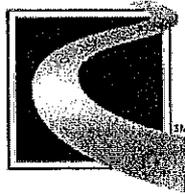


MARYLAND TRANSPORTATION AUTHORITY
Baltimore, Maryland

Invitation for Bids

Baltimore Harbor Tunnel Thruway
Fort McHenry Tunnel
Francis Scott Key Bridge
John F. Kennedy Memorial Highway
Governor Harry W. Nice Memorial Bridge
Thomas J. Hatem Memorial Bridge
William Preston Lane, Jr. Memorial Bridge



Maryland
Transportation
Authority

Contract No. MA 2267-000-002

On-Call Pneumatically Applied Mortar Repairs and Miscellaneous
Modifications

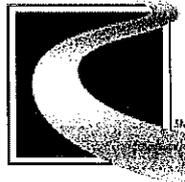
Anne Arundel, Baltimore, Cecil, Charles, Harford, Howard &
Queen Anne's Counties and Baltimore City

May 2009

MARYLAND TRANSPORTATION AUTHORITY
Baltimore, Maryland

Invitation for Bids

Baltimore Harbor Tunnel Thruway
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Anne Arundel, Baltimore, Cecil, Charles, Harford, Howard &
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May 2009



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NOTICE TO BIDDERS

Please review the checklist prior to submitting your bid on this Contract.

- When submitting your completed bid, do not separate the book. Submit the whole book including all addenda acknowledgment pages.
- Make sure that all addenda letters are attached outside of the front cover of the bid book.
- If the addendum has revised the Schedule of Prices, make sure that you have included the revised pages in your bid. Your price should reflect any and all changes.
- Prices must be written numerically and in words, unless approved substitute forms are used (Refer to GP-2.06). Don't leave any items blank.
- When tabulating your final price, make sure all your calculations are correct.
- Minority Business Enterprise Attachments A and B must be completed and submitted with your bid. If either of these attachments is missing your bid is non-responsive. Attachments C and D **should not** be submitted at time of bid.
For additional information on how to complete the MBE Attachments, please see the insert named "Important Information regarding MBE Utilization and Bidding Requirements" located in the IFB.
- The Bid/Proposal Affidavit must be completely filled out and signed by all the parties as indicated.
- If Escrow is being offered in a contract, the contractor must indicate whether or not they wish to utilize an Escrow Account for Retained Funds on the provided form.
- A bid bond must accompany all bids of One Hundred Thousand Dollars (\$100,000.00) or more. The bid bond document must be completely filled out and have an original Power of Attorney form attached.
- If the document is too large for the envelope that we have provided, you can place the document in another form of packaging that can be sealed and submitted. If the document is too large for the bid box, you should alert the receptionist.
- Make sure that your company's name, address, the contract number and the bid date appears on the front of the packaging.
- When submitting bid packages via US Mail, Federal Express, DHL, UPS or any other delivery service it is your responsibility to make sure that the bid reaches the bid box before the time deadline. It may be in your best interest to send the package 24 hours in advance of the deadline. Also, when sending packages this way, make sure that the labeling specifies that it is a bid submission.

Notice to Bidders/Offerors

eMaryland Marketplace

In order to take advantage of Maryland State and Local government contracting opportunities, vendors/contractors are encouraged to register with eMaryland Marketplace. The free registration provides a means for businesses to receive e-mail notification of upcoming contracting opportunities in their specified areas of interest and expertise.

For registration requirements, visit:
www.eMarylandMarketplace.com

IMPORTANT INFORMATION REGARDING MBE UTILIZATION AND BIDDING REQUIREMENTS

The Maryland Transportation Authority (the "Authority") has been forced to reject many recent bids/proposals due to bid submissions that were not in strict compliance with the stipulated MBE rules and regulations. The following checklist has been developed to highlight certain critical components of the MBE program requirements. This listing is not all-inclusive and the bidder **must** comply with all MBE rules and regulations listed throughout this entire proposal book.

Please read all of the instruction provided on Attachment A, B, C & D in its entirety before completing the forms.

Attachment A (Certified MBE Utilization and Fair Solicitation Affidavit) & Attachment B (MBE Participation Schedule) must be included with the submittal of the bid or offer. If the bidder or offeror fails to submit these forms with the bid/offer as required, the Procurement Officer **shall deem the bid non-responsive** or shall determine that the **offer is not reasonably susceptible** of being selected for award. MBE Prime Contractors must achieve the established MBE goal with other certified MBE contractors. A Prime MBE Contractor **can not** count itself as an MBE to obtain the goal.

ATTACHMENT A

When filling out Attachment A, make sure you complete the following:

- If the Prime Contractor can achieve the established overall goal and sub goals, you must check the appropriate box.
- If after making good faith efforts, you determine you can not achieve the established overall goal or subgoals, you must request a waiver by checking the appropriate box.
- If you do not request the waiver at time of bid and you **are not** meeting the established goal(s), your bid/offer will be considered **non-responsive or not reasonably susceptible of being selected for award.**
- Attachment A must be signed and dated.

ATTACHMENT B Part 2

When filling out Attachment B, make sure you have included the following:

- Prime Contractor's name, address and phone number.
- Project description.
- Project number/Solicitation Number.
- List the minority firm name(Column 1), certification number and MBE Classification (Column 2), Total sub contract dollar amount (Column 3) and NAICS Codes of the services to be performed or products to be supplied (Column 4)
- Clarify for each sub-contractor if it will provide services, is a supplier or will supply and install (Column 5)
- It is the Contractor's responsibility to ensure that the proposed subcontractors are certified to perform the proposed work. All Contractors are to submit an approvable MBE plan at time of bid. Approvable means, the subcontractors are certified in the applicable NAICS Codes through MDOT and can perform the proposed services for the required participation goal. Contractors pending MBE certification at time of bid are **not** eligible for participation. If you submit a firm that is not certified to perform the proposed services and your contract falls short of the established MBE goal, your firm will be considered **non-responsive or not reasonably susceptible of being selected for award.**
- Prime Contractors are strongly encouraged to check the MDOT database at www.mbe.mdot.state.md.us to see if the subcontractor is certified to perform the services and to make sure the subcontractor has not graduated from the listed NAICS codes. If you have questions after checking the data base, you may contact the Authority MBE Office at 410-537-1048 for further assistance.

If you are using a supplier, the 60% rule applies. Please refer to the MBE Manual for the description of the 60% rule.

Please provide details on how you arrived at the 60% on Attachment B (Column 5) (i.e. - \$150,000.00 X 60% = \$90,000.00).

- If you are requesting a third tier relationship, you must state that request on the Attachment B form (Column 1). Please note: Third Tier MBE/DBE subcontracting will be approved by the Authority only when the Authority is satisfied that there is no way except by Third Tier contracting that an MBE/DBE goal can be achieved. Specifics as to why a Third Tier contracting agreement must be included.

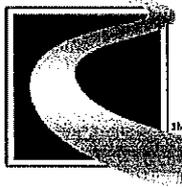
- Attachment B must be signed and dated.
- If you are the apparent low bidder, you will receive a letter from the Authority requesting your MBE Attachment C (Outreach Efforts Compliance Statement) and Attachment D (Subcontractor Project Participation Affidavit). You will have ten (10) working days to submit the attachments to the Authority. If you requested a waiver at time of bid, all of the back up documentation that complies with COMAR 21.11.03.11, must be submitted within the ten working days with Attachments C & D.
- If the apparent low bidder fails to return the required documentation within the allotted ten (10) days, the Procurement Officer may determine that the apparent low bidder is not responsible and therefore not eligible for contract award.



MARYLAND TRANSPORTATION AUTHORITY
Baltimore, Maryland

Invitation for Bids

Baltimore Harbor Tunnel Thruway
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Maryland
Transportation
Authority

Contract No. MA 2267-000-002

On-Call Pneumatically Applied Mortar Repairs and Miscellaneous
Modifications

Anne Arundel, Baltimore, Cecil, Charles, Harford, Howard &
Queen Anne's Counties and Baltimore City

May 2009

NOTICE TO BIDDERS

A "Pre-Bidding Session" for the purpose of answering or obtaining answers to questions of parties interested in constructing the work relative to Right-of-Way, Utilities, Design, and Construction Details will be conducted at 10:30 am on May 28, 2009, in the FSK Administrative Conference Room, at 303 Authority Drive in Dundalk, Maryland. While attendance at the Pre-Bid conference is not mandatory, this is the offerer's opportunity to raise questions and/or issues of concern regarding the Project.



NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

**NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)
REPORT 350 IMPLEMENTATION SCHEDULE FOR DEVICES USED IN THE
MAINTENANCE OF TRAFFIC**

Except as otherwise specified in this Section, all items for the maintenance of traffic, including those listed under the following categories, shall be crashworthy in conformance with Level 3 or other Level as specified by the Engineer in conformance with the safety crash testing and performance criteria published in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features." When conformance with NCHRP Report 350 is required, the Contractor shall provide the Engineer with the manufacturers' certifications that the devices comply with the specified criteria.

Unless specifically waived by an attachment to these Contract Provisions, devices must be approved by the Office of Traffic and Safety.

Category 1 Devices

These devices are cones, tubular markers, flexible delineator posts, and drums, all without any accessories or attachments, which are used for channelization and delineation.

Category 2 Devices

These devices are Type I, II, and III barricades; portable sign supports with signs; intrusion alarms; and drums, vertical panels, and cones, all with accessories or attachments.

Category 3 Devices

- (a) Truck Mounted Attenuators (TMAs).
- (b) Temporary Barrier.
 - (1) Concrete Barrier.
 - (2) Traffic Barrier W Beam and Water Filled Barrier.
- (c) Temporary End Treatments.

Category 4 Devices

These devices are area lighting supports, arrow panels, and portable variable message signs that are usually portable or trailer-mounted.

**CONTRACT PROVISIONS
(NCHRP) REPORT 350 IMPLEMENTATION SCHEDULE**

CONTRACT NO. MA 2267-000-002
2 of 2

WORK ZONE DEVICES	IMPLEMENTATION SCHEDULE TO CONFORM TO NCHRP REPORT 350 CRITERIA
CATEGORY 1 Cones, tubular markers, flexible delineator posts, and drums (all without any accessories or attachments)	All devices shall conform to NCHRP Report 350 criteria.
CATEGORY 2 Type I, II, and III barricades; portable signs supports with signs; intrusion alarms; and drums, vertical panels, and cones (all with accessories or attachments)	All devices shall conform to NCHRP Report 350 criteria.
CATEGORY 3 (a) Truck Mounted Attenuators (TMA) (b) Temporary Barriers (1) Concrete Barrier (2) Traffic Barrier W Beam and Water Filled Barrier (c) Temporary End Treatments	All devices shall conform to NCHRP Report 350 criteria.
CATEGORY 4 Portable trailer mounted devices including area lighting supports, arrow panels, and changeable message signs	The Contractor may use devices that do not conform to NCHRP Report 350 criteria, until compliance dates are established. Use of these devices shall comply with the provisions of Part 6 of the MUTCD.



NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

HIGH VISIBILITY SAFETY APPAREL POLICY

BACKGROUND. Research indicates that high visibility garments have a significant impact on the safety of employees who work on highways and rights-of-way. In addition, high visibility garments may help to prevent injuries and accidents and to make highway workers more visible to the motoring public, which ultimately improves traffic safety.

STATEMENT OF POLICY.

- (a) The High Visibility Safety Apparel Policy provides a standardized apparel program.
- (b) The program seeks to improve the visibility of all persons who work on Administration highways and rights-of-way.
- (c) All apparel shall contain the appropriate class identification label.
- (d) Compliance with this policy is retroactive and becomes effective immediately. All affected employees shall receive high visibility apparel awareness training.

APPLICABILITY. This policy applies to all Administration employees and all other persons who work on Administration highways and rights-of-way. All workers shall wear, at a minimum, Class 2 ANSI/ISEA 107/2004 apparel.

- (a) For Administration employees, this apparel shall have a fluorescent yellow-green background material color and be the outermost garment worn.
- (b) Retro-reflective material color for Administration employee apparel shall be silver or white and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment. The retro-reflective material may be contrasted by fluorescent orange background material not exceeding one and one half inches on either side of the retro-reflective material.
- (c) For non-Administration employees, this apparel shall be either fluorescent orange-red or fluorescent yellow-green background material color and be the outermost garment worn.
- (d) Retro-reflective material color for non-Administration employee apparel shall either be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment.



CONTRACT PROVISIONS
HIGH VISIBILITY SAFETY APPAREL POLICY

CONTRACT NO. MA 2267-000-002
2 of 2

REFERENCES.

- (a) ANSI/ISEA 107/2004 standard – American National Safety Institute/International Safety Equipment Association
- (b) MUTCD 2003 – Manual for Uniform Traffic Control Devices - Sections 6D.03B and 6E.02
- (c) Visibility Research – The VCTR 1989 report concludes that fluorescent colors, when compared with non-fluorescent colors, enhance the daytime conspicuity of worker clothing.

DEFINITIONS.

- (a) Apparel – The outermost high-visibility garment worn by employees who work on Administration highways and rights-of-way.
- (b) Highways – All roads owned by the Maryland Department of Transportation and maintained by the Administration.
- (c) High Visibility – The ability for workers to be distinguishable as human forms to be seen, day and night, at distances that allow equipment operators and motorists to see, recognize, and respond.



