL REQUIREMENTS

All contractors and subcontractors must submit weekly Certified Payrolls and Compliance Statement verifying that all laborers, workers, mechanics and truck drivers working on the project have been paid the prevailing wage rates for all work performed under the contract required by Section 103.50 of the Wisconsin Statutes.

III. POSTINGS AT THE SITE OF THE WORK

In addition to the required postings furnished by the Department, the contractor shall post the following in at least one conspicuous place at the site of work:

- a. "NOTICE TO EMPLOYEES," which provides information required to be posted by the provisions of Section 103.50 of the Wisconsin Statutes.
- b. A copy of the State of Wisconsin Minimum Wages Rates. (Four pages.)
- c. A copy of the contractor's Equal Employment Opportunity Policy.
- d. On any project involving federal aid, in addition to the furnished postings, the contractor shall post a copy of the "Davis-Bacon Act, Minimum Wage Rates". (Three pages.)

IV. WAGE RATE REDISTRIBUTION

The amount specified as the hourly basic rate of pay and the amount(s) specified as the fringe benefit contribution(s), for all classes of laborers, workers, mechanics or truck drivers may be redistributed, when necessary, to conform to those specified in any applicable collective bargaining agreement, provided that both parties to such agreement

request and receive the approval for any such redistribution from both the Department of Transportation and the Department of Workforce Development prior to the implementation of such redistribution.

V. ADDITIONAL CLASSIFICATIONS

Any unlisted laborer or mechanic classification that is needed to perform work on this project, and is not included within the scope of any of the classifications listed in the application prevailing wage rate determination, may be added after award only if all of the following criteria have been met:

1. The affected employer(s) must make a written request to WisDOT Central Office to utilize the unlisted classification on this project.
2. The request must indicate the scope of the work to be performed by the unlisted classification and must indicate the proposed wage/fringe benefit package that the unlisted classification is to receive.
3. The work to be performed by the unlisted classification must not be performed by a classification that is included in the applicable prevailing wage rate determination.
4. The unlisted classification must be commonly employed in the area where the project is located.
5. The proposed wage/fringe benefit package must bear a reasonable relationship to those set forth in the applicable prevailing wage rate determination.
6. The request should be made prior to the actual performance of the work by the unlisted classification.
7. DWD must approve the use of the unlisted classification and the proposed wage/fringe benefit package. USDOL also must approve the use of the unlisted classification and the proposed wage/fringe benefit package on federal aid projects.
8. WisDOT and DWD may amend the proposed wage/fringe benefit package, as deemed necessary, and may set forth specific employment ratios and scope of work requirements in the approval document.

The approved wage/fringe benefit package shall be paid to all laborers, workers, mechanics or truck drivers performing work within the scope of that performed by the unlisted classification, from the first day on which such work is performed. In the event that work is performed by the unlisted classification prior to approval, the wage/fringe benefit package to be paid for such work must be in conformance with the wage/fringe

benefit package approved for such work. Under this arrangement a retroactive adjustment in wages and/or fringe benefits may be required to be made to the affected laborers, workers, mechanics or truck drivers by the affected employer(s).

**ANNUAL PREVAILING WAGE RATE DETERMINATION
FOR ALL STATE HIGHWAY PROJECTS
MILWAUKEE COUNTY**

Compiled by the State of Wisconsin - Department of Workforce Development
for the Department of Transportation
Pursuant to s. 103.50, Stats.
Issued on May 1, 2013

CLASSIFICATION: Contractors are required to call the Department of Workforce Development if there are any questions regarding the proper trade or classification to be used for any worker on a public works project.

OVERTIME: Time and one-half must be paid for all hours worked over 10 hours per day and 40 hours per calendar week and for all hours worked on Saturday, Sunday and the following six (6) holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; the day before if January 1, July 4 or December 25 falls on a Saturday; the day following if January 1, July 4 or December 25 falls on a Sunday.

FUTURE INCREASE: If indicated for a specific trade or occupation, the full amount of such increase MUST be added to the "TOTAL" indicated for such trade or occupation on the date(s) such increase(s) becomes effective.

PREMIUM PAY: If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.

SUBJOURNEY: Wage rates may be available for some of the classifications indicated below. Any employer that desires to use any subjourney classification on a project MUST request the applicable wage rate from the Department of Workforce Development PRIOR to the date such classification is used on such project. Form ERD-10880 is available for this purpose and can be obtained by writing to the Department of Workforce Development, Equal Rights Division, P.O. Box 8928, Madison, WI 53708.

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Bricklayer, Blocklayer or Stonemason	35.58	19.20	54.78
Carpenter	32.93	19.81	52.74
Future Increase(s): Add \$.75/hr on 6/3/2013. Add \$1.25/hr on 6/2/2014.			
Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Cement Finisher	30.69	17.53	48.22
Future Increase(s): Add \$1.87 on 6/1/13; Add \$1.87 on 6/1/14; Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			
Electrician	31.54	21.14	52.68
Fence Erector	28.00	4.50	32.50
Ironworker	31.31	21.99	53.30
Line Constructor (Electrical)	31.29	15.34	46.63
Painter	29.22	16.69	45.91
Pavement Marking Operator	29.22	16.69	45.91
Piledriver	29.56	23.86	53.42
Roofer or Waterproofer	29.40	15.05	44.45
Teledata Technician or Installer	24.65	15.67	40.32
Tuckpointer, Caulker or Cleaner	34.35	11.13	45.48
Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.64	17.06	46.70
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	30.60	14.64	45.24
Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day,			

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
	\$	\$	\$
Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

TRUCK DRIVERS

Single Axle or Two Axle	33.22	18.90	52.12
Three or More Axle	23.31	17.13	40.44
Future Increase(s): Add \$1.85/hr on 6/1/2013.			
Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Articulated, Euclid, Dumptror, Off Road Material Hauler	27.77	19.90	47.67
Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .			
Pavement Marking Vehicle	23.84	14.90	38.74
Shadow or Pilot Vehicle	33.22	18.90	52.12
Truck Mechanic	22.50	16.19	38.69

LABORERS

General Laborer	25.39	18.40	43.79
Future Increase(s): Add \$1.70/hr on 6/1/2013; Add \$1.60/hr on 6/1/2014.			
Premium Pay: 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).			
Asbestos Abatement Worker	18.00	0.00	18.00
Landscaper	25.39	18.40	43.79
Future Increase(s): Add \$1.70/hr on 6/1/13; Add \$1.60/hr on 6/1/14.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).			
Flagperson or Traffic Control Person	21.88	18.40	40.28
Future Increase(s): Add \$1.70/hr on 6/1/2013; Add \$1.60/hr on 6/1/2014.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	<u>\$</u>	<u>\$</u>	<u>\$</u>
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.24	15.03	32.27
Railroad Track Laborer	14.50	3.53	18.03

HEAVY EQUIPMENT OPERATORS

Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Traveling Crane (Bridge Type).	35.22	19.90	55.12

Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.

Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium.

See DOT's website for details about the applicability of this night work premium at:

<http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm>.

Backhoe (Track Type) Having a Mfr.'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.	34.72	19.90	54.62

Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.

Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium.

See DOT's website for details about the applicability of this night work premium at:

<http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm>.

Air 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 Mfr.'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);	34.22	19.90	54.12

TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
	\$	\$	\$
Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A- Frames. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .			
Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawyer (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 6/1/13; Add \$1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .	33.96	19.90	53.86
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 6/1/13; Add \$1.75/hr on 6/1/14. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .	33.67	19.90	53.57
Fiber Optic Cable Equipment.	20.00	7.88	27.88
Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	27.75	19.15	46.90
Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks-Great Lakes ONLY.	27.75	19.15	46.90

SUPERSEDES DECISION WI20120010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin

GENERAL DECISION NUMBER: WI130010

DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: June 7, 2013

LABORERS CLASSIFICATION:		Basic Hourly Rates	Fringe Benefits			Basic Hourly Rates	Fringe Benefits
Group 1:	General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence and Bridge Builder; Landscaper, Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, Utility Man); Batch Truck Dumper; or Cement Handler; Bituminous Worker; (Dumper, Ironer, Smoother, Tamper); Concrete Handler	\$24.34.....	16.74	Truck Drivers:			
Group 2:	Air Tool Operator; Joint Sawyer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); Chain Saw Operator; Demolition Burning Torch Laborer	24.49.....	16.74	1 & 2 Axles	23.16	17.13	
Group 3:	Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off man	24.69.....	16.74	Three or More Axles; Euclids, Dumptor & Articulated, Truck Mechanic.....	23.31	17.13	
Group 4:	Line and Grade Specialist	24.84.....	16.74				
Group 5:	Blaster and Powderman	24.99.....	16.74				
Group 6:	Flagperson traffic control person	20.83.....	16.74				

CLASSES OF LABORER AND MECHANICS

Bricklayer	35.58.....	16.07
Carpenter	30.52.....	14.41
Piledriverman	27.25.....	19.46
Ironworker	30.51.....	22.72
Cement Mason/Concrete Finisher	30.69.....	17.53
Electrician	See Page 3	
Line Construction		
Lineman.....	38.25.....	18.00
Heavy Equipment Operator	34.43.....	16.71
Equipment Operator.....	30.60.....	15.41
Heavy Groundman Driver.....	26.78.....	14.11
Light Groundman Driver	24.86.....	13.45
Groundsman.....	21.04.....	12.16
Millwrights.....	26.32.....	13.98
Painter, Brush.....	29.52.....	18.79
Painter, Spray and Sandblaster	30.27.....	18.79
Painter, Bridge.....	29.87.....	18.79
Well Drilling:		
Well Driller	16.52.....	3.70

Notes: Welders receive rate prescribed for craft performing operation to which welding is incidental. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)). Includes Modification #0, dated January 4, 2013; Modification #1 dated February 1, 2013; Modification #2 dated June 7, 2013.