CONTRACT PROVISIONS
OCCUPYING WETLANDS

CONTRACT NO. MA 2267-000-002
1 of 1

OCCUPYING WETLANDS

The Contractor is hereby alerted to the importance of preserving wetland areas. The Administration, in conjunction with the various environmental agencies, has developed these Contract Documents so as to minimize or eliminate disturbance and damage to existing wetland areas. In order to accomplish this, the following must be rigidly adhered to:

- (a) Prior to performing any work on the project, the areas of wetland will be identified and marked as directed by the Administration. All personnel of the Contractor or sub-contractors shall be alerted to these designated areas.
- (b) The Contractor or sub-contractors shall not impact any wetland or waterway, whether it be permanently or temporarily unless otherwise stipulated in the permit application and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without a permit.
- (c) If a Contractor or sub-contractor has to impact a wetland or waterway that is not covered by an existing wetland permit, they shall immediately notify the Engineer. The Engineer will notify the Environmental Programs Division to determine the extent of any permit modification. At that time the Environmental Programs Division will request a permit modification or submit a permit application.
- (d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for restoring the wetland areas and possibly mitigating the wetland impacts to the full satisfaction of the environmental agencies, which could include monetary compensation.
- (e) The cost of restoration and mitigation of the impacted areas shall be at no additional cost to the Administration.

The importance of not abusing the wetland areas cannot be overemphasized. Abuse of wetland areas could jeopardize the operation of the total Contract and could be cause for a shut-down. If a shut-down occurs because of the Contractor's failure to secure the required permits (i.e. the Contractor's method of work includes impacts not approved by previously acquired permits), the Contractor's negligence or operations, all costs and damages to the Contractor and to the State will be at no additional cost to the Administration. Noncompliance with these requirements will not be considered for an extension of Contract time.



Maryland
Transportation
Authority

SPECIAL PROVISIONS

CONTRACT NO. MA 2267-000-002

Page 1 of 14

SP 1-1 PROJECT DESCRIPTION

CONTRACT NO.: MA 2267-000-002

TITLE: On-Call Pneumatically Applied Mortar Repairs and Miscellaneous Modifications

FACILITY: Baltimore Harbor Tunnel Thruway, Fort McHenry Tunnel, Thomas J. Hatem Memorial Bridge, Francis Scott Key Bridge, John F. Kennedy Memorial Highway, William Preston Lane Jr. Memorial Bridge, Governor Harry W. Nice Memorial Bridge

COUNTY: Anne Arundel, Baltimore, Cecil, Charles, Harford, Howard, Queen Anne's Counties and Baltimore City

ADVERTISED: **May 12, 2009**

PRE-BID MEETING: **May 28, 2009 at 10:30 a.m.** in the Conference Room at the Maryland Transportation Authority, 303 Authority Drive, FSK Administration Conference Room, Baltimore, MD 21222.

PROJECT CONTACT: Project Manager: Mr. Abey Tamrat at (410) 537-7822
Contract Administration: Ms. Maggie Johnson at (410) 537-7807

BIDS DUE: **12 Noon, June 18, 2009**, in the Bid Box on the 1st floor of the Maryland Transportation Authority, Engineering/Finance Building, 300 Authority Drive, Baltimore, MD 21222.

CLASSIFICATION: Class - F (\$5,000,001 to \$10,000,000)

CONTRACT TIME: One Thousand Four Hundred Forty (1440) Calendar Days

LIQUIDATED DAMAGES: N/A

MINIMUM MBE GOALS: Overall 26%
No Subgoals

BID DOCUMENTS: **\$25.00** Bid documents can be purchased between 7:30 a.m. and 3:30 p.m., Mondays, Wednesdays, Thursdays and Fridays and between 10:00 a.m. and 4:00 p.m. on Tuesdays at the Ticket Office located at the Francis Scott Key Bridge, Maryland Transportation Authority, Administration Building, 303 Authority Drive, Baltimore, MD 21222.



The work to be performed under this Contract is located in the following Maryland Transportation Authority ("Authority") facilities:

- a) John F. Kennedy Memorial Highway (I-95 in Harford, Cecil and Baltimore Counties);
- b) Thomas J. Hatem Memorial Bridge (U.S. 40 in Harford and Cecil Counties);
- c) Fort McHenry Tunnel (I-95 and I-395 in Baltimore City);
- d) Baltimore Harbor Tunnel Thruway (I-895 in Baltimore City and Baltimore, Anne Arundel and Howard Counties);
- e) Francis Scott Key Bridge Facility (I-695 in Baltimore City and Baltimore and Anne Arundel County);
- f) William Preston Lane Jr. Memorial Bridge (Anne Arundel and Queen Annes Counties);
- g) Governor Harry W. Nice Memorial Bridge (Charles County); and
- h) The Authority's Point Breeze Property.

The scope of work includes removing deteriorated concrete, furnish, and pneumatically applying Micro Silica, Fiber Reinforced Shotcrete mortar on concrete surfaces and miscellaneous concrete structural repairs (cast-in-place, trowel grade mortar, non shrink grout repairs etc.) as directed by the Engineer. The work may include but is not limited to the following:

- a) Concrete repairs to piers, pier caps, abutments, bridge decks
- b) Jacking bridge steel beams under traffic load and repairing concrete pedestals
- c) Repair damaged concrete toll islands
- d) Provide Maintenance of Traffic that is required for concrete repairs
- e) Concrete repair of signs & high mast light pole foundations
- f) Crack repairs in concrete by pressure injecting epoxy

The Engineer will provide a list and priority of projects to the Contractor on a monthly basis. Within two (2) weeks of the assignment, the Contractor shall supply the following information:

- a) The estimated time to receive all materials;
- b) The estimated number of work days to complete the project; and
- c) If requested by the Engineer, a lump sum cost proposal or a cost proposal based on a list of items supplied by the Engineer, which will include all labor, materials, equipment, and Subcontractors required to complete the project.

If an agreement on prices for projects that the Engineer has requested a cost proposal cannot be reached, the work will be performed by time and materials per TC 7.03 of the Standard Specifications.



The Contractor shall furnish to the Engineer the names, addresses, phone numbers, pager numbers, etc. of at least two individuals who can be contacted by the Engineer and who are authorized to provide construction services in the event of an emergency as determined by the Engineer. One of these individuals shall be available at all times to be contacted within a maximum time period of two (2) hours.

The Authority reserves the right to terminate the Contract for any reason, including its own convenience, by giving prior written notice to the Contractor. Work shall be performed as directed by the Engineer and may not be on a continual basis.

SP 1-2 SPECIFICATIONS

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "Standard Specifications for Construction and Materials" dated July 2008, revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

SP 1-3 ORIGINAL FACILITY PLANS AND SITE VISITS

The original facility plans are on file at the Engineering/Finance Building of the Francis Scott Key Bridge and will be made available for inspection to prospective bidders. Parties interested in viewing the plans should contact Mr. Abey Tamrat at (410) 537-7822. Parties interested in visiting the site should contact the following:

- a) John F. Kennedy Memorial Highway and Thomas J. Hatem Memorial Bridge – Mr. George Fish at (410)-537-1104.
- b) Fort McHenry Tunnel - Mr. Mike Darago at (410)-537-1269.
- c) Baltimore Harbor Tunnel Thruway - Mr. John Monk at (410)-537-1315.
- d) Francis Scott Key Bridge – Mr. Charles Raycob at (410)-537-7513.
- e) Wm. Preston Lane Jr. Memorial Bridge, Mr. Don Watts at (410)-537-6651.
- f) Governor Harry W. Nice Memorial Bridge - Mr. Gary Jackson at (301)-259-4870.

SP 1-4 - PROMPT PAYMENT TO SUBCONTRACTORS

The prime Contractor is responsible for making timely payments to all Subcontractors and Suppliers and provide written certification as required in Section 17-106 of the State Finance and Procurement Article of the Annotated Code of Maryland, as amended.

This contract requires the Contractor to make payment to all Subcontractors within ten (10) days of receiving payment from the Maryland Transportation Authority ("Authority").

Each month, the construction Project Engineer will review the current pay items with the prime Contractor and all involved Subcontractors to ensure that all work satisfactorily completed within specifications is included in the monthly progress payment. For



payment purposes, the same quantity totals used to compute the payment to the prime Contractor will be the basis for payment to the Subcontractor.

If the Subcontractor does not receive payment within the required ten (10) days, the Subcontractor shall notify the Project Engineer in writing of the amount in dispute including the item numbers and payment quantity for each. The Project Engineer will then notify the Director of Construction of the dispute. The Director of Construction or his representative will verbally contact the prime Contractor within 48 hours to ascertain whether or not a performance dispute exists which necessitates non-payment to the Subcontractor. If a performance dispute exists, the prime Contractor must demonstrate that there is a valid basis to withhold payment from the Subcontractor. If the prime Contractor withholds payment from a Subcontractor, the prime Contractor shall provide to the Subcontractor written notice of the withholding of payment. The notice shall detail the reasons for withholding payment as well as the amount. A copy of the notice shall be provided to the Surety and the Authority. If no valid dispute exists, the prime Contractor will be directed to make immediate payment to the Subcontractor. The Subcontractor will be responsible for notifying the Director of Construction if this payment is not made. Upon receipt of notification, the Director of Construction will schedule a meeting with the Contractor and Subcontractor to verify and discuss the non-payment issue. This meeting will be held at the Authority's offices within two (2) working days of the Authority's contact with the subcontractor. If it is determined that the prime Contractor has withheld payment to the Subcontractor without cause, further progress payments to the prime Contractor will be withheld until the Subcontractor is paid. In addition, the Authority may order a suspension of work or other administrative actions as it sees fit.

If an action is taken as stated above the Contractor shall notify the Authority's Project Engineer when payment is made. After the Authority's Project Engineer verifies that payment has been made to the Subcontractor the Authority shall release withheld progress payments.

Nothing in this Special Provision shall be construed to prevent the Subcontractor from pursuing a claim with the surety under the prime Contractor's payment bond at any time.

SP 1-5 WORK HOURS

Refer to Section 104 "Maintenance of Traffic" and contract plans for lane and shoulder closures.

The Contractor shall cooperate with any other Contractors that are on site during the term of the project, as stated in GP-5.06 of the Standard Specifications. If the Contractor is directed to move off a bridge/work site once its operations have begun because of unforeseen event, it will be compensated in accordance with the specifications.



Except for maintenance of traffic restrictions shown in Section 104, the Contractor will be permitted to work twenty-four (24) hours a day, seven (7) days a week. However, no lane or bridge closures will be permitted during high winds (greater than 25 mph), rain, snow or other precipitation events when water, ice or snow is on the roadway or when there is the potential for fog, as determined by the Authority. Night time construction noise shall not be allowed unless directed by the Engineer.

SP 1-6 INSURANCE

TC-5.01 INSURANCE

Section TC 5.01 of the Standard Specifications is supplemented as follows:

1. The Contractor shall not commence work under this contract until he has obtained all of the minimum amounts of insurance required by these Special Provisions and the insurance has been approved by the Engineer. The Contractor shall furnish to the Maryland Transportation Authority ("Authority") duly executed certification of all required insurance on forms satisfactory to the Authority. The certificates of insurance shall state that it is in force and cannot be cancelled, release or non-renewed except upon thirty (30) days prior written notice, registered mail to the Authority. All Contractors' insurance policies, with the exception of the Worker's Compensation and Employer's Liability, shall be endorsed to provide as additional insureds the Maryland Transportation Authority and the State of Maryland.
2. The Contractor shall purchase and maintain such insurance as is specified herein which will provide the Authority, its members, employees and agents, as well as the Contractor from claims which may arise out of or as a result of the Contractor's operations under this contract, whether such operations be by the Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them or by anyone whose acts any of them may be liable. This insurance shall be maintained in full force until the Contract has been accepted by the Authority and final payment is made.
3. The Authority requires the following minimum levels of insurance coverage for this contract:

a) Worker's Compensation and Employer's Liability

The Contractor shall, at all times, maintain and keep in force such insurance as will protect him from claims under the Worker's Compensation Act of the State of Maryland and maintain and keep Employer's Liability Insurance at a limit of One Hundred Thousand Dollars (\$100,000.00). The Contractor shall also maintain United States Long Shore and Harbors Act coverage, if such exposure exists.

b) Comprehensive General Liability Insurance



The Contractor shall maintain Comprehensive General Liability Insurance in the amount of at least One Million Dollars (\$1,000,000.00) Combined Single Limit for Bodily Injury Liability and Property Damage Liability Insurance per occurrence and in the aggregate. Such insurance shall specifically include the Comprehensive General

Liability Broad Form Endorsement and indicate explosion, collapse, and underground damage coverage.

c) Comprehensive Automobile Liability Insurance

The Contractor shall maintain Comprehensive Automobile Liability Insurance (including all automotive equipment owned, operated, rented, or leased), in the amount of at least Five Hundred Thousand (\$500,000.00) Combined Single Limit for bodily injury and property damage.

d) Additional Insurance

The Contractor shall also procure and keep in effect:

Excess liability (umbrella coverage) in excess of and applicable to the coverage in the Comprehensive General Public Liability and Property Damage Insurance, "X, C, U" and Comprehensive Automobile Insurance in the amount of at least Two Million Dollars (\$2,000,000.00) for each occurrence.

4. Accident Notification - The Contractor shall send a written report to the Engineer and to the Maryland transportation Authority within twenty-four (24) hours of any accident or other event arising in any manner from the performance of the contract which results in or might result in personal injury or property damage.
5. Failure to comply with these Special Provisions may lead to termination for default or convenience.
6. There will be no special payment for the insurance as required by this contract and all costs incidental thereto shall be included in the Lump Sum for "Mobilization", (refer to Section 108), or if the Contract does not include such an item, the insurance costs are to be included in pay items for the Proposal.

**SP 1-7 MINORITY BUSINESS ENTERPRISE REGULATIONS GOVERNING
CONSTRUCTION CONTRACTS IN EXCESS OF \$50,000
EFFECTIVE JULY 1, 2001**

See applicable sections of this Invitation for Proposal Book for details.

SP 1-8 PROGRESS SCHEDULE REQUIREMENTS



Refer to Section 110 of the Standard Specifications.