SUPERSEDES DECISION WI20120010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin

GENERAL DECISION NUMBER: WI130010

DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: June 7, 2013

<u>POWER EQUIPMENT OPERATORS CLASSIFICATION:</u>	<u>Basic Hourly Rates</u>	<u>Fringe Benefits</u>	<u>POWER EQUIPMENT OPERATORS CLASSIFICATION: (Continued)</u>	<u>Basic Hourly Rates</u>	<u>Fringe Benefits</u>
Group 1: Cranes, tower cranes and derricks, with or without attachments, with a lifting capacity of over 100 tons or cranes, tower cranes and derricks with boom, leads and/or jib lengths measuring 176 feet or longer	\$36.72	\$20.05	(scraper, dozer, pusher, loader); scraper - rubber tired (single or twin engine); endloader hydraulic backhoe (tractor-type); trenching machine; skid rigs; tractor, side boom (heavy); drilling or boring machine (mechanical heavy); roller (over 5 tons); percussion or rotary drilling machine; air track; blaster; loading machine (conveyor); tugger; boatmen; winches and A-frames; post driver; material hoist operator.	\$35.72	\$20.05
Group 2: Cranes, tower cranes and derricks, with or without attachments, with a lifting capacity of 100 tons or less or cranes, tower cranes and derricks with boom, leads and/or jib lengths measuring 175 feet or less, and backhoes (excavators) having a manufacturer's rated capacity of 3 cu. yds. and over, caisson rigs, pile driver, dredge operator, dredge engineer.	\$36.22	\$20.05	Group 4: Greaser, roller steel (5 tons or less); roller (pneumatic tired) - self-propelled; tractor (mounted or towed compactors and light equipment); shouldering machine; self-propelled chip spreader; concrete spreader; finishing machine; mechanical float; curing machine; power subgrader; joint saw (multiple blade) belting machine; burlap machine; texturing machine; tractor, endloader (rubber tired) - light; jeep digger; fork lift; mulcher; launch operator; fireman; environmental burner.	\$35.46	\$20.05
Group 3: Mechanic or welder - heavy duty equipment, cranes with a lifting capacity of 25 tons or less, concrete breaker (manual or remote); vibrator/sonic concrete breaker; concrete laser screed; concrete slipform paver; concrete batch plant operator; concrete pavement spreader - heavy duty (rubber tired); concrete spreader and distributor, automatic subgrader (concrete); concrete grinder and planing machine; concrete slipform curb and gutter machine; slipform concrete placer; tube finisher; hydro blaster (10,000 psi and over); bridge paver; concrete conveyor system; concrete pump; stabilizing mixer (self propelled); shoulder widener; asphalt plant engineer; bituminous paver; bump cutter and grooving machine; milling machine; screed (bituminous paver); asphalt heater, planer and scarifier; backhoes (excavators) having a manufacturers rated capacity of under 3 cu. yds.; grader or motor patrol; tractor			Group 5: Air compressor; power pack; vibratory hammer and extractor; heavy equipment, leadman; tank car heaters; stump chipper; curb machine operator; concrete proportioning plants generators; mudjack operator; rock breaker; crusher or screening plant; screed (milling machine); automatic belt conveyor and surge bin; pug mill operator; oiler; pump (over 3 inches); drilling machine helper.	\$35.17	\$20.05
			Group 6: Off - road material hauler with or without ejector	\$29.27	\$20.05
			Premium Pay: EPA Level "A" protection - \$3.00 per hour EPA Level "B" protection - \$2.00 per hour EPA Level "C" protection - \$1.00 per hours		

SUPERSEDES DECISION WI20120010
U. S. DEPARTMENT OF LABOR
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin

GENERAL DECISION NUMBER: WI130010

DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: June 7, 2013

LABORERS CLASSIFICATION:		Rates	Benefits		
Electricians				Area 4 -	BROWN, DOOR, KEWAUNEE, MANITOWOC (except Schleswig), MARINETTE (Wausauke and area south thereof), OCONTO, MENOMINEE (East of a line 6 miles West of the West boundary of Oconto County), SHAWANO (except area North of Townships of Aniwa and Hutchins) COUNTIES.
Area 1		\$27.80	16.52		
Area 2:				Area 5 -	ADAMS, CLARK (Colby, Freemont, Lynn, Mayville, Sherman, Sherwood, Unity), FOREST, JUNEAU, LANGLADE, LINCOLN, MARATHON, MARINETTE (Area North of the town of Wausauke), MENOMINEE (Area West of a line 6 miles West of the West boundary of Oconto County), ONEIDA, PORTAGE, SHAWANO (Area North of the townships of Aniwa and Hutchins), VILAS AND WOOD COUNTIES
Electricians.....		29.13	17.92		
Area 3:				Area 6 -	KENOSHA COUNTY
Electrical contracts under \$130,000		26.24	16.85	Area 8 -	DODGE, (Emmet Township only), GREEN, JEFFERSON, LAFAYETTE, RACINE (Burlington township), ROCK and WALWORTH COUNTIES
Electrical contracts over \$130,000		29.41	16.97	Area 9 -	COLUMBIA, DANE, DODGE, (area west of Hwy. 26, except Chester & Emmet Townships), GREEN LAKE (except townships of Berlin, Seneca and St. Marie), IOWA, MARQUETTE (except townships of Neshkoka, Crystal Lake, Newton and Springfield), and SAUK COUNTIES
Area 4:		28.10	17.24	Area 10 -	CALUMET (Township of New Holstein), DODGE (East of Hwy. 26 including Chester Township), FOND DU LAC, MANITOWOC (Schleswig), and SHEBOYGAN COUNTIES
Area 5		28.61	16.60	Area 11 -	DOUGLAS COUNTY
Area 6		35.25	19.30	Area 12 -	RACINE (except Burlington township) COUNTY
Area 8				Area 13 -	MILWAUKEE, OZAUKEE, WASHINGTON and WAUKESHA COUNTIES
Electricians.....		30.00	17.76	Area 14 -	Statewide.
Area 9:				Area 15 -	DODGE (East of Hwy 26 including Chester Twp, excluding Emmet Twp), FOND DU LAC (Except Waupun), MILWAUKEE, OZAUKEE, MANITOWOC (Schleswig), WASHINGTON, AND WAUKESHA COUNTIES.
Electricians.....		32.94	18.71		
Area 10		28.97	19.55		
Area 11		31.91	23.60		
Area 12		32.87	19.23		
Area 13		32.20	21.64		
Teledata System Installer					
Area 14					
Installer/Technician		21.89	11.83		
Sound & Communications					
Area 15					
Installer		16.47	14.84		
Technician		24.75	16.04		
Area 1 -	CALUMET (except township of New Holstein), GREEN LAKE (N. part, including Townships of Berlin, St. Marie and Seneca), MARQUETTE (N. part, including Townships of Crystal Lake, Neshkoro, Newton & Springfield), OUTAGAMIE, WAUPACA, WAUSHARA and WINNEBAGO COUNTIES.				
Area 2 -	ASHLAND, BARRON, BAYFIELD, BUFFALO, BURNETT, CHIPPEWA, CLARK (except Mayville, Colby, Unity, Sherman, Fremont, Lynn and Sherwood), CRAWFORD, DUNN, EAU CLAIRE, GRANT, IRON, JACKSON, LA CROSSE, MONROE, PEPIN, PIERCE, POLK, PRICE, RICHLAND, RUSK, ST. CROIX, SAWYER, TAYLOR, TREMPLEAU, VERNON and WASHBURN COUNTIES				
Area 3 -	FLORENCE (townships of Aurora, Commonwealth, Fern, Florence and Homestead), MARINETTE (Niagara township)				

FEBRUARY 1999

**NOTICE TO BIDDERS
WAGE RATE DECISION**

The wage rate decision of the Secretary of Labor which has been incorporated in these advertised specifications is incomplete in that the classifications may be omitted from the Secretary of Labor's decision.

Since the bidder is responsible, independently, for ascertaining area practice with respect to the necessity, or lack of necessity, for the use of these classifications in the prosecution of the work contemplated by this project, no inference may be drawn from the omission of these classifications concerning prevailing area practices relative to their use. Further, this omission will not, per se, be construed as establishing any governmental liability for increased labor cost if it is subsequently determined that such classifications are required.

There may be omissions and/or errors in the federal wage rates. The bidder is responsible for evaluating and determining the correct applicable rate. The higher of state or federal rate will apply.

SCHEDULE OF ITEMS

REVISED:

CONTRACT:
20130813007PROJECT(S):
1060-33-78FEDERAL ID(S):
WISC 2013376

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 ROADWAY ITEMS

0010	201.0105 CLEARING	83.000				
		STA	.		.	
0020	201.0120 CLEARING	390.000				
		ID	.		.	
0030	201.0205 GRUBBING	83.000				
		STA	.		.	
0040	201.0220 GRUBBING	390.000				
		ID	.		.	
0050	203.0200 REMOVING OLD STRUCTURE (STATION) 0002. 22+00.00	LUMP	LUMP			.
0060	203.0200 REMOVING OLD STRUCTURE (STATION) 0003. 40+40.00	LUMP	LUMP			.
0070	203.0210.S ABATEMENT OF ASBESTOS CONTAINING MATERIAL (STRUCTURE) 0001. B-40-0089	LUMP	LUMP			.
0080	204.0100 REMOVING PAVEMENT ***P**	17,011.000				
		SY	.		.	
0090	204.0120 REMOVING ASPHALTIC SURFACE MILLING ***P**	7,835.000				
		SY	.		.	
0100	204.0150 REMOVING CURB & GUTTER ***P**	3,015.000				
		LF	.		.	

Wisconsin Department of Transportation

PAGE: 2

DATE: 07/02/13

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			DOLLARS	CTS	DOLLARS	CTS
0110	204.0155 REMOVING CONCRETE SIDEWALK ***	1,222.000 SY	.		.	
0120	204.0157 REMOVING CONCRETE BARRIER ***	1,031.000 LF	.		.	
0130	204.0165 REMOVING GUARDRAIL ***	275.000 LF	.		.	
0140	204.0170 REMOVING FENCE ***	5,759.000 LF	.		.	
0150	204.0195 REMOVING CONCRETE BASES	8.000 EACH	.		.	
0160	204.0210 REMOVING MANHOLES	14.000 EACH	.		.	
0170	204.0220 REMOVING INLETS	39.000 EACH	.		.	
0180	204.0245 REMOVING STORM SEWER (SIZE) 0001. 12-INCH ***	1,120.000 LF	.		.	
0190	204.0245 REMOVING STORM SEWER (SIZE) 0002. 15-INCH ***	166.000 LF	.		.	
0200	204.0245 REMOVING STORM SEWER (SIZE) 0003. 18-INCH ***	84.000 LF	.		.	
0210	204.0245 REMOVING STORM SEWER (SIZE) 0005. 24-INCH ***	818.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
0220	204.0245 REMOVING STORM SEWER (SIZE) 0009. 48-INCH **P**	98.000 LF	.		.	
0230	204.0245 REMOVING STORM SEWER (SIZE) 0013. 72-INCH **P**	115.000 LF	.		.	
0240	204.0250 ABANDONING MANHOLES	2.000 EACH	.		.	
0250	204.0280 SEALING PIPES	7.000 EACH	.		.	
0260	204.9060.S REMOVING (ITEM DESCRIPTION) 0001. CRASH BARRELS	1.000 EACH	.		.	
0270	204.9060.S REMOVING (ITEM DESCRIPTION) 0002. BIKE RACK	1.000 EACH	.		.	
0280	204.9060.S REMOVING (ITEM DESCRIPTION) 0003. GATE, POSTS, AND FOOTINGS	1.000 EACH	.		.	
0290	204.9090.S REMOVING (ITEM DESCRIPTION) 0001. NOISE BARRIER	700.000 LF	.		.	
0300	205.0100 EXCAVATION COMMON **P**	77,088.000 CY	.		.	
0310	206.1000 EXCAVATION FOR STRUCTURES BRIDGES (STRUCTURE) 0001. B-40-785	LUMP	LUMP		.	

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			DOLLARS	CTS	DOLLARS	CTS
0320	206.1000 EXCAVATION FOR STRUCTURES BRIDGES (STRUCTURE) 0002. B-40-799	LUMP	LUMP			.
0330	206.2000 EXCAVATION FOR STRUCTURES CULVERTS (STRUCTURE) 0001. B-40-892	LUMP	LUMP			.
0340	206.2000 EXCAVATION FOR STRUCTURES CULVERTS (STRUCTURE) 0002. C-40-101	LUMP	LUMP			.
0350	206.3000 EXCAVATION FOR STRUCTURES RETAINING WALLS (STRUCTURE) 0001. R-40-524	LUMP	LUMP			.
0360	206.3000 EXCAVATION FOR STRUCTURES RETAINING WALLS (STRUCTURE) 0002. R-40-554	LUMP	LUMP			.
0370	206.3000 EXCAVATION FOR STRUCTURES RETAINING WALLS (STRUCTURE) 0003. R-40-555	LUMP	LUMP			.
0380	206.6000.S TEMPORARY SHORING	SF 4,360.000				.
0390	209.0100 BACKFILL GRANULAR **P**	CY 19,556.000				.
0400	209.0200.S BACKFILL CONTROLLED LOW STRENGTH **P**	CY 7,884.000				.

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			DOLLARS	CTS	DOLLARS	CTS
0410	210.0100 BACKFILL STRUCTURE ***P**	26,172.000 CY	.		.	
0420	213.0100 FINISHING ROADWAY (PROJECT) 0001. 1060-33-78	1.000 EACH	.		.	
0430	305.0120 BASE AGGREGATE DENSE 1 1/4-INCH ***P**	25,433.000 TON	.		.	
0440	312.0110 SELECT CRUSHED MATERIAL ***P**	14,480.000 TON	.		.	
0450	415.0090 CONCRETE PAVEMENT 9-INCH ***P**	11,510.000 SY	.		.	
0460	415.0410 CONCRETE PAVEMENT APPROACH SLAB ***P**	276.000 SY	.		.	
0470	415.1090 CONCRETE PAVEMENT HES 9-INCH	2,337.000 SY	.		.	
0480	416.0170 CONCRETE DRIVEWAY 7-INCH ***P**	33.000 SY	.		.	
0490	416.0610 DRILLED TIE BARS	1,586.000 EACH	.		.	
0500	416.0620 DRILLED DOWEL BARS	460.000 EACH	.		.	
0510	440.4410.S INCENTIVE IRI RIDE	2,610.000 DOL	1.00000		2610.00	

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			DOLLARS	CTS	DOLLARS	CTS
0520	455.0115 ASPHALTIC MATERIAL PG64-22	68.000 TON	.		.	
0530	455.0120 ASPHALTIC MATERIAL PG64-28	434.000 TON	.		.	
0540	455.0605 TACK COAT	934.000 GAL	.		.	
0550	460.1101 HMA PAVEMENT TYPE E-1	1,016.000 TON	.		.	
0560	460.1110 HMA PAVEMENT TYPE E-10	7,233.000 TON	.		.	
0570	460.1130 HMA PAVEMENT TYPE E-30	108.000 TON	.		.	
0580	460.2000 INCENTIVE DENSITY HMA PAVEMENT	8,249.000 DOL	1.000000		8249.00	
0590	465.0105 ASPHALTIC SURFACE	727.000 TON	.		.	
0600	465.0125 ASPHALTIC SURFACE TEMPORARY	135.000 TON	.		.	
0610	502.0100 CONCRETE MASONRY BRIDGES ***P**	508.000 CY	.		.	
0620	502.3200 PROTECTIVE SURFACE TREATMENT ***P**	3,159.000 SY	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
0630	502.5005 MASONRY ANCHORS TYPE L NO. 5 BARS ***P**	63.000 EACH	.		.	
0640	502.5010 MASONRY ANCHORS TYPE L NO. 6 BARS ***P**	16.000 EACH	.		.	
0650	502.6102 MASONRY ANCHORS TYPE S 1/2-INCH ***P**	75.000 EACH	.		.	
0660	503.0137 PRESTRESSED GIRDER TYPE I 36W-INCH ***P**	416.000 LF	.		.	
0670	503.0146 PRESTRESSED GIRDER TYPE I 45W-INCH ***P**	2,339.000 LF	.		.	
0680	504.0100 CONCRETE MASONRY CULVERTS ***P**	9,006.000 CY	.		.	
0690	504.0500 CONCRETE MASONRY RETAINING WALLS ***P**	2,160.000 CY	.		.	
0700	505.0405 BAR STEEL REINFORCEMENT HS BRIDGES	15,072.000 LB	.		.	
0710	505.0410 BAR STEEL REINFORCEMENT HS CULVERTS	1,406,430 LB	.		.	
0720	505.0415 BAR STEEL REINFORCEMENT HS RETAINING WALLS	16,060.000 LB	.		.	
0730	505.0605 BAR STEEL REINFORCEMENT HS COATED BRIDGES	281,016.000 LB	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
0740	505.0615 BAR STEEL REINFORCEMENT HS COATED RETAINING WALLS	314,009.000 LB	.		.	
0750	506.0605 STRUCTURAL STEEL HS	640,420.000 LB	.		.	
0760	506.2605 BEARING PADS ELASTOMERIC NON-LAMINATED **P**	49.000 EACH	.		.	
0770	506.2610 BEARING PADS ELASTOMERIC LAMINATED **P**	5.000 EACH	.		.	
0780	506.3010 WELDED STUD SHEAR CONNECTORS 7/8X5-INCH **P**	5,072.000 EACH	.		.	
0790	506.4000 STEEL DIAPHRAGMS (STRUCTURE) 0001. B-40-785 **P**	40.000 EACH	.		.	
0800	506.4000 STEEL DIAPHRAGMS (STRUCTURE) 0002. B-40-799 **P**	8.000 EACH	.		.	
0810	513.2000 RAILING PIPE (STRUCTURE) 0001. R-40-524	LUMP	LUMP		.	
0820	513.2000 RAILING PIPE (STRUCTURE) 0002. R-40-554	LUMP	LUMP		.	
0830	513.2000 RAILING PIPE (STRUCTURE) 0003. R-40-555	LUMP	LUMP		.	
0840	513.2000 RAILING PIPE (STRUCTURE) 0004. C-40-101	LUMP	LUMP		.	