SP 1-9 CORPORATE REGISTRATION

A foreign corporation is any corporation not incorporated under the Laws of the State of Maryland. All foreign corporations, prior to performing any services for the Authority, must register with the Maryland State Department of Assessment and Taxation in compliance with Subtitle 2, Title 7, of the Corporations and Associations Article of the Annotated Code of Maryland. Compliance is required of the successful vendor as well as the proposed subcontractors.

To accomplish the required registration, a foreign corporation must request and complete "Qualification Application Forms" which can be obtained from the Department of Assessment and Taxation, State Office Building, Room 803, 301 West Preston Street, Baltimore, Maryland 21201. Forms can be obtained via the Maryland Department of Assessments and Taxation website at www.dat.state.md.us.

The Contractor will be responsible for documenting compliance with the aforesaid. This documentation will be required prior to the execution of a contract with the successful bidder.

SP 1-10 CONTRACTOR'S EMPLOYEE IDENTIFICATION

The Contractor shall provide to the Authority, a list containing the following for Contractor and all sub-contractors that would be working at the site prior to start of work. This shall include trucking companies who would come to the site on a repetitive basis for supply or to remove materials:

Name of Company
Name and title of contact person
Address of the Company
Phone Number
Facsimile number
E-Mail address of contact person (if any)

All Contractor's employees, including employees of subcontractors, on this project, present at the site, shall be in possession of a valid employee identification card provided by the Employer, which shall contain a photograph and identify the employee by name and job title. The employee must produce the said identification if required by the Engineer or the Authority Police.

When working in or around the Authority's buildings, said employees identification shall be displayed at all times.



While working on the transportation facility projects of the Authority, Contractor's personnel shall have an ID decal displayed on their hardhat. These decals will be provided by the Authority. All Contractor's vehicles shall have a parking decal, attached to the rear view mirror. These parking decals will also be provided by the Authority and a distribution list will be maintained. At the time of project completion these decals shall be returned to the Authority. Requests for hardhat and rearview mirror decals shall be made to the Construction Section before the beginning of construction and should include the number required of each type of decal.

All costs associated with identification cards will not be paid for separately and shall be incorporated under other items of payment in the Contract.

SP 1-11 MAINTENANCE OF RAILROAD TRAFFIC

For purpose of these Special Provisions, Amtrak, CSX Transportation, Inc., and Norfolk Southern Corporation will hereinafter be referred to as the "Railroad". Refer to GP-1.03 of the Standard Specifications for the definition of the "Engineer".

A. Railroad Traffic

The following requirements will apply to work performed in or near Railroad property.

B. Rules, Regulations, Etc.

Railroad traffic shall be maintained at all times with safety and continuity within the limitations stated below, and the Contractor shall conduct all operations on, over, and adjacent to the Railroad's property fully within the rules, regulations, and requirements of the Railroad. The Contractor shall be responsible for acquainting itself with such requirements as the Railroad may demand.

Before proceeding with any construction work on, over, or adjacent to the Railroad's property, the Contractor shall submit plans and a detailed description of the method of procedure which will be followed for work in these areas for the approval of the Engineer and the Railroad; however, such approval shall not serve in any way to relieve the Contractor's responsibility for the adequacy and safety of the method of procedure.

Since the work in the field will not be permitted to proceed until the plans and method of procedure have been approved by the Engineer and the Railroad, it shall be the responsibility of the Contractor to submit its plans and method of procedure promptly so that unnecessary delays in construction operations will be avoided.

The Contractor shall be required to submit to the Railroad a written safety program prepared by the Contractor for the education and protection of its employees.



This program shall address the hazards and safety considerations in working in the vicinity of the Railroad's property and operation.

No work shall be performed on these portions of the project until such times as all insurance policies, and other requirements of the Railroad have been complied with and their approval, in writing, has been obtained by the Engineer.

The proper official of the railroad to be contacted is as follows:

AMTRAK

Mr. Earl Watson III
Director I&C Projects
30th Street, Station
Third Floor Tower, Box 64
Philadelphia, P.A. 19104
(215) 349-1393

Norfolk Southern Corporation

Mr. T. David Wyatt
System Engineering Public Improvements
Norfolk Southern Corporation
1200 Peachtree Street, N.E.
Atlanta, GA 30309
(404)529-1641

CSX Transportation, Inc.

Mr. Carl Roe, Jr., P.E.
Principal Engineer
Public Improvements
500 Water Street, 13th Floor, J-301
Jacksonville, FL 32202
(904)359-1036

Except in emergencies, contact shall be made with the above specified officials.

All construction performed on, under, adjacent to, or over Railroad property will be subject to the inspection and approval of the Railroad.

At least ten (10) days advance notice shall be given, through the Engineer, to the Railroad, prior to entering upon or commencing any work on Railroad property.



Scheduling of the Contractor's operations that may affect the Railroad shall be coordinated through the Railroad. Scheduling or permission to occupy the track shall be made through the appropriate Yardmaster, in addition to the above specified officials.

All work herein provided to be done on, over, and adjacent to the Railroad's property shall be performed by the Contractor in a manner satisfactory to the Railroad, and shall be performed at such times, and in such a manner, as not to interfere with the movements of trains or traffic upon the tracks of the Railroad. The Contractor shall use all reasonable care and precaution in order to avoid accidents, damage, delay, or interference with the Railroad's trains or other property.

The Contractor shall consult the Railroad in order to determine the type of protection to ensure safety and continuity of Railroad traffic incident to the particular methods of operation and equipment to be used on the work.

The Railroad will furnish such qualified flaggers, signalmen, or protection men other than crossing watchmen, as may be required, to insure complete protection of train operations and Railroad facilities. The need for this type of service will be determined on the basis of Railroad regulations and the Contractor's approved construction schedule. No work shall proceed without proper protection on the site. The providing of watchmen and guards, or any other precautionary and protective services by the Railroad, shall not relieve the Contractor from liability for payment of damages caused by or in consequence of the Contractor's operations.

All expenses incurred in connection with protection of Railroad facilities by Railroad employees will be borne by the Maryland Transportation Authority. Billings for such services or expense will be made directly to the Maryland Transportation Authority by the Railroad.

It shall be expressly understood that this Contract includes no work for which the Railroad is to be billed by the Contractor, and it shall be further understood that the Contractor is not to bill the Railroad for any work which it may perform, unless the Railroad gives written permission that such work be performed at the Railroad's expense.

Any work performed by the Railroad at the Contractor's request, other than protective services and work specifically designated in these Special Provisions, shall be paid for by the Contractor immediately upon presentation of the bills by the Railroad.

Final settlement by the Maryland Transportation Authority with the Contractor shall be contingent upon: (a) the Contractor showing proof that the Railroad's property has been cleared of all machinery, equipment, surplus materials, false work, rubbish, temporary buildings, and other property in a condition satisfactory to the Railroad; and (b) the Contractor showing proof that no bills are owed by the Contractor to the Railroad in connection with the work performed on this project.



The Contractor shall secure permission from the Railroad, in writing, for the erection of any temporary structures, scaffolding, rigging on, over, or adjacent to the Railroad's property. Forms for concrete, false work, and bracing on, over the Railroad's property shall be approved by the Railroad with respect to any reduction of existing clearance. All work on or over the Railroad's property shall be approved by the Railroad with respect to any reduction of existing clearance. All work on or over the Railroad's property shall be performed under the supervision of both the Engineer and the Railroad.

Approved minimum temporary construction clearances from Railroad tracks are 22.00 ft. vertical from top of rail and 18.00 ft. horizontal from track centerline. Approval for clearances less than noted must be obtained by the Contractor through the Engineer from the Railroad and from the regulatory agency having jurisdiction over Railroad clearances in the State of Maryland before beginning any work involving such clearances.

The Contractor shall be held responsible to see that his employees enter upon Railroad or other property through points of access designated by the property owner. Operations within these properties shall be confined to the rights-of-way as shown on the drawings and as designated by the Engineer.

Should the Contractor require a temporary grade crossing of Railroad tracks, the Contractor shall be required to apply for and execute the standard private grade crossing agreement for each crossing required. Application for the crossing shall be made to the Railroad at least six weeks before the crossing is required. A letter size plan showing location and size of crossing should accompany the letter of application. The letter should state the purpose for which the crossing is needed and the expected life of the crossing. The Contractor shall pay all construction, maintenance, removal, protection, and other costs. The roadbed shall be restored to its original condition.

The Contractor shall conduct its operations both on and off Railroad right-of-way so that no earth, mud, silt, or other foreign matter will be deposited on Railroad ballast or cause flooding or saturation of subgrade. In order to accomplish this, it may be necessary for the Contractor to construct temporary drainage facilities, temporary sheeting or take other precautionary action, such as nailing canvas or other similar materials to the ties to cover the ballast. The protective measures shall be performed by the Contractor at the Contractor's own expense in a manner satisfactory to the Railroad.

However, in addition to the aforementioned protective measures, if the Railroad track ballast does become fouled due to the Contractor's operations, the Railroad, with its own forces, will remove the fouled ballast and replace it with clean ballast. The charges for this work will be billed against the Contractor by the Railroad.



The Contractor shall furnish and maintain during all construction work, such watchmen, lights, barricades, fences, and other appropriate protection as, in the opinion of the Railroad, shall be necessary for the protection of all persons having access to property and facilities of the Railroad.

Every bidder is required to ascertain from the Railroad its rules, regulations, and requirements and what, if any, delays that it shall be subjected to, or scheduled days when work would be permitted, in connection with the supporting of tracks, and in connection with other Railroad operations, and every bidder will be assumed to have included in its bid price, all costs and expenses and all risks of loss and damage to it, due to such delays, rules, regulations, and requirements.

Should any damage occur to Railroad property as a result of the Contractor's operations, the Railroad may repair such damage and perform any work for protection of its property it may deem necessary and the actual cost for such work shall be borne by the Contractor.

The Contractor will not be permitted to use Railroad personnel for the Contractor's purposes when such personnel are required at the immediate site of project construction by the Railroad solely for the safe operations of the Railroad.

Any approvals given by the Railroad will not be considered as a release from responsibility for any damage to the Railroad by the acts of the Contractor, its subcontractors, or those of the Contractor's or subcontractor's employees.

C. Shop and Working Drawings for Railroad Approval

Where the Contract Drawings or Specifications require that shop and/or working drawings are to be submitted for Railroad review and approval, such submission shall be as required above and modified herein.

Six (6) copies of shop and/or working drawings shall be submitted through the Engineer to the Railroad at least sixty (60) calendar days in advance of them being required for the work.

All working drawings submitted for Railroad approval shall be certified by a Professional Engineer registered in the area where the work is to be performed.

No work shall be performed until the working drawings are approved by the Engineer and the Railroad. Approval of the working drawings by the Engineer and the Railroad shall not relieve the Contractor's responsibility for errors in dimensions, elevations, or design calculations and for performance of the work in a safe manner without endangering the safety of the Railroad personnel, equipment, or the Contractor's workmen.



The working drawings shall clearly show all dimensions, sizes of members, types of materials, and all other pertinent information as may be required by the Engineer and the Railroad to permit proper checking for such working drawings. The Contractor shall also submit along with the working drawings, copies of the design calculations.

D. Insurance

The Contractor shall purchase and maintain for the length of the project the following insurance policies in addition to those required in the Specifications and in other sections of these Special Provisions.

1. Contractor's Public Liability and Property Damage Insurance:

Limits not less than Two Million Dollars (\$2,000,000.00) per occurrence for Bodily Injury and Two Million Dollars (\$2,000,000.00) per occurrence for Property Damage.

2. Contractor's Protective Public Liability and Property Damage Insurance:

If any part of the work is to be performed by a Subcontractor, the prime Contractor shall carry in the Contractor's own behalf, insurance of same limits as set forth in paragraph 1, above.

3. Railroad Protective Public Liability and Property Damage Insurance:

This policy shall name the respective "Railroad" as "The Insured" and shall be written on the form prescribed by the U.S. Department of Transportation, Federal Highway Administration, in the Federal Air Highway Program Manual, Volume 6, Chapter 6, Section 2, Subsection 2 Railroad-Highway Insurance Protection Required for Contractors.

Limits of liability shall be in the amount of Two Million Dollars (\$2,000,000.00) for bodily injury and property damage per occurrence with an aggregate of Six Million Dollars (\$6,000,000.00) per annual policy period.

The limits stated herein have been established after reviewing the work listed in the Contract. Should the Contractor be otherwise using railroad property (for example for a temporary grade crossing) it may be subject to other requirements. The Contractor is required to communicate with the Railroad and provide for complying with all of their requirements.



The original of policy 3. must be furnished to and approved by the Railroad.

For 1. and 2., Certifications are to be furnished to the Maryland Transportation Authority and to the Railroad on request. In all instances, the Contractor must furnish evidence to the Maryland Transportation Authority and Railroad that the insurance has been purchased and is in force until the Contract is completed and accepted. Contractor will not be permitted on Railroad property until the Insurance Policy(s) have been approved.

Policies, notices of cancellation or change, etc., are to be sent by the Contractor directly to the Engineering Officer of the Railroad. Contractor and the Contractor's insurance representatives must reconcile all policy requirements to the satisfaction of the Railroad and the Engineer.

E. Measurement and Payment

Work on Railroad property during the life of the Contract and all incidental costs imposed on the Contractor due to the operations of the Railroad will not be measured for payment, but cost thereof shall be incidental to the lump sum cost proposal for the individual project site affected by the Railroad.

Costs of all Contractor's and Railroad insurance policies will be paid for under the Reimbursable Railroad Permit Expenses item.



**GENERAL PROVISIONS
GP-SECTION 1
DEFINITIONS AND TERMS**

GP 1.03 – ORGANIZATIONAL DEFINITIONS

Revise the definitions of Administration to read as follows:

Administration – The word “Administration” shall mean the “Maryland Transportation Authority”.