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			DOLLARS	CTS	DOLLARS	CTS
0850	516.0500 RUBBERIZED MEMBRANE WATERPROOFING **P**	739.000 SY	.		.	
0860	517.1050.S ARCHITECTURAL SURFACE TREATMENT (STRUCTURE) 0002. R-40-525 **P**	6,805.000 SF	.		.	
0870	517.1050.S ARCHITECTURAL SURFACE TREATMENT (STRUCTURE) 0003. R-40-554 **P**	11,995.000 SF	.		.	
0880	517.1050.S ARCHITECTURAL SURFACE TREATMENT (STRUCTURE) 0004. R-40-555 **P**	22,950.000 SF	.		.	
0890	520.8000 CONCRETE COLLARS FOR PIPE	24.000 EACH	.		.	
0900	522.1024 APRON ENDWALLS FOR CULVERT PIPE REINFORCED CONCRETE 24-INCH	3.000 EACH	.		.	
0910	522.1084 APRON ENDWALLS FOR CULVERT PIPE REINFORCED CONCRETE 84-INCH	1.000 EACH	.		.	
0920	531.0300.S NOISE BARRIERS DOUBLE-SIDED SOUND ABSORPTIVE (STRUCTURE) 0010. N-40-70 **P**	18,770.000 SF	.		.	
0930	531.0300.S NOISE BARRIERS DOUBLE-SIDED SOUND ABSORPTIVE (STRUCTURE) 0020. N-40-71 **P**	14,470.000 SF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0940	531.0300.S NOISE BARRIERS DOUBLE-SIDED SOUND ABSORPTIVE (STRUCTURE) 0030. N-40-72 **P**	14,440.000 SF	.		.	
0950	550.0500 PILE POINTS	6.000 EACH	.		.	
0960	550.1120 PILING STEEL HP 12-INCH X 53 LB	600.000 LF	.		.	
0970	550.2146 PILING CIP CONCRETE 14 X 0.375-INCH	3,958.000 LF	.		.	
0980	601.0319 CONCRETE CURB & GUTTER 19-INCH **P**	287.000 LF	.		.	
0990	601.0331 CONCRETE CURB & GUTTER 31-INCH **P**	7,055.000 LF	.		.	
1000	601.0600 CONCRETE CURB PEDESTRIAN **P**	128.000 LF	.		.	
1010	602.0410 CONCRETE SIDEWALK 5-INCH **P**	22,155.000 SF	.		.	
1020	602.0515 CURB RAMP DETECTABLE WARNING FIELD NATURAL PATINA **P**	264.000 SF	.		.	
1030	603.1132 CONCRETE BARRIER TYPE S32 **P**	2,622.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1040	603.1142 CONCRETE BARRIER TYPE S42 ***P**	1,466.000 LF	.		.	
1050	603.3513 CONCRETE BARRIER TRANSITION TYPE S32 TO S36 ***P**	1.000 EACH	.		.	
1060	603.3535 CONCRETE BARRIER TRANSITION TYPE S36 TO S42 ***P**	1.000 EACH	.		.	
1070	603.8000 CONCRETE BARRIER TEMPORARY PRECAST DELIVERED	14,337.500 LF	.		.	
1080	603.8125 CONCRETE BARRIER TEMPORARY PRECAST INSTALLED	14,337.500 LF	.		.	
1090	604.0400 SLOPE PAVING CONCRETE ***P**	13.000 SY	.		.	
1100	604.0500 SLOPE PAVING CRUSHED AGGREGATE ***P**	1,247.000 SY	.		.	
1110	606.0200 RIPRAP MEDIUM	1,145.000 CY	.		.	
1120	608.0312 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 12-INCH	344.000 LF	.		.	
1130	608.0315 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 15-INCH	1,412.000 LF	.		.	
1140	608.0318 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 18-INCH	503.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1150	608.0324 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 24-INCH	2,984.000 LF	.		.	
1160	608.0330 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 30-INCH	314.000 LF	.		.	
1170	608.0336 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 36-INCH	91.000 LF	.		.	
1180	608.0348 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 48-INCH	27.000 LF	.		.	
1190	608.0360 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 60-INCH	21.000 LF	.		.	
1200	608.0384 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 84-INCH	90.000 LF	.		.	
1210	608.0396 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 96-INCH	92.000 LF	.		.	
1220	608.0412 STORM SEWER PIPE REINFORCED CONCRETE CLASS IV 12-INCH	68.000 LF	.		.	
1230	608.0512 STORM SEWER PIPE REINFORCED CONCRETE CLASS V 12-INCH	17.000 LF	.		.	
1240	608.0515 STORM SEWER PIPE REINFORCED CONCRETE CLASS V 15-INCH	32.000 LF	.		.	
1250	608.0524 STORM SEWER PIPE REINFORCED CONCRETE CLASS V 24-INCH	103.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1260	608.0572 STORM SEWER PIPE REINFORCED CONCRETE CLASS V 72-INCH	18.000 LF	.		.	
1270	611.0535 MANHOLE COVERS TYPE J-SPECIAL	19.000 EACH	.		.	
1280	611.0606 INLET COVERS TYPE B	8.000 EACH	.		.	
1290	611.0624 INLET COVERS TYPE H	27.000 EACH	.		.	
1300	611.0642 INLET COVERS TYPE MS	20.000 EACH	.		.	
1310	611.0654 INLET COVERS TYPE V	31.000 EACH	.		.	
1320	611.0663 INLET COVERS TYPE X	16.000 EACH	.		.	
1330	611.2004 MANHOLES 4-FT DIAMETER	9.000 EACH	.		.	
1340	611.2005 MANHOLES 5-FT DIAMETER	19.000 EACH	.		.	
1350	611.2006 MANHOLES 6-FT DIAMETER	9.000 EACH	.		.	
1360	611.2007 MANHOLES 7-FT DIAMETER	2.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1370	611.2008 MANHOLES 8-FT DIAMETER	1.000 EACH	.		.	
1380	611.3004 INLETS 4-FT DIAMETER	64.000 EACH	.		.	
1390	611.3225 INLETS 2X2.5-FT	2.000 EACH	.		.	
1400	611.3902 INLETS MEDIAN 2 GRATE	10.000 EACH	.		.	
1410	611.8110 ADJUSTING MANHOLE COVERS	1.000 EACH	.		.	
1420	611.8115 ADJUSTING INLET COVERS	1.000 EACH	.		.	
1430	611.8120.S COVER PLATES TEMPORARY	2.000 EACH	.		.	
1440	611.9800.S PIPE GRATES	3.000 EACH	.		.	
1450	612.0106 PIPE UNDERDRAIN 6-INCH	75.000 LF	.		.	
1460	612.0206 PIPE UNDERDRAIN UNPERFORATED 6-INCH	75.000 LF	.		.	
1470	612.0406 PIPE UNDERDRAIN WRAPPED 6-INCH	780.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1480	614.0805 CRASH CUSHIONS PERMANENT LOW MAINTENANCE	3.000 EACH	.		.	
1490	614.0905 CRASH CUSHIONS TEMPORARY	3.000 EACH	.		.	
1500	616.0206 FENCE CHAIN LINK 6-FT	1,387.000 LF	.		.	
1510	616.0329 GATES CHAIN LINK (WIDTH) 0001. 8-FT	4.000 EACH	.		.	
1520	616.0329 GATES CHAIN LINK (WIDTH) 0002. 22-FT	2.000 EACH	.		.	
1530	616.0600.S FENCE TEMPORARY	6,350.000 LF	.		.	
1540	616.0700.S FENCE SAFETY	1,000.000 LF	.		.	
1550	619.1000 MOBILIZATION	1.000 EACH	.		.	
1560	620.0300 CONCRETE MEDIAN SLOPED NOSE **P**	503.000 SF	.		.	
1570	623.0200 DUST CONTROL SURFACE TREATMENT	31,568.000 SY	.		.	
1580	624.0100 WATER	191.000 MGAL	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1590	625.0100 TOPSOIL ***P**	84,969.000				
		SY	.		.	
1600	628.1104 EROSION BALES	100.000				
		EACH	.		.	
1610	628.1504 SILT FENCE	14,444.000				
		LF	.		.	
1620	628.1520 SILT FENCE MAINTENANCE	14,444.000				
		LF	.		.	
1630	628.1905 MOBILIZATIONS EROSION CONTROL	12.000				
		EACH	.		.	
1640	628.1910 MOBILIZATIONS EMERGENCY EROSION CONTROL	6.000				
		EACH	.		.	
1650	628.2004 EROSION MAT CLASS I TYPE B	72,210.000				
		SY	.		.	
1660	628.2027 EROSION MAT CLASS II TYPE C	22,323.000				
		SY	.		.	
1670	628.7005 INLET PROTECTION TYPE A	72.000				
		EACH	.		.	
1680	628.7010 INLET PROTECTION TYPE B	115.000				
		EACH	.		.	
1690	628.7015 INLET PROTECTION TYPE C	71.000				
		EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1700	628.7020 INLET PROTECTION TYPE D	60.000 EACH	.		.	
1710	628.7504 TEMPORARY DITCH CHECKS	315.000 LF	.		.	
1720	628.7555 CULVERT PIPE CHECKS	1.000 EACH	.		.	
1730	628.7560 TRACKING PADS	12.000 EACH	.		.	
1740	628.7570 ROCK BAGS	15.000 EACH	.		.	
1750	629.0210 FERTILIZER TYPE B	59.000 CWT	.		.	
1760	630.0200 SEEDING TEMPORARY	946.000 LB	.		.	
1770	630.0400 SEEDING NURSE CROP	449.000 LB	.		.	
1780	631.0300 SOD WATER	132.000 MGAL	.		.	
1790	631.1000 SOD LAWN	5,883.000 SY	.		.	
1800	633.5200 MARKERS CULVERT END	1.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1810	634.0618 POSTS WOOD 4X6-INCH X 18-FT	15.000 EACH	.		.	
1820	634.0622 POSTS WOOD 4X6-INCH X 22-FT	17.000 EACH	.		.	
1830	634.0816 POSTS TUBULAR STEEL 2X2-INCH X 16-FT	52.000 EACH	.		.	
1840	634.0885 POSTS TUBULAR STEEL 2X2-INCH X 8.5-FT	1.000 EACH	.		.	
1850	635.0200 SIGN SUPPORTS STRUCTURAL STEEL HS	7,800.000 LB	.		.	
1860	635.0300 SIGN SUPPORTS REPLACING BASE CONNECTION BOLTS	2.000 EACH	.		.	
1870	636.0100 SIGN SUPPORTS CONCRETE MASONRY **P**	21.600 CY	.		.	
1880	636.0500 SIGN SUPPORTS STEEL REINFORCEMENT	756.000 LB	.		.	
1890	636.1000 SIGN SUPPORTS STEEL REINFORCEMENT HS	715.000 LB	.		.	
1900	637.0101 SIGNS TYPE I	100.000 SF	.		.	
1910	637.0202 SIGNS REFLECTIVE TYPE II	1,039.060 SF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
1920	637.0402 SIGNS REFLECTIVE FOLDING TYPE II	14.920 SF	.		.	
1930	638.2101 MOVING SIGNS TYPE I	8.000 EACH	.		.	
1940	638.2102 MOVING SIGNS TYPE II	7.000 EACH	.		.	
1950	638.2601 REMOVING SIGNS TYPE I	1.000 EACH	.		.	
1960	638.2602 REMOVING SIGNS TYPE II	150.000 EACH	.		.	
1970	638.3000 REMOVING SMALL SIGN SUPPORTS	63.000 EACH	.		.	
1980	638.3100 REMOVING STRUCTURAL STEEL SIGN SUPPORTS	16.000 EACH	.		.	
1990	643.0200 TRAFFIC CONTROL SURVEILLANCE AND MAINTENANCE (PROJECT) 0001. 1060-33-78	338.000 DAY	.		.	
2000	643.0300 TRAFFIC CONTROL DRUMS	140,619.000 DAY	.		.	
2010	643.0410 TRAFFIC CONTROL BARRICADES TYPE II	3,801.000 DAY	.		.	
2020	643.0420 TRAFFIC CONTROL BARRICADES TYPE III	35,146.000 DAY	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2030	643.0500 TRAFFIC CONTROL FLEXIBLE TUBULAR MARKER POSTS	25.000 EACH	.		.	
2040	643.0600 TRAFFIC CONTROL FLEXIBLE TUBULAR MARKER BASES	25.000 EACH	.		.	
2050	643.0705 TRAFFIC CONTROL WARNING LIGHTS TYPE A	70,267.000 DAY	.		.	
2060	643.0715 TRAFFIC CONTROL WARNING LIGHTS TYPE C	48,441.000 DAY	.		.	
2070	643.0800 TRAFFIC CONTROL ARROW BOARDS	2,806.000 DAY	.		.	
2080	643.0900 TRAFFIC CONTROL SIGNS	112,022.000 DAY	.		.	
2090	643.0910 TRAFFIC CONTROL COVERING SIGNS TYPE I	5.000 EACH	.		.	
2100	643.0920 TRAFFIC CONTROL COVERING SIGNS TYPE II	26.000 EACH	.		.	
2110	643.1000 TRAFFIC CONTROL SIGNS FIXED MESSAGE	2,086.500 SF	.		.	
2120	643.1050 TRAFFIC CONTROL SIGNS PCMS	3,632.000 DAY	.		.	
2130	643.2000 TRAFFIC CONTROL DETOUR (PROJECT) 0001. 1060-33-78	1.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2140	643.3000 TRAFFIC CONTROL DETOUR SIGNS	80,623.000 DAY	.		.	
2150	645.0105 GEOTEXTILE FABRIC TYPE C **p**	11,578.000 SY	.		.	
2160	645.0111 GEOTEXTILE FABRIC TYPE DF SCHEDULE A **p**	55.000 SY	.		.	
2170	645.0120 GEOTEXTILE FABRIC TYPE HR	55.000 SY	.		.	
2180	646.0106 PAVEMENT MARKING EPOXY 4-INCH	72,544.000 LF	.		.	
2190	646.0126 PAVEMENT MARKING EPOXY 8-INCH	13,079.000 LF	.		.	
2200	646.0600 REMOVING PAVEMENT MARKINGS	28,010.000 LF	.		.	
2210	646.0841.S PAVEMENT MARKING GROOVED WET REFLECTIVE CONTRAST TAPE 4-INCH **p**	809.000 LF	.		.	
2220	646.0843.S PAVEMENT MARKING GROOVED WET REFLECTIVE CONTRAST TAPE 8-INCH **p**	315.000 LF	.		.	
2230	647.0156 PAVEMENT MARKING ARROWS EPOXY TYPE 1	1.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2240	647.0166 PAVEMENT MARKING ARROWS EPOXY TYPE 2	6.000 EACH	.		.	
2250	647.0176 PAVEMENT MARKING ARROWS EPOXY TYPE 3	2.000 EACH	.		.	
2260	647.0356 PAVEMENT MARKING WORDS EPOXY	6.000 EACH	.		.	
2270	647.0566 PAVEMENT MARKING STOP LINE EPOXY 18-INCH	215.000 LF	.		.	
2280	647.0606 PAVEMENT MARKING ISLAND NOSE EPOXY	15.000 EACH	.		.	
2290	647.0746 PAVEMENT MARKING DIAGONAL EPOXY 24-INCH	857.000 LF	.		.	
2300	647.0766 PAVEMENT MARKING CROSSWALK EPOXY 6-INCH	382.000 LF	.		.	
2310	649.0200 TEMPORARY PAVEMENT MARKING REFLECTIVE PAINT 4-INCH	26,060.000 LF	.		.	
2320	649.0400 TEMPORARY PAVEMENT MARKING REMOVABLE TAPE 4-INCH	305.000 LF	.		.	
2330	649.2100 TEMPORARY RAISED PAVEMENT MARKERS	445.000 EACH	.		.	
2340	652.0110 CONDUIT RIGID METALLIC 1-INCH	40.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2350	652.0125 CONDUIT RIGID METALLIC 2-INCH	260.000 LF	.		.	
2360	652.0210 CONDUIT RIGID NONMETALLIC SCHEDULE 40 1-INCH	68.000 LF	.		.	
2370	652.0215 CONDUIT RIGID NONMETALLIC SCHEDULE 40 1 1/4-INCH	17.000 LF	.		.	
2380	652.0220 CONDUIT RIGID NONMETALLIC SCHEDULE 40 1 1/2-INCH	40.000 LF	.		.	
2390	652.0225 CONDUIT RIGID NONMETALLIC SCHEDULE 40 2-INCH	4,756.000 LF	.		.	
2400	652.0230 CONDUIT RIGID NONMETALLIC SCHEDULE 40 2 1/2-INCH	40.000 LF	.		.	
2410	652.0235 CONDUIT RIGID NONMETALLIC SCHEDULE 40 3-INCH	5,327.000 LF	.		.	
2420	652.0405 CONDUIT REINFORCED THERMOSETTING RESIN 2-INCH	130.000 LF	.		.	
2430	652.0605 CONDUIT SPECIAL 2-INCH	408.000 LF	.		.	
2440	652.0615 CONDUIT SPECIAL 3-INCH	1,432.000 LF	.		.	
2450	652.0700.S INSTALL CONDUIT INTO EXISTING ITEM	9.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2460	652.0800 CONDUIT LOOP DETECTOR	120.000 LF	.		.	
2470	652.0900 LOOP DETECTOR SLOTS	54.000 LF	.		.	
2480	653.0135 PULL BOXES STEEL 24X36-INCH	12.000 EACH	.		.	
2490	653.0140 PULL BOXES STEEL 24X42-INCH	30.000 EACH	.		.	
2500	653.0222 JUNCTION BOXES 18X12X6-INCH	6.000 EACH	.		.	
2510	653.0905 REMOVING PULL BOXES	13.000 EACH	.		.	
2520	654.0101 CONCRETE BASES TYPE 1	8.000 EACH	.		.	
2530	654.0102 CONCRETE BASES TYPE 2	12.000 EACH	.		.	
2540	654.0105 CONCRETE BASES TYPE 5	19.000 EACH	.		.	
2550	654.0217 CONCRETE CONTROL CABINET BASES TYPE 9 SPECIAL	3.000 EACH	.		.	
2560	655.0108 CABLE IN DUCT 2-8 AWG	300.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2570	655.0128 CABLE IN DUCT 3-8 AWG	814.000 LF	.		.	
2580	655.0230 CABLE TRAFFIC SIGNAL 5-14 AWG	1,904.000 LF	.		.	
2590	655.0240 CABLE TRAFFIC SIGNAL 7-14 AWG	1,944.000 LF	.		.	
2600	655.0260 CABLE TRAFFIC SIGNAL 12-14 AWG	516.000 LF	.		.	
2610	655.0270 CABLE TRAFFIC SIGNAL 15-14 AWG	1,105.000 LF	.		.	
2620	655.0505 ELECTRICAL WIRE TRAFFIC SIGNALS 14 AWG	9,915.000 LF	.		.	
2630	655.0515 ELECTRICAL WIRE TRAFFIC SIGNALS 10 AWG	2,302.000 LF	.		.	
2640	655.0620 ELECTRICAL WIRE LIGHTING 8 AWG	5,619.000 LF	.		.	
2650	655.0625 ELECTRICAL WIRE LIGHTING 6 AWG	180.000 LF	.		.	
2660	655.0630 ELECTRICAL WIRE LIGHTING 4 AWG	548.000 LF	.		.	
2670	655.0640 ELECTRICAL WIRE LIGHTING 1 AWG	274.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2680	655.0700 LOOP DETECTOR LEAD IN CABLE	5,735.000 LF	.		.	
2690	655.0800 LOOP DETECTOR WIRE	440.000 LF	.		.	
2700	655.0900 TRAFFIC SIGNAL EVP DETECTOR CABLE	1,202.000 LF	.		.	
2710	656.0200 ELECTRICAL SERVICE METER BREAKER PEDESTAL (LOCATION) 0001. CB-RM-40-0004	LUMP	LUMP		.	
2720	656.0200 ELECTRICAL SERVICE METER BREAKER PEDESTAL (LOCATION) 0002. CB-CCTV-40-0009	LUMP	LUMP		.	
2730	656.0200 ELECTRICAL SERVICE METER BREAKER PEDESTAL (LOCATION) 3001. IH 94 EB RAMPS & STH 181	LUMP	LUMP		.	
2740	656.0200 ELECTRICAL SERVICE METER BREAKER PEDESTAL (LOCATION) 3002. IH 94 WB RAMPS & STH 181	LUMP	LUMP		.	
2750	656.0400 ELECTRICAL SERVICE MAIN LUGS ONLY METER PEDESTAL (LOCATION) 0001. HL-40-SF	LUMP	LUMP		.	