Except for Office of Materials and Research, all references to the Maryland State Highway Administration’s offices and positions shall mean the Authority’s corresponding Engineering Divisions and positions such as Bridge, Traffic, Highway, and Environmental Sections.



**GENERAL PROVISIONS
GP- SECTION 1
DEFINITIONS AND TERMS**

GP 1.05 - DEFINITIONS

Add the following definitions:

Highway Standards - The official Book of Standards for Highway and Incidental Structures, edited by the State Highway Administration, with the latest incorporated revisions issued on or before the date of advertisement on the Contract.



**GENERAL PROVISIONS
GP-SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS**

GP 2.04 SITE INVESTIGATION

Revise the paragraph to read as follows:

The Contractor acknowledges that it has investigated and satisfied itself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling, and storage of materials; availability of labor, water, electric power, roads; uncertainties of weather, river stages, tides, or similar physical conditions at the site; and confirmation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as the information is reasonably ascertainable from an inspection of the site, including all exploratory INFORMATION IN POSSESSION OF THE STATE, as well as from information presented by the drawings and Specifications made part of this contract. Any failure by the Contractor to acquaint itself with the available information may not relieve it from responsibility for estimating properly the difficulty or cost of successfully performing the work. The State assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the State.



**GENERAL PROVISIONS
GP-SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS**

GP-2.06 PREPARATION OF THE BID

GP9 **ADD:** After paragraph (a), the following.

The Contractor may elect to submit its bid on forms it has generated in the development of its bid. These may be submitted in lieu of the schedule of prices bid forms furnished by the Administration in the Invitation for Bids. These forms shall emulate the forms currently furnished by the Administration and, as a minimum, contain the following information:

- (1) State Contract No.;
- (2) State Item Nos.;
- (3) State's Proposed Quantities;
- (4) Description of Items;
- (5) Unit Price;
- (6) Total Cost of Each Item; and
- (7) Total Bid Amount.

The document shall be 8-1/2 x 11 inches, and oriented in a landscape format. The font size shall be no less than 10 point with horizontal lines dividing each item. Any addendum which revised items or quantities shall be noted on all affected schedule of prices sheets. Any special bid requirements that are noted in the schedule of prices shall also be listed on the form.

Should the Contractor elect to submit bids on the Contractor's own forms, the Contractor shall submit a sample of the form to the Administration at least two (2) weeks prior to the scheduled opening of bids. The use of Contractor generated forms shall be approved, in writing, prior to their use. If the Contractor's forms were previously approved in writing on another Administration project and have not changed, they need not be resubmitted for this project.



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Sample forms shall be submitted to:

Ms. Linda McGill
Chief Procurement Officer
Maryland Transportation Authority
300 Authority Drive
Baltimore, MD 21222



**GENERAL PROVISIONS
GP-SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS**

GP 2.23 - BID PROTESTS

Section GP 2.23 of the General Provisions is supplemented as follows:

The Board of Public Works does not have the jurisdiction to consider protests relating to this solicitation or an award of this contract under this solicitation.

All protests relating to this solicitation, the selection, and/or award must be filed in writing with the Authority's Procurement Officer, within the time limitations set forth in COMAR 21.10.07 and 21.10.02. Bid protests shall be filed not later than 7 days after the basis for protest is known, or should have been known, whichever is earlier. Oral protests will not be considered.

The specific details of the protest procedures shall be followed by aggrieved actual or prospective bidders or offerors are contained in COMAR 21.10.



**GENERAL PROVISIONS
GP SECTION 4
SCOPE OF WORK**

GP 4.10 - WARRANTY OF CONSTRUCTION

GP 4.10 of the Standard Specifications is revised to read as follows:

Delete: The first paragraph in its entirety.

Insert: The following:

The Warranty as defined under paragraphs A through G in GP 4.10 "Warranty of Construction" shall apply to this Maryland Transportation Authority contract unless specified elsewhere in this Invitation for Bids.



**GENERAL PROVISIONS
GP SECTION 5
CONTROL OF WORK**

GP 5.12 - FAILURE TO MAINTAIN ENTIRE PROJECT

Delete Section GP 5.12 in its entirety

Insert: Revise the paragraph to read as follows:

Failure on the part of the Contractor, at any time, to RESPOND TO the provisions of GP 5.11 above, will result in the procurement officer immediately notifying the Contractor to comply with the required maintenance provisions. In the event that the Contractor fails to PROCEED WITH CORRECTIONS TO UNSATISFACTORY MAINTENANCE SO AS TO CONFORM TO THE PROVISIONS OF GP 5.11 within 4 hours of receipt of such notice, the procurement officer MAY NOTIFY THE CONTRACTOR TO SUSPEND ALL OTHER WORK ON THE CONTRACT UNTIL SUCH TIME AS THE UNSATISFACTORY MAINTENANCE IS CORRECTED. In the event that the Contractor fails to RESPOND TO unsatisfactory maintenance within 4 hours after receipt of such notice, the procurement officer will immediately proceed with adequate forces and equipment to maintain the project, and the entire cost of this maintenance will be deducted from monies due the Contractor ON THE NEXT MONTHLY ESTIMATE.



**GENERAL PROVISIONS
GP SECTION 9
PAYMENT**

GP 9.05 LATE PAYMENTS

ADD the following:

- (e) Payments will be made within thirty (30) days of the date when the Contract amount becomes due and payable or the date of receipt of a proper invoice, whichever is later. The State's failure to remit payment within forty-five (45) days from that date may entitle the Contractor to interest at the rate of 10 percent per annum beginning on the 31st day.



**TERMS AND CONDITIONS
TC SECTION 4
CONTROL OF WORK**

TC 4.01 - SHOP PLANS AND WORKING DRAWINGS

Section TC 4.01 of the Specifications is amended to add:

All shop plans and working drawings for this project shall be submitted to:

Maryland Transportation Authority
Engineering Division
300 Authority Drive
Baltimore, MD 21222
Mr. Abey Tamrat

The Contractor shall allow a minimum of four (4) weeks turn around time on all drawings from the date they are received by the Authority. All shop plans and working drawings shall be reviewed and approved by the Contractor prior to submitting for approval to the Maryland Transportation Authority and shall be submitted by the general Contractor only. No drawings sent to the Authority directly by subcontractors, fabricators, etc. will be accepted. Ten (10) sets of drawings shall be submitted for approval.

Acceptance of a material source by the Engineer does not constitute approval of the material as a substitute as an "equal". Submission of a material as an "or equal" must be done in accordance with the following paragraphs:

All shop drawings, regardless if "Submitted as Specified" or "Submitted as Equal to Specified," shall be furnished with complete, specific, detailed information from the manufacturer or supplier or the material or equipment the Contractor proposes to furnish, in which the requirements of the Specifications are clearly shown to be met. This shall include a point by point comparison with the detail requirements of the Specifications.

When any article is specified by trade name of manufacturer with or without the clause "or equal," it is intended to establish the quality of the article. If the Contractor proposes to use material or equipment of another manufacturer as an "or equal" to material or equipment specified, all shop drawings shall conform to the following requirements, conditions, and procedure:

1. Substitution of equipment or materials other than those specified will be considered, providing, in the opinion of the Engineer, such equipment or material



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is equal to, or better than specified. The decision of the Engineer with respect to approval or disapproval of any material or equipment proposed to be substituted as an "or equal" is final. The Contractor shall have no claim of any sort by reason of such decision.

2. If the Contractor proposes to substitute materials or equipment as "or equal" to those specified, it shall be its responsibility to furnish, in addition to the information discussed above, a point by point comparison of the material or equipment specified under the Contract and that proposed to be substituted. The burden of responsibility in furnishing this information is with the Contractor.

If incomplete or irrelevant data is submitted as evidence of compliance with this section of the Specifications, the data will be returned and the request for approval will be denied.



**TERMS AND CONDITIONS
TC SECTION 4
CONTROL OF WORK**

TC-4.02 FAILURE TO ADEQUATELY MAINTAIN PROJECT.

16 **ADD**: To the existing paragraph.

Additionally, an appropriate deduction will be made from the Contractor's next progress estimate for each day or portion thereof that Maintenance of Traffic deficiencies exist, and will continue until the deficiencies are satisfactorily corrected and accepted by the Engineer. Any portion of a day will be assessed a full day deduction. The deduction will be equal to a prorata share of the lump sum price bid for Maintenance of Traffic or an amount prorated from the Engineer's estimate, whichever is more. The amount prorated will be the per diem amount established by using the working days (based upon calendar dates when required) divided into the total value of the bid item or the Engineer's estimate of that item, whichever is more.

The above noted deduction will be assessed on the next progress estimate if:

The Contractor does not take action to correct the deficiencies and properly assume the responsibilities of maintaining the project (as determined by the Engineer) within four (4) hours of receiving a notice to comply with the required maintenance provisions.

The deduction will be equal to the daily prorated share of the lump sum price bid for Maintenance of Traffic or \$ 1,000.00 per day, whichever is more for each day or portion thereof that the deficiencies exist, and will continue until the deficiencies and proper assumption of the required maintenance provisions are satisfactorily corrected and accepted by the Engineer. The amount of monies deducted will be a permanent deduction and are not recoverable. Upon satisfactory correction of the deficiencies, payment of the Maintenance of Traffic lump sum item will resume.



**TERMS AND CONDITIONS
TC SECTION 5
LEGAL RELATIONS AND PROGRESS**

TC-5.01 INSURANCE.

17 **DELETE:** The first three paragraphs under TC-5.01 in their entireties.

INSERT: The following.

The requirement of GP-7.14 "Liability Insurance" to submit Certificate of Insurance prior to starting work is modified for Administration Contracts to require the certificate of insurance to be submitted prior to the execution of the Contract.

The Contractor shall maintain in full force and effect third party legal liability insurance necessary to cover claims arising from the Contractor's operations under this agreement which cause damage to the person or property of third parties. The insurance shall be under a standard commercial general liability ("CGL") form endorsed as necessary to comply with the above requirements; or other liability insurance form deemed acceptable by the State. The State of Maryland shall be listed as an additional named insured on the policy. The limit of liability shall be no less than One Million Dollars (\$1,000,000.00) per occurrence/\$ One Million Dollars (\$1,000,000.00) general aggregate. The insurance shall be kept in full force and effect until all work has been satisfactorily completed and accepted. The policies shall be endorsed to provide thirty (30) days notice of cancellation or non-renewal to:

Director of Construction
Maryland Transportation Authority
300 Authority Drive
Baltimore, Maryland 21222



**TERMS AND CONDITIONS
TC SECTION 7
PAYMENT**

29 **DELETE:** TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS in its entirety.

INSERT: The following.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS.

When the Contractor requests payment allowance for materials, the following terms and conditions shall apply:

- (a) For superstructure members delivered on the project site, an allowance of 100 percent of the material cost plus freight charges as invoiced may be made provided the cost does not exceed 90 percent of the Contract price of the applicable Contract item. The allowance will be based upon validated invoices or bills for material including freight charges, and a copy thereof shall be made a part of the documented records for the project.
- (b) For reinforcement steel, piling, pipe, traffic barrier, signs and sign assemblies, and other nonperishable material in storage on the project, but excluding aggregates, cement, seed, plants, fertilizer or other perishable items, an allowance of 100 percent of the invoiced cost of the material plus freight charges to the Contractor may be made provided the cost does not exceed 90 percent of the Contract price of the applicable Contract item. Such material shall be delivered and stock-piled at the project site, and have been tested by the Administration and found to have conformed to the Specifications or have been accepted under an approved certification program prior to the allowance.
- (c) No allowance will be made for fuels, form lumber, falsework, temporary structures or other materials of any kind which will not become an integral part of the finished construction.

No payment for stored material will be made if it is anticipated that the material will be incorporated into the work within thirty (30) days of the written request.

Only end product manufactured material or fully fabricated products that are awaiting installation or incorporation into the finished work are eligible for prepayment. Components, elements, or ingredients of a finished product are not eligible for prepayment.

Material for which an allowance is requested shall be stored in an approved manner in areas within the State of Maryland where damage is not likely to occur. If any of the stored materials are lost or become damaged in any manner, the Contractor shall



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be responsible for repairing or replacing the damaged materials. The value of the lost or damaged material will be deducted from the Contractor's subsequent estimates until replacement has been accomplished. The request for allowances for any materials stored on private property within the State of Maryland shall be accompanied by a release from the owner and/or tenant of such property agreeing to permit the removal of the materials from the property without cost to the State of Maryland.

The material shall be clearly marked with the Administration's Contract number on individual units. If the material is normally shipped to the project in bundles or other forms of packaging, the Administration's Contract number shall be clearly marked or affixed to the package. When the material is not stored at the actual project site, the material shall be physically separated by fencing or equivalent barrier from other materials stored at the same site. The material shall be accessible to the Administration at all times.

When it is considered impractical to store materials on the actual project, the Engineer may approve storage areas in the vicinity of the actual project which will be considered at the project site.

When storage of the materials within the State of Maryland is not practical, approval shall be obtained from the Engineer for storage elsewhere. Storage of materials outside the State of Maryland will be subject to the conditions set forth in this provision and limited to materials exceeding Twenty-Five Thousand Dollars (\$25,000), which are designed and fabricated exclusively for use on a specific project.