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			DOLLARS	CTS	DOLLARS	CTS
2760	656.0500 ELECTRICAL SERVICE BREAKER DISCONNECT BOX (LOCATION) 0001. CB-RM-40-0004	LUMP	LUMP			.
2770	656.0500 ELECTRICAL SERVICE BREAKER DISCONNECT BOX (LOCATION) 0002. CB-CCTV-40-0009	LUMP	LUMP			.
2780	657.0100 PEDESTAL BASES	7.000 EACH	.		.	
2790	657.0255 TRANSFORMER BASES BREAKAWAY 11 1/2-INCH BOLT CIRCLE	14.000 EACH	.		.	
2800	657.0305 POLES TYPE 2	6.000 EACH	.		.	
2810	657.0310 POLES TYPE 3	7.000 EACH	.		.	
2820	657.0321 POLES TYPE 5-STEEL	1.000 EACH	.		.	
2830	657.0420 TRAFFIC SIGNAL STANDARDS ALUMINUM 13-FT	1.000 EACH	.		.	
2840	657.0425 TRAFFIC SIGNAL STANDARDS ALUMINUM 15-FT	1.000 EACH	.		.	
2850	657.0430 TRAFFIC SIGNAL STANDARDS ALUMINUM 10-FT	5.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2860	657.0585 TROMBONE ARMS 15-FT	5.000 EACH	.		.	
2870	657.0590 TROMBONE ARMS 20-FT	3.000 EACH	.		.	
2880	657.0595 TROMBONE ARMS 25-FT	3.000 EACH	.		.	
2890	657.0609 LUMINAIRE ARMS SINGLE MEMBER 4-INCH CLAMP 6-FT	7.000 EACH	.		.	
2900	658.0110 TRAFFIC SIGNAL FACE 3-12 INCH VERTICAL	16.000 EACH	.		.	
2910	658.0115 TRAFFIC SIGNAL FACE 4-12 INCH VERTICAL	4.000 EACH	.		.	
2920	658.0215 BACKPLATES SIGNAL FACE 3 SECTION 12-INCH	16.000 EACH	.		.	
2930	658.0220 BACKPLATES SIGNAL FACE 4 SECTION 12-INCH	4.000 EACH	.		.	
2940	658.0416 PEDESTRIAN SIGNAL FACE 16-INCH	12.000 EACH	.		.	
2950	658.0500 PEDESTRIAN PUSH BUTTONS	13.000 EACH	.		.	
2960	658.0600 LED MODULES 12-INCH RED BALL	16.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
2970	658.0605 LED MODULES 12-INCH YELLOW BALL	14.000 EACH	.		.	
2980	658.0610 LED MODULES 12-INCH GREEN BALL	12.000 EACH	.		.	
2990	658.0615 LED MODULES 12-INCH RED ARROW	4.000 EACH	.		.	
3000	658.0620 LED MODULES 12-INCH YELLOW ARROW	10.000 EACH	.		.	
3010	658.0625 LED MODULES 12-INCH GREEN ARROW	8.000 EACH	.		.	
3020	658.0635 LED MODULES PEDESTRIAN COUNTDOWN TIMER 16-INCH	12.000 EACH	.		.	
3030	658.5069 SIGNAL MOUNTING HARDWARE (LOCATION) 3001. IH 94 EB RAMPS & STH 181	LUMP	LUMP		.	
3040	658.5069 SIGNAL MOUNTING HARDWARE (LOCATION) 3002. IH 94 WB RAMPS & STH 181	LUMP	LUMP		.	
3050	659.0802 PLAQUES SEQUENCE IDENTIFICATION	4.000 EACH	.		.	
3060	661.0200 TEMPORARY TRAFFIC SIGNALS FOR INTERSECTIONS (LOCATION) 3001. IH 94 EB RAMPS & STH 181	LUMP	LUMP		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
3070	661.0200 TEMPORARY TRAFFIC SIGNALS FOR INTERSECTIONS (LOCATION) 3002. IH 94 WB RAMPS & STH 181	LUMP	LUMP			.
3080	661.0300 GENERATORS	4.000 DAY	.		.	
3090	670.0100 FIELD SYSTEM INTEGRATOR 0001. FTMS	LUMP	LUMP			.
3100	670.0100 FIELD SYSTEM INTEGRATOR 3002. TRAFFIC SIGNALS	LUMP	LUMP			.
3110	670.0200 ITS DOCUMENTATION 0001. FTMS	LUMP	LUMP			.
3120	670.0200 ITS DOCUMENTATION 3002. TRAFFIC SIGNALS	LUMP	LUMP			.
3130	671.0132 CONDUIT HDPE 3-DUCT 2-INCH	2,595.000 LF	.		.	
3140	671.0232 CONDUIT HDPE DIRECTIONAL BORE 3-DUCT 2-IN	955.000 LF	.		.	
3150	671.0244 CONDUIT HDPE DIRECTIONAL BORE 4-DUCT 4-IN	270.000 LF	.		.	
3160	672.0100 BASE ITS CONTROLLER CABINET	2.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3170	672.0250 BASE CAMERA POLE 50-FT	1.000 EACH	.		.	
3180	673.0105 COMMUNICATION VAULT TYPE 1	8.000 EACH	.		.	
3190	673.0200.S INSTALL ITS FIELD CABINET	2.000 EACH	.		.	
3200	674.0112 CABLE ITS COMMUNICATION 12 PAIR	3,855.000 LF	.		.	
3210	674.0125 CABLE ITS COMMUNICATION 25 PAIR	1,711.000 LF	.		.	
3220	674.0200 CABLE MICROWAVE DETECTOR	1,320.000 LF	.		.	
3230	674.0300 REMOVE CABLE	5,823.000 LF	.		.	
3240	675.0100 INSTALL CONTROLLER RAMP METER PROCESSOR ASSEMBLY	1.000 EACH	.		.	
3250	675.0300 INSTALL MOUNTED CONTROLLER MICROWAVE DETECTOR ASSEMBLY	2.000 EACH	.		.	
3260	675.0400.S INSTALL ETHERNET SWITCH	2.000 EACH	.		.	
3270	676.0300 SIGNAL ASSEMBLY ADVANCE FLASHER TYPE 1	3.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3280	676.9001.S REMOVING ADVANCE FLASHER ASSEMBLIES TYPE 1	2.000 EACH	.		.	
3290	677.0100 INSTALL CAMERA POLE	1.000 EACH	.		.	
3300	677.0200 INSTALL CAMERA ASSEMBLY	1.000 EACH	.		.	
3310	677.0300.S INSTALL VIDEO ENCODER	2.000 EACH	.		.	
3320	677.9051.S REMOVING 50-FOOT CAMERA POLE	1.000 EACH	.		.	
3330	677.9200.S REMOVING CCTV CAMERA	1.000 EACH	.		.	
3340	678.0006 INSTALL FIBER OPTIC CABLE OUTDOOR PLANT 6-CT	380.000 LF	.		.	
3350	678.0036 INSTALL FIBER OPTIC CABLE OUTDOOR PLANT 36-CT	912.000 LF	.		.	
3360	678.0072 INSTALL FIBER OPTIC CABLE OUTDOOR PLANT 72-CT	13,426.000 LF	.		.	
3370	678.0200 FIBER OPTIC SPLICE ENCLOSURE	2.000 EACH	.		.	
3380	678.0300 FIBER OPTIC SPLICE	175.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3390	678.0400 FIBER OPTIC TERMINATION	84.000 EACH	.		.	
3400	678.0500 COMMUNICATION SYSTEM TESTING 0001. FTMS	LUMP	LUMP		.	
3410	678.0500 COMMUNICATION SYSTEM TESTING 3002. TRAFFIC SIGNALS	LUMP	LUMP		.	
3420	690.0150 SAWING ASPHALT	871.000 LF	.		.	
3430	690.0250 SAWING CONCRETE	8,445.000 LF	.		.	
3440	715.0415 INCENTIVE STRENGTH CONCRETE PAVEMENT	1,039.000 DOL	1.00000		1039.00	
3450	715.0502 INCENTIVE STRENGTH CONCRETE STRUCTURES	74,987.000 DOL	1.00000		74987.00	
3460	ASP.1T0A ON-THE-JOB TRAINING APPRENTICE AT \$5.00/HR	800.000 HRS	5.00000		4000.00	
3470	ASP.1T0G ON-THE-JOB TRAINING GRADUATE AT \$5. 00/HR	3,000.000 HRS	5.00000		15000.00	
3480	SPV.0035 SPECIAL 0010. LOADING, HAULING, AND REUSE OF SOLID WASTE SOIL	63,105.000 CY	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3490	SPV.0035 SPECIAL 4000. HPC MASONRY STRUCTURES **P**	1,138.000 CY	.		.	
3500	SPV.0035 SPECIAL 4010. CONCRETE MASONRY SOLDIER PILE FOOTINGS **P**	922.000 CY	.		.	
3510	SPV.0035 SPECIAL 4020. FILTER RIPRAP	400.000 CY	.		.	
3520	SPV.0045 SPECIAL 0010. TEMPORARY CROSSWALK/SIDEWALK	224.000 DAY	.		.	
3530	SPV.0045 SPECIAL 0020. TRUCK MOUNTED ATTENUATOR	200.000 DAY	.		.	
3540	SPV.0055 SPECIAL 0010. LANE RENTAL ASSESSMENT	1.000 DOL	1.00000		1.00	
3550	SPV.0060 SPECIAL 0007. SURFACE SETTLEMENT PLATE EXTENSION	6.000 EACH	.		.	
3560	SPV.0060 SPECIAL 0011. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC ARROWS, TYPE 2 **P**	2.000 EACH	.		.	
3570	SPV.0060 SPECIAL 0013. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC WORDS **P**	2.000 EACH	.		.	
3580	SPV.0060 SPECIAL 0014. TRAFFIC CONTROL CLOSE-OPEN FREEWAY ENTRANCE RAMP	40.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3590	SPV.0060 SPECIAL 0015. TRAFFIC CONTROL CLOSE-OPEN FREEWAY TO FREEWAY SYSTEM RAMP	10.000 EACH	.		.	
3600	SPV.0060 SPECIAL 0016. TRAFFIC CONTROL INTERIM FREEWAY LANE CLOSURE	80.000 EACH	.		.	
3610	SPV.0060 SPECIAL 0017. MOBILIZATION EMERGENCY PAVEMENT REPAIR	6.000 EACH	.		.	
3620	SPV.0060 SPECIAL 0021. REMOVING PILLAR AND FOOTING	2.000 EACH	.		.	
3630	SPV.0060 SPECIAL 0024. BASELINE CPM PROGRESS SCHEDULE	1.000 EACH	.		.	
3640	SPV.0060 SPECIAL 0025. CPM PROGRESS SCHEDULE UPDATES AND ACCEPTED REVISIONS	12.000 EACH	.		.	
3650	SPV.0060 SPECIAL 0035. TRAFFIC CONTROL BARRICADES TYPE III LEFT IN PLACE	4.000 EACH	.		.	
3660	SPV.0060 SPECIAL 0036. TRAFFIC CONTROL WARNING LIGHTS TYPE A LEFT IN PLACE	4.000 EACH	.		.	
3670	SPV.0060 SPECIAL 0038. 24-HOUR BASELINE VIBRATION MONITORING	32.000 EACH	.		.	
3680	SPV.0060 SPECIAL 0039. DAILY VIBRATION MONITORING	16.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3690	SPV.0060 SPECIAL 0040. TEMPORARY BUS PAD	1.000 EACH	.		.	
3700	SPV.0060 SPECIAL 0043. EXPOSING EXISTING UTILITY, UNPAVED AREA	25.000 EACH	.		.	
3710	SPV.0060 SPECIAL 0044. EXPOSING EXISTING UTILITY, PAVED AREA	25.000 EACH	.		.	
3720	SPV.0060 SPECIAL 0045. FIXED MESSAGE SIGN PORTABLE SUPPORT	3.000 EACH	.		.	
3730	SPV.0060 SPECIAL 0050. TRAFFIC CONTROL LOCAL ROAD LANE CLOSURES	25.000 EACH	.		.	
3740	SPV.0060 SPECIAL 1010. LAMP DISPOSAL HIGH INTENSITY DISCHARGE	6.000 EACH	.		.	
3750	SPV.0060 SPECIAL 1020. SALVAGING LIGHT POLES LUMINAIRES AND ARMS	6.000 EACH	.		.	
3760	SPV.0060 SPECIAL 1050. PULL BOXES STEEL 24X36-INCH GROUNDED	3.000 EACH	.		.	
3770	SPV.0060 SPECIAL 1051. PULL BOXES STEEL 24X42-INCH GROUNDED	2.000 EACH	.		.	
3780	SPV.0060 SPECIAL 1090. SALVAGE DISTRIBUTION CENTER	1.000 EACH	.		.	
3790	SPV.0060 SPECIAL 1154. ELECTRIC SERVICE METER BREAKER PEDESTAL LIGHTING	1.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3800	SPV.0060 SPECIAL 2001. INSTALLING TEMPORARY VEHICLE DETECTOR ASSEMBLY	EACH 3.000	.		.	
3810	SPV.0060 SPECIAL 2002. INSTALLING PORTABLE VIDEO SURVEILLANCE SYSTEM	EACH 2.000	.		.	
3820	SPV.0060 SPECIAL 2003. RELOCATING PORTABLE VIDEO SURVEILLANCE SYSTEM	EACH 1.000	.		.	
3830	SPV.0060 SPECIAL 2004. GROUND ROD	EACH 4.000	.		.	
3840	SPV.0060 SPECIAL 2005. REFOCUSING TEMPORARY VEHICLE DETECTOR ASSEMBLY	EACH 6.000	.		.	
3850	SPV.0060 SPECIAL 2006. REMOVING CONTROLLER CABINET	EACH 2.000	.		.	
3860	SPV.0060 SPECIAL 2007. REMOVING CONTROLLER CABINET BASE	EACH 2.000	.		.	
3870	SPV.0060 SPECIAL 2008. REMOVING ELECTRICAL SERVICE METER BREAKER PEDESTAL	EACH 2.000	.		.	
3880	SPV.0060 SPECIAL 2009. REMOVING CONTROLLER RAMP METER PROCESSOR ASSEMBLY	EACH 1.000	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3890	SPV.0060 SPECIAL 2010. SALVAGE HYBRID DYNAMIC MESSAGE SIGN ASSEMBLY	1.000 EACH	.		.	
3900	SPV.0060 SPECIAL 2011. INSTALL SALVAGED HYBRID DYNAMIC MESSAGE SIGN ASSEMBLY	1.000 EACH	.		.	
3910	SPV.0060 SPECIAL 2012. INSTALLING CONDUIT INTO EXISTING MANHOLE	4.000 EACH	.		.	
3920	SPV.0060 SPECIAL 2013. 4-FT DIAMETER MANHOLE TYPE TES	4.000 EACH	.		.	
3930	SPV.0060 SPECIAL 2015. ADJUSTING TES MANHOLE COVER	1.000 EACH	.		.	
3940	SPV.0060 SPECIAL 3001. TRAFFIC SIGNAL INTERCONNECT VAULT	2.000 EACH	.		.	
3950	SPV.0060 SPECIAL 3002. TRAFFIC POLYMER CONCRETE VAULT 13-INCH X 24-INCH X 18-INCH	8.000 EACH	.		.	
3960	SPV.0060 SPECIAL 3003. TRAFFIC POLYMER CONCRETE VAULT 17-INCH X 30-INCH X 18-INCH	10.000 EACH	.		.	
3970	SPV.0060 SPECIAL 3004. INSTALL TRAFFIC CABINET BASE	2.000 EACH	.		.	
3980	SPV.0060 SPECIAL 3005. INSTALL TRAFFIC SIGNAL BASE	8.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
3990	SPV.0060 SPECIAL 3006. CONCRETE BASES TYPE 1 SPREAD FOOTING	1.000 EACH	.		.	
4000	SPV.0060 SPECIAL 3007. CONCRETE BASES TYPE 2 SPREAD FOOTING	2.000 EACH	.		.	
4010	SPV.0060 SPECIAL 4100. ANCHOR ASSEMBLY LIGHT POLES STRUCTURES	2.000 EACH	.		.	
4020	SPV.0060 SPECIAL 4130. TIEBACK ANCHORS	218.000 EACH	.		.	
4030	SPV.0060 SPECIAL 4140. TIEBACK ANCHORS PERFORMANCE TEST	14.000 EACH	.		.	
4040	SPV.0060 SPECIAL 4150. ANCHOR SLAB INLET COVER SPECIAL	2.000 EACH	.		.	
4050	SPV.0060 SPECIAL 5010. ADJUSTING SANITARY SEWER MANHOLES	1.000 EACH	.		.	
4060	SPV.0060 SPECIAL 5020. SANITARY SEWER DROP MANHOLE 48-INCH PRECAST CONCRETE WITH CASTING	1.000 EACH	.		.	
4070	SPV.0060 SPECIAL 5030. SANITARY SEWER MANHOLE 48-INCH PRECAST CONCRETE WITH CASTING	2.000 EACH	.		.	
4080	SPV.0060 SPECIAL 5035. GREYWOLF SANITARY SEWER MANHOLE 48-INCH PRECAST CONCRETE WITH CASTING	5.000 EACH	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4090	SPV.0060 SPECIAL 5040. MMSD SANITARY SEWER MANHOLE 48-INCH PRECAST CONCRETE WITH CASTING	EACH 1.000	.		.	
4100	SPV.0060 SPECIAL 5050. SANITARY MANHOLE VACUUM TEST	EACH 9.000	.		.	
4110	SPV.0060 SPECIAL 5060. ADJUSTING WATER BOXES	EACH 4.000	.		.	
4120	SPV.0060 SPECIAL 5080. ABANDONING SANITARY MANHOLES	EACH 4.000	.		.	
4130	SPV.0060 SPECIAL 5100. EXTEND MMSD MANHOLE	EACH 3.000	.		.	
4140	SPV.0060 SPECIAL 8004. INLET COVERS TYPE 57	EACH 1.000	.		.	
4150	SPV.0060 SPECIAL 8006. INLET COVERS TYPE R - SPECIAL	EACH 1.000	.		.	
4160	SPV.0060 SPECIAL 8007. RECONNECT STORM SEWER LATERALS	EACH 15.000	.		.	
4170	SPV.0060 SPECIAL 8009. COVER PLATES LEFT IN PLACE	EACH 2.000	.		.	
4180	SPV.0060 SPECIAL 8015. PIPE CONNECTION TO EXISTING STRUCTURE	EACH 14.000	.		.	
4190	SPV.0060 SPECIAL 8017. SEDIMENTATION BASIN	EACH 6.000	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4200	SPV.0060 SPECIAL 8050. STORM SEWER STRUCTURE TL219	1.000 EACH	.		.	
4210	SPV.0060 SPECIAL 8051. STORM SEWER STRUCTURE TL220	1.000 EACH	.		.	
4220	SPV.0060 SPECIAL 8052. REMOVING WELDS FROM STORM SEWER COVERS	2.000 EACH	.		.	
4230	SPV.0060 SPECIAL 8061. REMOVE AND CAP EXISTING DRAINAGE STORM SEWER STRUCTURE	8.000 EACH	.		.	
4240	SPV.0060 SPECIAL 8075. WELDING STORM SEWER COVERS	3.000 EACH	.		.	
4250	SPV.0060 SPECIAL 8100. APRON ENDWALLS FOR CULVERT PIPE REINFORCED CONCRETE 96-INCH	2.000 EACH	.		.	
4260	SPV.0085 SPECIAL 0010. SEEDING MIXTURE NATIVE SEED BUTTERFLY MIX	224.000 LB	.		.	
4270	SPV.0085 SPECIAL 4300. BAR STEEL REINFORCEMENT HS STAINLESS BRIDGES	700.000 LB	.		.	
4280	SPV.0090 SPECIAL 0010. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC STOP LINE, 18-INCH **P**	78.000 LF	.		.	
4290	SPV.0090 SPECIAL 0011. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC CROSSWALK, 6-INCH **P**	380.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4300	SPV.0090 SPECIAL 0012. CONCRETE BARRIER TEMPORARY PRECAST LEFT IN PLACE **P**	6,312.500 LF	.		.	
4310	SPV.0090 SPECIAL 0013. REMOVING PAVEMENT MARKINGS WATER BLASTING	817.000 LF	.		.	
4320	SPV.0090 SPECIAL 0014. FENCE TEMPORARY LEFT IN PLACE **P**	2,649.000 LF	.		.	
4330	SPV.0090 SPECIAL 0015. COCONUT FIBER ROLL DELIVERED	372.000 LF	.		.	
4340	SPV.0090 SPECIAL 0016. COCONUT FIBER ROLL INSTALLED	372.000 LF	.		.	
4350	SPV.0090 SPECIAL 0017. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC STOP LINE, 24-INCH **P**	146.000 LF	.		.	
4360	SPV.0090 SPECIAL 0018. PAVEMENT MARKING GROOVED PREFORMED THERMOPLASTIC CROSSWALK, 12-INCH **P**	304.000 LF	.		.	
4370	SPV.0090 SPECIAL 0020. CONCRETE GUTTER SPECIAL	2,049.000 LF	.		.	
4380	SPV.0090 SPECIAL 2001. 4-DUCT CONDUIT CEMENT ENCASED 4-INCH CONDUIT DB-60	1,100.000 LF	.		.	
4390	SPV.0090 SPECIAL 2002. 2-DUCT CONDUIT CEMENT ENCASED 4-INCH CONDUIT DB-60	401.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4400	SPV.0090 SPECIAL 2003. CONDUIT SUBDUCT 1-INCH	3,511.000 LF	.		.	
4410	SPV.0090 SPECIAL 3001. CABLE TYPE UF 2-14 AWG	1,202.000 LF	.		.	
4420	SPV.0090 SPECIAL 4400. FENCE DECORATIVE BRIDGE ***P**	432.000 LF	.		.	
4430	SPV.0090 SPECIAL 4420. FOUNDATION DRILLING ***P**	10,301.000 LF	.		.	
4440	SPV.0090 SPECIAL 4430. PILING SLEEVES	126.000 LF	.		.	
4450	SPV.0090 SPECIAL 4440. CULVERT PIPE REINFORCED CONCRETE CLASS V 120-INCH	656.000 LF	.		.	
4460	SPV.0090 SPECIAL 4450. TUNNELING REINFORCED CONCRETE CLASS V 120-INCH ***P**	696.000 LF	.		.	
4470	SPV.0090 SPECIAL 5010. STEEL CASING WITH DUCTILE IRON 30-INCH CARRIER	216.000 LF	.		.	
4480	SPV.0090 SPECIAL 5015. SANITARY SEWER PRESSURE AND DEFLECTION TESTING	885.000 LF	.		.	
4490	SPV.0090 SPECIAL 5020. STEEL CASING WITH DUCTILE IRON 12-INCH CARRIER	72.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4500	SPV.0090 SPECIAL 5025. GREYWOLF SANITARY SEWER 8-INCH PVC	570.000 LF	.		.	
4510	SPV.0090 SPECIAL 5027. STEEL CASING CONCRETE CAP	90.000 LF	.		.	
4520	SPV.0090 SPECIAL 5030. SANITARY SEWER 8-INCH PVC	130.000 LF	.		.	
4530	SPV.0090 SPECIAL 5033. ABANDONING SANITARY SEWER 8-INCH & 10-INCH	842.000 LF	.		.	
4540	SPV.0090 SPECIAL 5034. ABANDONING SANITARY SEWER 12-INCH	259.000 LF	.		.	
4550	SPV.0090 SPECIAL 5035. ABANDONING SANITARY SEWER 24-INCH	598.000 LF	.		.	
4560	SPV.0090 SPECIAL 5040. DUCTILE IRON WATER MAIN 12-INCH	105.000 LF	.		.	
4570	SPV.0090 SPECIAL 5050. DUCTILE IRON WATER MAIN 16-INCH	9.000 LF	.		.	
4580	SPV.0090 SPECIAL 5060. DUCTILE IRON WATER MAIN 30-INCH	581.000 LF	.		.	
4590	SPV.0090 SPECIAL 5070. STEEL CASING WITH PVC 10-INCH CARRIER	185.000 LF	.		.	
4600	SPV.0090 SPECIAL 5080. SANITARY SEWER AND STEEL CASING REMOVAL	15.000 LF	.		.	