- (e) Material for which payment has been made, either wholly or partially, shall not be removed from the approved location until such time that it is to be incorporated into the work unless authorized by the Engineer.
- (f) The Contractor shall submit a written request for payment to the Engineer at least two weeks prior to the estimate cutoff date established by the Engineer. The following items shall accompany the written request for payment:
 - (1) Consent of surety specifying the material type and the item(s) in which the material is to be used.
 - (2) Validated invoices with the signature of an officer of the company supplying the material showing actual cost.
 - (3) A notarized statement from the Contractor attesting that the invoices as submitted do not include charges or fees for placing, handling, erecting or any other charges or markups other than the actual material cost, sales tax(es), if applicable, and freight charges.
 - (4) Bills of lading showing delivery of the material. The request for allowances for any materials stored on property outside the State of Maryland shall be



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accompanied by a release from the owner or tenant of such property agreeing to permit verification by the Inspector that the material is stored at the approved location, and to permit the removal of the materials from the property without cost to the State of Maryland.

- (5) Inspection test reports, certifications and/or a written statement from the Inspector attesting to the inspection and approval of the material.
- (6) A statement explaining why the material can not be stored on the project, if the Contractor is requesting to store material at a location other than the project site. The statement shall include the methods of storage, separation, and identification to be used by the Contractor. The Contractor shall provide a method of inventory control and withdrawal satisfactory to the Administration which shall be used by the Contractor to monitor materials not stored on the project.
- (7) A breakdown of the Contract line item bid unit price showing the relationship of the cost of the stored material to the costs of all other materials, labor, and components of the work included in the Contract line item unit price bid by the Contractor.

Upon receipt of the above by the District Engineer and verification by the Inspector that the material is stored at the approved location, the District Engineer will authorize payment.

The Contractor shall pay the material provider the amount shown on the invoice within ten (10) calendar days of receipt of payment from the Administration. Evidence of payment shall be provided to the Administration. Failure to make invoice payments as specified will be cause to deduct the monies from future estimates and/or deny future stored materials payment requests.

Copies of all pertinent data shall be made by the Contractor and distributed to the Inspector for retention as part of the documented records for the project.



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CATEGORY 100 PRELIMINARY

SECTION 100.01 - MAINTENANCE OF NAVIGATION AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS

100.01 GENERAL

Note that the bridges to be repaired may be over navigable waters which are under the navigational jurisdiction of the U.S. Coast Guard, U.S. Department of Transportation with headquarters at the following address: Commander (AOWB) USCG Atlantic Area, 4th Floor, Federal Building, 431 Crawford Street, Portsmouth, Virginia 23704. The Contractor shall be responsible for full compliance with all laws, regulations and requirements of the U.S. Coast Guard, which may be applicable to any operations conducted.

All work shall be conducted so as to not to interfere with the free navigation of the waterways. The Contractor shall therefore arrange his work so that the structure is capable of passing marine traffic at all times.

The Contractor shall be responsible for obtaining any required permit from the Coast Guard should any of his equipment be located in the navigable waters.

The Contractor shall be responsible for, and make good any damage caused to any craft or any person on said craft, which damage or injury is attributable to acts of the Contractor.

Removed materials, scrap or waste material and debris shall not be disposed of in the surrounding waters. The obtaining of approved disposal areas is the responsibility of the Contractor.

Any removed materials, scrap or waste material or debris dropped into the surrounding waters inadvertently, shall be removed from the water and disposed of suitably.

100.02 MEASUREMENT AND PAYMENT

Payment for this item including obtaining Coast Guard permits will not be measured for payment, but cost thereof shall be incidental to the pertinent repair items for the individual project site affected by Navigable water.



**CATEGORY 100
PRELIMINARY**

SECTION 103 — ENGINEERS OFFICE

103.03 CONSTRUCTION.

DELETE: 103.03.06 Microcomputer System for all Offices in its entirety.

INSERT: The following.

103.03.06 Microcomputer System for all Offices.

(a) Desktop Unit.

- (1) IBM compatible with an Intel Pentium 4 or AMD processor.
- (2) Minimum microprocessor speed of 3.4 GHz.
- (3) Minimum hard drive storage of 80 GB (gigabyte).
- (4) Minimum of 2.0 GB RAM (Random Access Memory).
- (5) Enhanced 101 key keyboard with wrist rest.
- (6) Super Video Graphics Accelerator ("SVGA") with 16MB memory.
- (7) Modem 56K BPS, ITU V.92 compliant – required for remote dial-in to the computer to provide MCMS system administration.
- (8) Full Duplex Sound Card (Sound Blaster Pro & Windows Compatible).
- (9) Audio Speakers.
- (10) Mouse with mouse pad.
- (11) One CDRW/DVDRW combo drive. Min Speed = 48X.
- (12) One Parallel Port, One Serial Port, Two USB Ports.

(b) Operating System. Minimum Microsoft® Windows XP.

(c) Video Monitor. Color Super VGA monitor conforming to Energy Star requirements with a minimum screen size of 17-inch flat panel.



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(d) Printer/Scanner. HP (Hewlett-Packard) Photosmart C6180 All-in-One Inkjet Printer, 32 PPM, 4800x1200 DP, Color, 64MB, PC/Mac. Office jets and Bubble jets will not be accepted.

(e) Software.

(1) Microsoft® Office 2000/XP Professional for Windows™ or later.

(2) Antivirus software shall be installed and configured to perform an automatic update when the microcomputer system connects to the Internet.

(f) Internet Access. The microcomputer system shall be provided with unlimited DSL/Broadband or better Internet access approved by the Engineer.

(g) Accessories.

(1) Uninterruptible power supply (“UPS”).

(2) Standard computer workstation with minimum desk space of 60 X 30 in. and a swivel type office chair, padded with arm rests.

(3) 8-1/2 X 11 in. xerographic paper to be supplied as needed.

(4) Toner or ink as needed for printer.

(5) Maintenance agreement to provide for possible down time.

(6) Physical security system to deter theft of computer components.

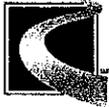
(7) Blank recordable CD-R media for re-writable CD-ROM drive to be supplied as needed.

(8) One – USB 2.0 Flash Drive (1GB of Memory).

(h) Notes.

(1) The microcomputer system shall be completely set up ready for use on or before the day the Engineer’s Office is to be occupied.

(2) All software stated above shall be supplied on original disks with manuals and be retained in the construction field office for the duration of the Contract.



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- (3) If for any reason the system fails to operate, the system shall be replaced or repaired within 48 hours.
- (4) When the microcomputer system is no longer required, the Construction Management software system including original user/operator guide manuals, program disks, and all data files will be removed by the Engineer and delivered to the Area Engineer and become the property of the Authority. The remaining microcomputer system shall remain the property of the Contractor.

Type 'C' and Type 'D' Engineer's Office shall have two (2) complete microcomputer systems.



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**CATEGORY 100
PRELIMINARY**

SECTION 104 - MAINTENANCE OF TRAFFIC

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION

DELETE: The forth paragraph sentence “Refer to contract documents for work restrictions” in its entirety.

INSERT: The following:

- 1) The work in this Contract affects the following roads and will require coordination with the Maryland Transportation Authority:
 - a) John F. Kennedy Memorial Highway (I-95 in Baltimore, Harford, and Cecil Counties)
 - b) Thomas J. Hatem Memorial Bridge (U.S. 40 in Harford and Cecil Counties)
 - c) Baltimore Harbor Tunnel Thruway (I-895 in Baltimore City and Baltimore, Anne Arundel, and Howard Counties)
 - d) Francis Scott Key Bridge (I-695 in Baltimore City and Baltimore and Anne Arundel Counties)
 - e) William Preston Lane Jr. Memorial Bridge (U.S. 50 in Anne Arundel and Queen Annes Counties)
 - f) Governor Harry W. Nice Memorial Bridge (U.S. 301 in Charles County)
 - g) Fort McHenry Tunnel (I-95 in Baltimore City)

AGENCY CONTACTS

Pre-construction/Existing Contract Coordination

Maryland Transportation Authority

Facility	Contact	Phone Number
Francis Scott Key Bridge (I-695)	Mr. Charles Raycob Administrator	(410) 537-7513
John F. Kennedy Memorial Highway (I-95) & Thomas J. Hatem Memorial Bridge	Mr. George Fish Administrator- Northern Region	(410) 537-1102



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(U.S. 40)		
Baltimore Harbor Tunnel Thruway (I-895)	Mr. Dave Roehmer Tunnel Administrator	(410) 537-1310
Fort McHenry Tunnel (I-95)	Mr. Dave Roehmer Tunnel Administrator	(410) 537-1310
William Preston Lane Jr. Memorial Highway (US 50/301)	Mr. Ken Cimino Administrator	(410) 295-8157
Governor Harry W. Nice Memorial Bridge	Mr. Gary Jackson Administrator	(301) 259-4870

Refer to Section SP 1-11 – Maintenance of Railroad Traffic for Railroad company contacts.

Work Restrictions. On Monday of each week, the Contractor shall provide the Engineer with a complete list of anticipated lane and shoulder closures for the following two weeks, allowing the Authority a minimum of fourteen (14) calendar days or ten (10) working days notification. The Engineer shall then notify the affected facilities, the Engineering Division’s Traffic Section and other appropriate offices. No lane closures shall be made without prior written approval of the Engineer in the form of an Authority lane/shoulder closure permit. The Authority is not responsible for lost workdays resulting from the Contractor failing to submit schedules or providing notification of maintenance of traffic requirements in a timely manner. Other contractors may be actively working in or around the vicinity of this project. The Contractor shall cooperate with and coordinate work activities with contractors in adjoining or overlapping work areas.

The Contractor is responsible for obtaining lane/shoulder closure or other Permits from all affected agencies that require permits for work on their right of way, including those listed in this Special Provision. The Contractor shall make contact with the representative from the affected agency, through the Project Engineer and provide a copy of all coordination correspondence to the Authority. Sufficient time shall be allowed for review and approval of the permit application.

ALLOWABLE LANE CLOSURE SCHEDULES

BALTIMORE HARBOR TUNNEL THRUWAY

Harbor Tunnel Bore Closures - 8 P.M. to 5 A.M. Monday to Thursday night (Friday morning). Maintenance of Traffic for Harbor Tunnel Bore Closures will be furnished and installed by the Harbor Tunnel Maintenance staff.



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TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:30 AM – 3:00 PM	Monday – Thursday	Southbound Single Lane Closure
9:00 AM – 2:30 PM	Monday - Thursday	Northbound Single Lane Closure
8:00 PM – 5:00 AM	Monday – Thursday	Single Lane Closure
9:30 AM – 12:00 Noon	Friday	Southbound Single Lane Closure
9:00 AM – 12:00 Noon	Friday	Northbound Single Lane Closure
10:00 PM – 10:00 AM	Continuous: Friday (10 PM) to Sunday (10 AM)*	North or Southbound Single Lane Closure
10:00 PM – 5:00 AM	Sunday	Southbound Single Lane Closure

*These closures are subject to the facility Administrator’s approval.

No lane or shoulder closures permitted during stadium events (i.e. Baltimore Ravens, Baltimore Orioles home games, and major events at the M&T National Bank Stadium or Camden Yards).

FORT MCHENRY TUNNEL

Fort McHenry Tunnel Bore Closures - 8 PM to 5 AM Monday to Thursday night (Friday morning). Maintenance of Traffic for Fort McHenry Tunnel Bore Closures will be furnished and installed by the Fort McHenry Tunnel Maintenance staff.

April 1 through September 30:

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 A.M. – 2:00 P.M.	Monday – Thursday	Single Lane Closure
7:00 P.M. – 5:00 A.M.	Monday – Thursday	Single Lane Closure
9:00 A.M. – 12:00 Noon	Friday	Single Lane Closure
9:00 P.M. – 9:00 A.M.	Friday & Saturday	Single Lane Closure
9:00 P.M. – 5:00 A.M.	Sunday	Single Lane Closure
10:00 P.M. – 5:00 A.M.	Monday – Thursday	Double Lane Closure

No lane or shoulder closures permitted during stadium events (i.e. Baltimore Ravens, Baltimore Orioles home games, and major events at the M&T National Bank Stadium or Camden Yards) except for tunnel closures during night games after 8:00 p.m. South bound, and after midnight North bound.

October 1 through March 31:



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TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 A.M. – 3:00 P.M.	Monday – Thursday	Single Lane Closure
7:00 P.M. – 5:00 A.M.	Monday – Thursday	Single Lane Closure
9:00 A.M. – 12:00 Noon	Friday	Single Lane Closure
7:00 P.M. – 9:00 A.M.	Friday & Saturday	Single Lane Closure
7:00 P.M. – 5:00 A.M.	Sunday	Single Lane Closure
10:00 P.M. – 5:00 A.M.	Sunday– Thursday	Double Lane Closure *

* Double lane closures on Sundays, in areas with only three lanes, must be coordinate with and approved by the Administrator. No lane or shoulder closures permitted during stadium events (i.e. Baltimore Raven, Baltimore Oriole home games, and major events at the M&T National Bank Stadium or Camden Yards) except for tunnel closures during night games after 8:00 p.m. South bound, and after midnight North bound.

FRANCIS SCOTT KEY BRIDGE

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 A.M. – 3:00 P.M.	Monday – Friday	Single Lane Closure
8:00 P.M. – 5:00 A.M.	Monday – Friday	Single Lane Closure
8:00 P.M. – 5:00 A.M.	Friday to Monday	Single Lane Closure

GOVERNOR HARRY W. NICE MEMORIAL BRIDGE

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 AM – 3:00 PM	Monday – Thursday	Single Lane Closure
9:00 AM – 12:00 Noon	Friday	Single Lane Closure
8:00 PM – 5:00 AM	Monday - Thursday	Single Lane Closure
10:00 PM – 5:00 AM	Sunday	Single Lane Closure

JOHN F. KENNEDY MEMORIAL HIGHWAY

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
Continuous	Monday - Sunday	Shoulder Closure
9:00 A.M. – 3:00 P.M.	Monday – Thursday	Single Lane Closure
7:00 P.M. – 5:00 A.M.	Monday – Thursday in three lane sections	Single Lane Closure Northbound
9:00 P.M. – 5:00 A.M.	Monday – Thursday in four lane sections	Single Lane Closure Northbound
7:00 P.M. – 5:00 A.M.	Monday – Thursday	Single Lane Closure Southbound
Thanksgiving through New	Monday – Thursday south of	Single Lane Closure



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Years 9:00 P.M. – 5:00 A.M.	the Little Gunpowder River	Southbound
9:00 A.M. – 12:00 Noon	Friday	Single Lane Closure
9:00 P.M. – 5:00 A.M.	Monday – Thursday in three lane sections	Double Lane Closure Northbound
11:00 P.M. – 5:00 A.M.	Monday – Thursday in four lane sections	Double Lane Closure Northbound
9:00 P.M. – 5:00 A.M.	Monday – Thursday	Double Lane Closure Southbound
Thanksgiving through New Years 10: 00 P.M. – 5:00 A.M.	Monday – Thursday south of the Little Gunpowder River	Double Lane Closure Southbound
Midnight – 5:00 A.M.	Monday – Thursday in four lane sections	Triple Lane Closure Northbound
11:00 P.M. – 4:00 A.M.	Monday – Thursday in four lane sections	Triple Lane Closure Southbound

THOMAS J. HATEM MEMORIAL BRIDGE

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 A.M. – 3:00 P.M.	Monday – Thursday	Single Lane Closure
7:00 P.M. – 5:00 A.M.	Monday – Thursday	Single Lane Closure

WILLIAM PRESTON LANE, JR. MEMORIAL BRIDGE

Work must be coordinated with ALL on-going Bay Bridge project including LB 378-000-006R2. All lane closure requests must be coordinated and approved by the Engineer and the LB 378-000-006R2 (Phase II Re-decking, see Contract Details below) Construction Manager. No additional payment for delays due to late submission of lane closure schedules or conflicts with other work or special events will be allowed. Available westbound Bay bridge closures for 2009 & 2010 are included in the Proposal Book for informational purposes only.

LB 378-000-006R2 (Deck Replacement of Westbound Suspension and Through Truss Spans and Miscellaneous Repairs):

The scope of this project includes the following items:

- Replacing the concrete deck and steel railing in the suspension and through truss spans.
- Rehabilitating the existing steel railing in deck truss spans 35-43 and on the southwest end of the bridge
- Replacing and/or modifying the bridge deck joints



- Installing an acoustic monitoring system in the suspension spans of the eastbound bridge
- Miscellaneous structural repairs
- Repairing the timber ferry slip at the west approach of the eastbound bridge
- Painting portions of the structural steel of the westbound bridge

LB 378-000-006R2 Contract is expected to be completed by November, 2010.

No lane closures shall be made without prior written approval of the project Engineer in the form of an Authority lane/shoulder closure permit or the Bridge Administration.

ALLOWABLE LANE CLOSURE SCHEDULES
Bay Bridges*

TIME OF DAY	DAYS OF THE WEEK	ALLOWED CLOSURES
9:00 A.M. – 2:30 P.M.	Monday through Thursday (5.5 Hours Per Day)	Single Lane Closure (East or Westbound)
10:00 P.M. – 5:00 A.M.	Monday Nights to Wednesday Nights (7 Hours Per Night)	Single Lane Closure (East or Westbound)

* Available westbound Bay Bridge closures for 2009 & 2010 are included in the Proposal Book for informational purposes only.

Work is not permitted on the day before, the day of, and the day after the Holidays indicated below on all facilities. For detailed Bay bridge holiday closure restrictions, see table below:

- New Year's Day, January 1
- Easter Weekend
- Memorial Day, the last Monday in May (Including that Weekend)
- Independence Day, July 4
- Labor Day, the first Monday in September (Including that Weekend)
- Thanksgiving Day, the fourth Thursday in November, including Friday through Monday
- Christmas Day, December 25

The Engineer reserves the right to modify or expand the methods of traffic control or working hours as specified in the Contract Documents. Any request from the Contractor to modify the work restrictions shall require written approval from the Engineer at least 72 hours prior to implementing the change. The Contractor shall submit a copy of the original work restrictions with the written request.



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As directed by the Engineer, temporary lane and shoulder closures will not be permitted during periods of falling precipitation, in heavy fog or otherwise poor visibility, or in the event of emergencies such as serious traffic accidents or unusually severe traffic congestion. In the event that a temporary lane or shoulder must be reopened as directed by the Engineer or authorized Authority staff, the Contractor shall evacuate all equipment, materials and personnel from the lane within thirty (30) minutes.

- 149 **ADD:** The following after the last paragraph, “Any monetary savings...and the Administration.”

When closing or opening a lane on freeways, expressways, and roadways with posted speed ≥ 45 mph, a work vehicle shall be closely followed by a protection vehicle (PV) during installation and removal of temporary traffic control devices. The PV shall consist of a work vehicle with approved flashing lights, a truck-mounted attenuator (TMA) with support structure designed for attaching the system to the work vehicle, and arrow panel (arrow mode for multilane roadways and caution mode on two-lane, two-way roadways) The work vehicle size and method of attachment shall be as specified in the TMA manufacture’s specification as tested under NCHRP Test Level 3.

When a temporary lane or shoulder closure is in effect, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings and shall discuss traffic control and the Traffic Control Plan including procedures to be implemented for lane closures.

All closures shall be in conformance with the approved TCP and under the direction of the Contractor's Certified Traffic Manager and the Engineer.

Workers and equipment, including temporary traffic control devices needed for setting up a lane closure or restriction, are prohibited in the lane or shoulder to be closed or restricted before the time permitted in the Contract work restrictions unless otherwise noted below or as approved by the Engineer.

Temporary traffic control devices to be used for lane/shoulder closure may be placed on the shoulder of the roadway by workers no earlier than 15 minutes prior to actual time lane/shoulder closure or restriction is permitted. Temporary traffic signs may be displayed to traffic at this time.

Workers shall not enter a lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 15 minutes prior to actual time lane/shoulder closure or restriction is permitted.



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All temporary lane or shoulder closures shall be restored at the end of the closure period and no travel lane shall be reduced to less than 11 ft. Prior to opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction being assessed on the next progress estimate in conformance with the following. This is in addition to the requirements specified in TC-4.02.

ELAPSED TIME, MINUTES	DEDUCTION
1 - 5	\$ <u>1,000.00</u>
Over 5	\$ <u>75.00</u> per Minute (In addition to the Original 5 minutes)

104.01.04 MEASUREMENT AND PAYMENT.

INSERT: The following:

Measurement and payment will be made at the Contract unit days for Single Lane Closure, Double Lane Closure, Shoulder Closure, Entrance Ramp Treatment, and Exit Ramp Treatment items. Flagging Operations will be measured and paid for at the Contract unit price per Unit Day. The payment will be full compensation for all material, labor, traffic manager, equipment, tools, and incidentals necessary to complete the work. The cost shall include all required equipment and setups shown on the maintenance of traffic standards as well as removal of all traffic control setups.

A unit day shall consist of any approved usage within a 24 hour calendar day period. Each item will be paid for only once per unit day, regardless of how many times it is used, located, or relocated.



William Preston Lane, Jr. Memorial (Bay) Bridge Available Westbound Lane Closures - 2010



- Code A Close at 8:00 PM and reopen at 5:00 AM
- Code B Close at 8:00 PM and reopen at 7:00 AM
- Code C Close at 8:00 PM and reopen at 8:00 AM
- Code D Close at 8:00 PM and reopen at 10:00 AM
- Code E Close at 9:00 PM and reopen at 5:00 AM

- Code F Close at 9:00 PM and reopen at 8:00 AM
- Code G Close at 10:00 PM and reopen at 5:00 AM
- Code H Close at 10:00 PM and reopen at 7:00 AM
- Code I Close at 11:00 PM and reopen at 7:00 AM

- In addition to the above, between Labor Day weekend and Memorial Day weekend, single lane closures are permitted from 9 AM - 2:30 PM, Mondays, Tuesdays, Wednesdays, and Thursdays.
- In addition to the above, between Memorial Day weekend and Labor Day weekend, single lane closures are permitted from 9 AM - 2:30 PM, Mondays, Tuesdays and Wednesdays.

LEGEND

No Bridge Closure

Holiday: No bridge closure (only all lane closures permitted during the New Year's and Christmas holidays)

January 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	A	D	D	A			
11	12	13	14	15	16	17	18	19	20
A	A	A	A	D	D	A			
21	22	23	24	25	26	27	28	29	30
A	A	A	A	D	D	A			
31									
A	A	A	A	D	D	A			

February 2010

1	2	3	4	5	6	7
A	A	A	A	D	D	A
8	9	10	11	12	13	14
A	A	A	A	D	D	A
15	16	17	18	19	20	21
A	A	A	A	D	D	A
22	23	24	25	26	27	28
A	A	A	A	D	D	A

March 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	E	H	F				
11	12	13	14	15	16	17	18	19	20
A	A	A	E	H	F				
21	22	23	24	25	26	27	28	29	30
A	A	A	E	H	F				
31									
A	A	A	E	H	F				

April 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	E	H	I				
11	12	13	14	15	16	17	18	19	20
A	A	A	E	H	I				
21	22	23	24	25	26	27	28	29	30
A	A	A	E	H	I				
31									
A	A	A	E	H	I				

May 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	G	I					
11	12	13	14	15	16	17	18	19	20
A	A	A	G	I					
21	22	23	24	25	26	27	28	29	30
A	A	A	G	I					
31									
A	A	A	G	I					

June 2010

1	2	3	4	5	6	7	8	9	10
G	G	I	I						
11	12	13	14	15	16	17	18	19	20
G	G	I	I						
21	22	23	24	25	26	27	28	29	30
G	G	I	I						

July 2010

1	2	3	4	5	6	7	8	9	10
G	G	I	I						
11	12	13	14	15	16	17	18	19	20
G	G	I	I						
21	22	23	24	25	26	27	28	29	30
G	G	I	I						
31									
G	G	I	I						

August 2010

1	2	3	4	5	6	7	8	9	10
G	G	I	I						
11	12	13	14	15	16	17	18	19	20
G	G	I	I						
21	22	23	24	25	26	27	28	29	30
G	G	I	I						
31									
G	G	I	I						

September 2010

1	2	3	4	5	6	7	8	9	10
G	E	E	E	E	E	E	E	E	E
11	12	13	14	15	16	17	18	19	20
E	E	E	E	E	E	E	E	E	E
21	22	23	24	25	26	27	28	29	30
E	E	E	E	E	E	E	E	E	E
31									
E	E	E	E	E	E	E	E	E	E

October 2010

1	2	3	4	5	6	7	8	9	10
I	I	I	I	I	I	I	I	I	I
11	12	13	14	15	16	17	18	19	20
E	E	E	E	E	E	E	E	E	E
21	22	23	24	25	26	27	28	29	30
A	A	A	A	A	A	A	A	A	A
31									
A	A	A	A	A	A	A	A	A	A

November 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	A	B	C	G			
11	12	13	14	15	16	17	18	19	20
A	A	A	A	B	C	G			
21	22	23	24	25	26	27	28	29	30
A	A	A	A	B	C	G			
31									
A	A	A	A	B	C	G			

December 2010

1	2	3	4	5	6	7	8	9	10
A	A	A	B	C	G				
11	12	13	14	15	16	17	18	19	20
A	A	A	B	C	G				
21	22	23	24	25	26	27	28	29	30
A	A	A	B	C	G				
31									
A	A	A	B	C	G				

All full bridge closures are subject to change and may not be allowed at the indicated start time due to high traffic volumes, traffic incidents, inclement weather or high wind warnings.



SPECIAL PROVISIONS

CONTRACT NO. MA 2267-000-002

104.21 — CELLULAR TELEPHONES

1 of 1

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.21 CELLULAR TELEPHONES.

104.21.01 DESCRIPTION. This work shall consist of furnishing and maintaining new or like new cellular telephones for use by the appropriate Administration personnel. The telephones shall be fully activated and operational at the time of delivery. The telephones shall be delivered to the Engineer at the time of the Notice to Proceed and shall remain operational and not returned to the Contractor until final acceptance of the entire project in conformance with GP-5.13.

104.21.02 MATERIALS.

Cellular Telephones

As approved by the Engineer

104.21.03 CONSTRUCTION. Not applicable.

104.21.04 MEASUREMENT AND PAYMENT. The number of cellular telephones required for this Contract is 2. The cellular telephones will not be measured but will be incidental to the Contract price for Maintenance of Traffic unless otherwise specified in the Contract Documents. The work includes furnishing and installing the telephones, activation fees, battery replacement, monthly service fees, extensive coverage charges, air time (peak and nonpeak time per minute), roaming rates, long distance fees in conformance with the schedules provided, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. If any of the telephones become defective, are stolen, or for any other reason do not function as intended, they shall be replaced with a like kind unit at no additional expense to the Administration. Nonfunctioning or stolen telephones shall be replaced within eight hours after the Contractor is notified by the Engineer.

Ownership of the telephones will remain with the Contractor. The Administration assumes no responsibility or liability for the condition of the telephones when they are returned.



CATEGORY 100
PRELIMINARY

SECTION 113 — DIGITAL CAMERA

113.01 DESCRIPTION. This work shall consist of furnishing a new or like new digital camera with a Color Inkjet Printer for use by Administration personnel. The digital camera and printer shall be delivered to the Engineer at the time of the Notice to Proceed. They shall remain operational and not be returned to the Contractor until final acceptance of the entire project, in conformance with GP-5.13.

113.02 MATERIALS.

(a) **Digital Camera.** The digital camera shall meet the following requirements and be furnished with the specified accessories.