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			DOLLARS	CTS	DOLLARS	CTS
4610	SPV.0090 SPECIAL 8001. PIPE UNDERDRAIN 6-INCH SPECIAL	2,993.000 LF	.		.	
4620	SPV.0090 SPECIAL 8500. STORM SEWER PIPE REINFORCED CONCRETE CLASS III 24-INCH	686.000 LF	.		.	
4630	SPV.0105 SPECIAL 0001. SURVEY PROJECT 1060-33-78	LUMP	LUMP		.	
4640	SPV.0105 SPECIAL 0002. PAVEMENT CLEANUP PROJECT. 1060-33-78	LUMP	LUMP		.	
4650	SPV.0105 SPECIAL 0003. MOVING SIGN BRIDGE CANTILEVERED S-40-133	LUMP	LUMP		.	
4660	SPV.0105 SPECIAL 0010. TEMPORARY UNDERPASS LEFT IN PLACE	LUMP	LUMP		.	
4670	SPV.0105 SPECIAL 0015. CONCRETE PAVEMENT JOINT LAYOUT	LUMP	LUMP		.	
4680	SPV.0105 SPECIAL 1005. MAINTENANCE OF LIGHTING SYSTEM	LUMP	LUMP		.	
4690	SPV.0105 SPECIAL 2001. SAWING CONCRETE-ENCASED DUCT PACKAGE	LUMP	LUMP		.	
4700	SPV.0105 SPECIAL 3001. INSTALL STATE FURNISHED TRAFFIC SIGNAL CABINET IH 94 EB RAMPS & STH 181	LUMP	LUMP		.	