- (1) Windows 2000, ME, XP compatible operating system
- (2) Photo Suite, Photo Deluxe, Picture Works, Photo Shop, or similar Photo Managing Software
- (3) 4.0 megapixel image resolution (minimum)
- (4) 3X optical zoom (minimum)
- (5) Two (2) sets of rechargeable batteries
- (6) SmartMedia Card or memory stick (512 MB minimum)
- (7) Pop-up or built-in flash modes
- (8) All items required for quick downloading
- (9) Auto-quick focus
- (10) Lens Cover, Shoulder Strap, and Carrying Case
- (11) AC adapter and Battery Charger

(b) **Color Inkjet Printer.** The printer shall conform to the following minimum requirements;

- (1) Resolution of 2400 x 1200 DPI (dots per inch).
- (2) Print speed of 17 PPM (pages per minute) for black and white and 13 PPM for color.
- (3) Memory 8 MB.
- (4) Duty cycle of 5,000 pages/month.

Office-jets and Bubble-jets will not be accepted.

113.03 CONSTRUCTION. Not applicable.



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113 — DIGITAL CAMERA

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113.04 MEASUREMENT AND PAYMENT. The digital camera will not be measured but the cost will be incidental to the Contract price for Maintenance of Traffic unless otherwise specified in the Contract Documents. If the digital camera or printer becomes defective, is stolen, or for any other reason does not function as intended, it shall be replaced with an approved camera or printer at no additional cost to the Administration. A nonfunctioning or stolen camera or printer shall be replaced within eight hours after the Engineer notifies the Contractor.

Ownership of the camera and printer will remain with the Contractor. The Administration assumes neither responsibility nor liability for the condition of the camera when returned.



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**CATEGORY 400
STRUCTURES**

SECTION 400-01 – MISCELLANEOUS REIMBURSABLE EXPENSES

400-01.01 DESCRIPTION. To provide for miscellaneous reimbursable expenses throughout the term of the Contract, such as Railroad insurance in accordance with State and Federal Regulations, etc.

This item will only be used if necessary and will not be used without approval of the Engineer.

400-01.02 MATERIALS. Not applicable.

400-01.03 CONSTRUCTION. Not applicable.

400-01.04 MEASUREMENT AND PAYMENT. Payment for this item is included in the Reimbursable Railroad Permit Expenses item. There is no guarantee that any or all of this item will be used during the term of this Contract.



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CATEGORY 400 STRUCTURES

SECTION 400.02 – CONTINGENT MISCELLANEOUS REPAIRS AND MODIFICATIONS

400-02.01 DESCRIPTION. An allowance of \$450,000 has been included in the proposal book to perform miscellaneous structural repairs assigned by the Engineer within the project site. The scope of repair will be determined by the Engineer.

This item will only be used if necessary and will not be used without approval of the Engineer.

400-02.02 MATERIALS. Not applicable.

400-02.03 CONSTRUCTION. Not applicable.

400-02.04 MEASUREMENT AND PAYMENT. All work performed under this item will be measured and paid for in accordance with TC-7.03 of the Standard Specifications. If the Contractor and the Engineer can agree upon unit prices or other method of payment, the agreed upon method of measurement and payment shall then be used. There is no guarantee that any or all of this item will be used during the term of the Contract.



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**CATEGORY 400
STRUCTURES**

SECTION 400-03 — PRESSURE INJECTED EPOXY CRACK REPAIR

400-03.01 DESCRIPTION. Epoxy injection of cracks shall include the furnishing and placing of an epoxy at crack locations such as abutments, bents, deck slabs, pier columns, pier caps, and other locations as directed by the Engineer.

400-03.02 MATERIALS.

Epoxy grout 902.11(d)

The epoxy resin shall conform to C 881, Type I. The grade shall be submitted for the Engineer's approval after the Contractor's analysis of areas to be injected.

The system shall be moisture insensitive and shall not be used when the ambient or concrete temperature is 50 F or below, nor temperatures lower than recommended by the manufacturer.

The expiration date of acceptance of this material shall be one year after the date of manufacture. Any unauthorized tampering or breaking of the seals on the containers between the time of sampling and delivery to the job site will be cause for rejection of the material.

400-03.03 CONSTRUCTION. The locations for the pressure injection of cracks will be delineated by the Engineer.

The Contractor shall ensure that the epoxy manufacturer's technical representative will be present for the duration of the injection process, and shall submit details of the proposed method of repairs and the injection procedure for the Engineer's approval.

The epoxy injection equipment shall be a positive displacement pump system. The system shall have a suitable mixing chamber where the epoxy components are accurately metered and thoroughly mixed immediately prior to injection. A clear, legible, and accurate pressure gauge shall be located in the supply line adjacent to the mixing chamber.

The equipment shall also be capable of providing a continuous and uninterrupted pressure head to continually force the injection of epoxy into the cracks. Epoxy flow shall be capable of being fully controlled by the operator controls at the mixing chamber.

All working personnel shall be familiar with the equipment, materials and procedures to be used during the operation.

All materials and equipment, including backup equipment, shall be at the work site before injection operations begin. All equipment shall be in proper calibration and in good working order as determined by the Engineer.



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Epoxy shall be injected only by the use of the automatic mechanical pumping, metering, and mixing equipment described above. Pressure pot systems and caulking guns or grease guns will not be permitted.

The two components shall be mixed in conformance with the manufacturer's recommendations. The ratio of the components shall be maintained within a tolerance of five percent.

Acceptable solvents used for cleaning shall include mineral spirits, methyl ethyl ketone, acetone, low boiling naphtha, xylene, and any other nonchlorinated solvent.

400-03.03.01 Port Installation. Prior to injection of the epoxy in the crack, a surface seal material shall be applied to the face of the crack to prevent the liquid resin from leaking out. The surface seal material shall be useable on vertical, horizontal and overhead applications and shall completely bridge the crack when applied to the face of the crack.

Openings to inject the epoxy shall be established through the surface seal material along the entire length of the crack and entry ports shall be provided. The holes shall be 3/4 in. diameter, spaced 6 to 12 in. apart and be of sufficient depth to ensure maximum dissemination of the pressure of the epoxy throughout this area.

Inserts shall be set in drilled holes and the holes shall be cleaned to remove any dust or debris left by drilling operations. Special care shall be exercised to assure that oil or other contaminants are not introduced into the air feed hoses, or deposited on any air blown surfaces.

400-03.03.02 Injection. The epoxy shall be forced into the internal voids and cracks by means of hydraulic pressure to completely fill all internal voids. If the surface seal material has insufficient strength and adhesion to confine the injected epoxy until it has cured, the Contractor shall remove the surface seal material and furnish and place a new surface seal material at no additional cost to the Administration.

Before injecting any epoxy, the automatic mixing and metering pump shall be activated and approximately 1 pt of the epoxy shall be mixed and pumped into a disposable container. The Engineer will observe this trial operation to determine that the equipment is working properly. If the equipment is not working properly, it shall be immediately repaired to full working condition or replaced with the backup equipment. If the backup equipment is used, additional and fully operable equipment shall be provided as its backup equipment.

The feed line from the mixing equipment shall be securely held or properly attached to the port. The operator shall then initiate the epoxy injection in conformance with the manufacturer's recommendations.

Injection shall be started at the lowest row of holes and at the hole nearest the center line of structure. Injection shall continue at the first port until the epoxy begins to flow out of the port at the next highest elevation. The first port shall then be plugged and injection started at the second port until the adhesive flows from the next port. This sequence shall continue until the entire crack is repaired.



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The injection procedure shall be monitored to assure the epoxy flow does not cease before the injection epoxy exudes from the adjacent port. If the epoxy flow stops before epoxy appears at the adjacent port, the feed line shall be moved to the adjacent port and the port just used shall be sealed.

During the course of all operations, extreme care shall be given to observe for breaking out of epoxy. When breaking out occurs, the injection shall stop and the line shall be moved to another crack. Injecting may be resumed in the original location after a minimum elapse of 24 hours.

A continuous injection operation shall be accomplished by replenishing the epoxy supply tanks in the mixing equipment before they are exhausted. Each epoxy component shall be thoroughly stirred before adding it to its respective storage tank in the mixing equipment. No discontinuity of epoxy flow through the feed lines of either component shall be allowed.

Any work stoppage permitting mixed epoxy to remain in the injection equipment more than 15 minutes shall require cleaning the mixing chamber and all equipment in contact with the mixed epoxy. Quantities of epoxy purged from the injection equipment shall not be included for payment.

After the injection process has been completed and the epoxy allowed to fully cure, the injection ports and surface seal shall be removed from all surfaces. Ports shall be cut or knocked off, while the surface seal and any spillage shall be ground off flush with the original surface.

Any damage to the concrete due to the Contractor's operations shall be repaired in a manner satisfactory to the Engineer at no additional cost to the Administration.

The cured injected epoxy shall have penetrated a minimum of 90 percent of the visible crack. Acceptance will be based upon drilling cores of the repaired concrete to determine the depth of penetration from representative locations selected by the Engineer. If the penetration is less than 90 percent of the visible crack along the sides of the core, the crack from which the core was taken will be deemed unsatisfactory and will not be included for payment. A minimum of three 4 in. diameter core samples for the full crack depth of the member or area being repaired shall be required for each 100 ft or fraction thereof per job site. The cored holes shall be filled with epoxy grout.

400-03.04 MEASUREMENT AND PAYMENT. The preparation of cracks, including chipping, cleaning, sealing, installation and removal of injection ports, testing of repairs, repairing of cored holes and for all material, labor, equipment, tools and incidentals necessary to complete the item will be measured and paid for at the Contract unit price per linear foot for the pertinent Pressure Injected Epoxy Crack Repairs item. The epoxy used shall be incidental to this item.



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**CATEGORY 400
STRUCTURES**

**SECTION 400-04 — TROWEL GRADE MORTAR
FOR BRIDGE REPAIRS**

400-04.01 DESCRIPTION. This work shall consist of furnishing and placing trowel grade mortar for repairing bridge abutments, deck slabs, pier columns, pier caps, and other locations as specified herein or as directed by the Engineer.

400-04.02 MATERIALS.

Synthetic Fibers	902.06.06
Curing Materials	902.07
Mortar for Grout	902.11(a) or (b), 4500 psi
Reinforcement	908.01, 908.02, and 908.08
Water	921.01

The mortar shall be fiber reinforced, trowelable, patching mortar designed for overhead use. Color shall match existing.

400-04.03 CONSTRUCTION. Construction shall be as specified in Section 423 except that trowel grade mortar shall be used.

All surfaces of the removal areas shall be either vertical or horizontal after preparation. Feathered edges shall not be permitted.

400-04.04 MEASUREMENT AND PAYMENT. Trowel Grade Mortar Repairs in place for Bridges and other locations will be measured and paid at the Contract unit price per cubic foot. The payment will be full compensation for all removal of existing deteriorated concrete, cleaning existing reinforcing steel, furnishing and placing new reinforcing steel as required, drilling and grouting holes, furnishing and installing wire fabric, furnishing and placing trowelable mortar, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.



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**CATEGORY 400
STRUCTURES**

SECTION 400-05 — NONSHRINK GROUT FOR BEARING REPAIRS

400-05.01 DESCRIPTION. This work shall consist of repairing deteriorated concrete in a bearing area with nonshrink grout.

400-05.02 MATERIALS.

Reinforcement	908.01 and 908.08
Epoxy Protective Coating	917.01, Match Existing Color
Nonshrink Grout	902.11(c)

The nonshrink grout may contain pea gravel conforming to the gradation of the following table. The quality and laboratory test methods shall conform to 901.01 except that the plasticity index shall not exceed 9.

SIEVE SIZE	PERCENT PASSING
3/4 in.	100
1/2 in.	85-100
3/8 in.	70-100
No. 4	0-55
No. 8	0-15
No. 16	0-8

400-05.03 CONSTRUCTION. The removal of the deteriorated concrete portions of the existing structure shall be in conformance with Section 423.

All areas to be repaired shall be reinforced with welded steel wire fabric in addition to the reinforcement steel. Installation of fabric shall conform to 423.03.04 except that the fabric may be wired to existing reinforcement without the use of expansion bolts, etc., where approved by the Engineer.



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Test cubes (cylinders if pea gravel is used) shall be made of the nonshrink grout for each pour. Test specimens shall reach a minimum compressive strength of 3500 psi before lowering the jacked beam. The repaired bearing area shall be epoxy coated as specified in Section 464.

400-05.04 MEASUREMENT AND PAYMENT. All nonshrink grout, complete in place, including scaffolding, removal of existing deteriorated concrete, cleaning and epoxy touch up of existing reinforcement steel, furnishing and placing new reinforcement steel as required, drilling and grouting holes, furnishing and installing welded steel wire fabric, forming, furnishing and placing nonshrink grout, making and transporting test cubes or cylinders, curing, applying epoxy protective coating and any other material, labor, equipment, tools, and incidentals necessary to repair the deteriorated concrete will be measured and paid for at the Contract unit price per cubic foot grout in place for the pertinent Nonshrink Grout for Bearing Repair items.



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**CATEGORY 400
STRUCTURES**

SECTION 400-06 — JACKING BEAM OPERATIONS

400-06.01 DESCRIPTION. This work includes the jacking of existing beams for repairs as specified in the Contract Documents, or as directed by the Engineer.

Expected jacking loads (dead load and live load plus impact) for this Contract are between 35K to 80K as per Maryland State Highway Standard No. BR-SR (0.03)-95-306.

400-06.02 MATERIALS. Refer to the Standards and Sections 430, 435, and 902.11.

400-06.03 CONSTRUCTION. Construction shall be as shown on the Plans. All field welding shall be done by the shielded metal-arc process. All requirements of the Contract Documents shall be adhered to except that for temporary installation, the requirements for radiographic and ultrasonic inspection will be waived if the Engineer's visual inspection indicates the welds are satisfactory.