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			DOLLARS	CTS	DOLLARS	CTS
4710	SPV.0105 SPECIAL 3002. INSTALL STATE FURNISHED TRAFFIC SIGNAL CABINET IH 94 WB RAMPS & STH 181	LUMP	LUMP			.
4720	SPV.0105 SPECIAL 3003. TRNSPRT AND INSTALL STATE FURNSHD AUTOSCP VID DET SYS I94 EB RPS & STH 181	LUMP	LUMP			.
4730	SPV.0105 SPECIAL 3004. TRNSPRT AND INSTALL STATE FURNSHD AUTOSCP VID DET SYS I94 WB RPS & STH 181	LUMP	LUMP			.
4740	SPV.0105 SPECIAL 3005. INSTALL STATE FURNISHED EVP DETECTOR HEADS IH 94 EB RAMPS & STH 181	LUMP	LUMP			.
4750	SPV.0105 SPECIAL 3006. INSTALL STATE FURNISHED EVP DETECTOR HEADS IH 94 WB RAMPS & STH 181	LUMP	LUMP			.
4760	SPV.0105 SPECIAL 3007. TEMPORARY EVP SYSTEM IH 94 EB RAMPS & STH 181	LUMP	LUMP			.
4770	SPV.0105 SPECIAL 3008. TEMPORARY EVP SYSTEM IH 94 WB RAMPS & STH 181	LUMP	LUMP			.
4780	SPV.0105 SPECIAL 3009. INSTALL FIBER OPTIC COMMUNICATIONS IN CABINET IH 94 EB RAMPS & STH 181	LUMP	LUMP			.

SCHEDULE OF ITEMS

REVISED:

CONTRACT:
20130813007PROJECT(S):
1060-33-78FEDERAL ID(S):
WISC 2013376

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
4790	SPV.0105 SPECIAL 3010. INSTALL FIBER OPTIC COMMUNICATIONS IN CABINET IH 94 WB RAMPS & STH 181	LUMP	LUMP			.
4800	SPV.0105 SPECIAL 4500. TUNNELING INSTRUMENTATION	LUMP	LUMP			.
4810	SPV.0105 SPECIAL 4510. GALVANIZED STEEL GRATING	LUMP	LUMP			.
4820	SPV.0110 SPECIAL 4600. TIMBER LAGGING **p**	118.600 MBM	.			.
4830	SPV.0165 SPECIAL 0010. TEMPORARY SHORING LEFT IN PLACE	7,295.000 SF	.			.
4840	SPV.0165 SPECIAL 4700. LONGITUDINAL GROOVING BRIDGE DECK **p**	3,870.000 SF	.			.
4850	SPV.0165 SPECIAL 4710. WALL CONCRETE PANEL MECHANICALLY STABILIZED EARTH LRFD/QMP PILOT **p**	6,805.000 SF	.			.
4860	SPV.0165 SPECIAL 4730. TEMP WALL WIRE FACE MECHANICALLY STABILIZED EARTH LRFD/QMP	1,100.000 SF	.			.
4870	SPV.0165 SPECIAL 4740. GEOCOMPOSITE DRAINBOARD	39,537.000 SF	.			.

SCHEDULE OF ITEMS

REVISED:

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
4880	SPV.0165 SPECIAL 4750. PRESTRESSED PRECAST CONCRETE WALL PANEL **P**	SF 1,280.000	.		.	
4890	SPV.0180 SPECIAL 0010. CONCRETE PAVEMENT REPAIR SPECIAL	SY 100.000	.		.	
4900	SPV.0180 SPECIAL 0020. JOINT SEALING **P**	SY 1,634.000	.		.	
4910	SPV.0180 SPECIAL 0030. GEOGRID REINFORCEMENT	SY 692.000	.		.	
4920	SPV.0180 SPECIAL 0040. GEOTEXTILE FABRIC TYPE FF	SY 200.000	.		.	
4930	SPV.0195 SPECIAL 0010. ASPHALTIC PAVEMENT REPAIR SPECIAL	TON 250.000	.		.	
4940	SPV.0195 SPECIAL 0020. COLD PATCH	TON 5.000	.		.	
4950	SPV.0195 SPECIAL 0040. LOADING HAULING AND DISPOSAL OF PETROLEUM CONTAMINATED SOIL	TON 5,107.000	.		.	
	SECTION 0001 TOTAL				.	
	TOTAL BID				.	

PLEASE ATTACH SCHEDULE OF ITEMS HERE