The Contractor may submit an alternate jacking beam or method to those specified in the Contract Documents to the Engineer for approval. Alternate jacking beams shall comply with the following restrictions:

- (a) The material may be used but shall be in new condition.
- (b) The section modulus and web area (depth x thickness) shall not be less than the jacking beams shown in the Contract Documents unless otherwise specified.
- (c) If the connection detail, stiffener plate detail or jacking method are changed, the Contractor shall submit detailed calculations to the Bridge Inspection and Remedial Engineering Division for approval. These calculations shall be stamped by a professional engineer registered in the State of Maryland.

Jacking beams shall be set level unless otherwise specified in the Contract Documents. The Contractor may cut the existing anchor bolts above the nut to achieve a level beam. In no instances will the Contractor be permitted to chip away the concrete end diaphragms to achieve a level jacking beam.

Areas under the proposed jacks shall be thoroughly cleaned to provide a flat, clean jacking surface. Jacking surfaces that are not level or have slightly deteriorated concrete areas shall be repaired to a flat level surface with the application of nonshrink grout. The minimum thickness of the grout shall be as recommended by the manufacturer.



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If the Engineer determines that any jacking surface contains highly deteriorated concrete, all work at that location shall be delayed and provisions for pneumatically applied mortar or cast in place concrete repairs shall be initiated to restore the surface to full capacity for the jacking operations.

The Contractor shall utilize the correct scheme and jack capacity corresponding to the particular bearing being repaired as shown in the Contract Documents. Any damage resulting from the Contractor's misuse of the jacking schemes to any portion of the existing bridge that is to remain in place shall be repaired by the Contractor to the complete satisfaction of the Engineer, at no additional cost to the Administration.

Any steel that has been welded to the existing bridge shall not be removed but shall remain in place. The Contractor may opt to leave the jacking beam in place unless otherwise specified.

The Engineer will determine if any additional bearings are to be repaired by use of a jacking operation.

400-06.03 Jacking Requirements and Restrictions. The Contractor shall conform to the following requirements and restrictions during the jacking sequences to provide for a safe repair of deteriorated bearing pedestals, pier caps, and bearing assemblies.

The Engineer or his representative shall be present during all jacking operations to check all pertinent dimensions and to ensure conformance with all pertinent Contract requirements before commencement of the actual jacking.

Jacks with a higher capacity than those listed in the Contract Documents may be allowed, but the Contractor shall monitor the jack load to ensure the safety of the bridge.

The jack system shall be equipped with a direct reading gauge to directly read the jack force in pounds or kips. However, a gauge accompanied by a chart with which the dial reading can be converted into pounds may be used if approved by the Engineer.

An existing bearing may not be raised more than 1/8 in. higher than its as built elevation unless otherwise specified. The maximum jacking forces shown in the Contract Documents shall not be exceeded.

Test cubes or cylinders of the nonshrink grout or concrete used for bearing pedestal repairs shall be made. The beams shall not be lowered in place until the test specimens achieve 3500 psi minimum compressive strength.



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The jack hydraulics shall not be used to support the load after jacking. However, the Contractor may use a jack with a locking nut if approved by the Authority's Engineering Division. In the event that any of the above requirements or restrictions cannot be met, the Engineer will notify the Authority's Engineering Division.

400-06.04 MEASUREMENT AND PAYMENT. Erecting and jacking, including all materials, labor and equipment necessary for jacking the existing beams, removing the jacking beam assemblies and cleaning and painting the steel and bearings in the repair area will be measured and paid for at the Contract unit price per each on the pertinent Jacking Existing Stringer item.

The payment will be full compensation for fabricated structural steel; removal, storage, and reinstallation of existing steel end diaphragms or cross frames where required; bolts; paint; welding; jacking bearing plates; hydraulic jacks; any temporary timber blocking; scaffolding; providing nonshrink grout leveling pads if necessary; painting the steel and bearing assemblies; and for all material, labor, equipment, tools, and incidentals necessary to complete the work.



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**CATEGORY 400
STRUCTURES**

SECTION 400-07 CONCRETE BRIDGE DECK REPAIRS

400.07.01 DESCRIPTION

This work shall consist of on-call, partial or full depth removal and replacement of deteriorated concrete in reinforced concrete and steel grid decks.

400.07.02 MATERIALS

Refer to Subsection 426.02 of the Standard Specifications and the following:

A bonding agent, approved by the Engineer, shall be applied to all exposed concrete immediately prior to placement of fresh concrete.

The rapid setting mortar/concrete shall be one of the following products or an approved equal:

- Quikrete Rapid Road Repair #1242

-Bonsal Rapid Patch-VR manufactured by W. R. Bonsal Company in Charlotte, NC

-Sika Rapid-1 Hardening Accelerator manufactured by Sika Corporation in Lyndhurst, NJ added to mix no. 6 concrete

The bonding agent and mortar shall be from the same manufacturer.

Course Aggregate (1/2" maximum) shall be added to the rapid setting mortar in the proportion recommended by the manufacturer of the mortar/concrete.

400.07.03 CONSTRUCTION

Refer to Subsection 426.03 of the Standard Specifications and the following:

1. Concrete Deck Removal - The Engineer will outline the area to be repaired. In the reinforced concrete sections, a minimum 1" clearance shall be provided under the top mat of reinforcing steel.

Removal of concrete shall be limited to an area that can be repaired within the allotted work hours.



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Existing portions of grid deck shall be sandblasted if necessary and epoxy zinc rich coated. Care shall be exercised to prevent cutting or damaging any exposed reinforcement steel or steel grid.

Deck rebars shall be sand blasted as directed by the Engineer.

2. Proportioning and Mixing the Concrete Materials - Materials shall be mixed at the site in conformance with the specified requirements of the manufacturer and for the equipment used. The concrete discharged from the mixer shall be uniform in composition and consistency. Mixing shall be capable of permitting repair operations to proceed at a steady pace.

3. Placing of Concrete – Any required forms supplied to enable placement of the concrete may be suspended from the deck by wire ties. The top surface of the deck repair shall be even with the top of the remaining deck.

Apply a bonding agent to all surfaces where fresh concrete will be placed against existing concrete. While the bonding agent is still tacky, place the fresh concrete. If the bonding agent dries, another coat shall be required at no cost to the Authority.

The new concrete shall not be placed at temperatures lower than the manufacturer's specifications without approved cold weather protection.

Concrete placement shall be limited to an area that will allow an appropriate time for curing within the allotted work hours.

4. Curing of Concrete – The concrete shall be wet cured for a minimum of one hour. Curing compound may be used as a substitute when a water cure is not practical.

All traffic (Contractor's or public) is prohibited on the concrete repair area until the curing of the material is completed and has reached a minimum compressive strength of 2500 psi.

5. General Requirements - Grinding or chipping the existing concrete deck within 6 ft of a newly repaired area is prohibited until the concrete has cured for a minimum of 12 hours.

Adequate precautions shall be taken to protect freshly placed concrete repair areas from sudden or unexpected rain.

The finished concrete repair area will be part of the riding surface of the bridge. The top of the repair area shall be placed to the true as planned line and grade of the roadway. The Contractor shall take every reasonable precaution to secure a smooth riding bridge deck by placing the concrete in a manner that meets the grade and finish of the adjoining portions of the existing bridge deck.



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Any repairs of damage to the existing deck caused by the Contractor's operations will not be paid for by the Authority. The cost of repairing such areas shall be the sole responsibility of the Contractor.

400.07.04 MEASUREMENT AND PAYMENT

Deck repairs will be measured and paid for at the Contract unit price per square foot for the pertinent Deck Repair items. The payment will be full compensation for removing deteriorated concrete to the required depth, placing the repair materials, for all removal and cleaning, abrasive blasting, air blasting, flushing with water, forming, curing and disposing of material removed, wire fabric, and for all material, tools, including mixers, and incidentals necessary to complete the work.

Type II Deck Repairs in Reinforced Concrete Deck shall include areas where the depth of deck removal is 1 to 3 in. deep. Wire fabric will not be required for repair areas less than 2 ft².

Type III Deck Repairs in Reinforced Concrete Deck shall include areas where the depth of deck removal is over 3 in. deep but not full depth.

Type IV Deck Repairs in Reinforced Concrete Deck shall include areas where the depth of deck removal is full depth.

Partial Depth Deck Repairs in Concrete Grid Deck are defined as those in which the depth of repair extends only to a maximum of 50 percent of the vertical I-beam within the deck section.

Maintenance of Traffic for deck repairs will be paid for under other pertinent items. See Section 104 for details.



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**CATEGORY 400
STRUCTURES**

SECTION 423 — PNEUMATICALLY APPLIED MORTAR

423.01 DESCRIPTION

DELETE AND INSERT THE FOLLOWING:

This work shall consist of furnishing the materials, equipment and labor necessary for pneumatically applying Micro Silica, Fiber Reinforced Shotcrete mortar on concrete surfaces as specified in the Contract Documents and as directed by the Engineer. Elements of the structures to be repaired shall include bridge pier caps, columns, abutments, pedestals, and footings. In addition, the scope includes repairs to concrete toll islands, signs & high mast light pole foundations. The existing surfaces shall be cleaned and prepared to the extent that they are completely free of unsound concrete, or epoxy patches and other materials detrimental to achieving bond of a new material to the existing concrete. All work is to be performed in accordance with ACI 506.2-95. ACI Shotcrete Nozzleman Certification is required for this work.

423.02 MATERIALS

Refer to Subsection 423.02 of the Standard Specifications and the following:

A. Micro Silica, Fiber reinforced Shotcrete mortar shall be a prepackaged material containing Portland Cement, conforming to Subsections 902.03 and 902.06 of the Specifications, micro silica and synthetic fibers. The prepackaged binder or mortar shall be of recent manufacture and free of lumps. The shotcrete mortar shall be one of the following products, or an approved equal:

- * “Bay Bridge Shotcrete”, Shotcrete 300 (manufactured by Bonsal American Inc., Charlotte, NC).
- * FX-288 Micro Silica, Fiber reinforced Shotcrete Mortar (manufactured by Fox Industries, Inc.; Baltimore, Maryland).
- * Sika Repair 224 with fibers (manufactured by Sika Corporation; Lyndhurst, New Jersey).



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B. Sand shall be clean, sharp and free of clay, loam and silts conforming to Section 901. Coarse sand may be utilized for mortar except for flash or finish coats where a finer masonry sand must be used. All aggregate must be stockpiled on a clean paved area.

C. Water shall be potable fresh, clean and free from oil, salt, acids, alkali organic matter or other substances injurious to the finished product, conforming to Section 921.01. Chloride concentration shall not exceed 500 ppm.

423.02.01 Micro Silica, Fiber Reinforced Shotcrete Mortar Mix Design

The Micro silica, Fiber Reinforced Shotcrete mortar shall have the following minimum physical properties:

Compressive Strength	ASTM C-109
36 hours	3000 psi
7 days	6000 psi
28 days	8000 psi
Flexural Strength	ASTM C-78
28 days	1600 psi
Tensile Strength	ASTM C-496
7 days	700 psi

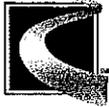
423.02.02 Equipment

All equipment for the concrete preparation, mixing, placing and finishing of polymer shotcrete shall be approved by the Engineer prior to start of any work.

Surface preparation equipment shall be of the following types:

- A. Pneumatic hammers shall be nominal thirty (30) pound class or lighter.
- B. Sandblasting equipment shall be capable of removing rust scale from the reinforcement bars and small chips of concrete partially loosened by the chipping operation.

The type of equipment used to mix materials and apply shotcrete shall be as recommended by the manufacturer of the admixtures and approved by the Engineer. It shall be



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equipped with proper air control valves and gauges to allow necessary adjustments required for various hose lengths which carry the modified concrete materials.

The minimum size of the air compressor shall be as recommended by the equipment manufacturer. The air from the compressor shall be free of any oils.

423.03 CONSTRUCTION

Refer to Subsection 423.03 of the Standard Specifications and the following:

A. General

1. Except as modified herein, mortar and reinforcing shall be installed in accordance with the applicable provisions of Subsection 423.03 of the Specifications and the Special Provision inserts.

2. The work to be performed shall consist of the installation of reinforcing, material, mortar, and shall also include chipping, cleaning, burning, cutting, sandblasting and all other incidentals necessary to complete the proposed work. The specific locations of work will be determined by the Engineer and will be submitted to the Contractor prior to beginning work.

3. The job foreman shall be a working foreman and normally act as supervisor. A job superintendent shall, however, be required to visit the site at least once a week and at the request of the Authority.

4. The foreman should have good personal experience, preferably including not less than 2 years as a shotcrete nozzle man.

5. The nozzle man should have served at least 6 months apprenticeship on similar applications and should be able to demonstrate by tests his ability to perform satisfactorily his duties and to apply shotcrete of the required quality.

B. Equipment

1. Cement Gun - The pneumatic mixing and delivery equipment shall be of sufficient capacity to deliver material to the material hose continuously during the upper chamber charging period.



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2. Gaskets - Gaskets in the equipment shall be kept in good condition to avoid reduced pressure and subsequent reduced velocity of material during the charging periods.

3. Hose & Nozzle - The length of material hose for the application of shotcrete shall be approximately 100 ft. although it shall be permissible to use as much as 500 ft. of material hose if the supply nozzle pressures are increased to maintain proper velocity.

C. Testing & Quality Control

1. The nozzle man must initially pre-qualify by shooting small (3 ft. x 3 ft.) unreinforced test panels from which cores and cubes shall be extracted for compressive and visual examinations. In order to demonstrate his capacity to consistently perform quality work, the Contractor may receive periodic requests from the Engineer to make test panels. These test panels shall be made and tested in accordance with the requirements of ACI 506.2-77 (Revised 1983). These test panels shall also serve to verify that the applied shotcrete mixture meets the specified requirements. Any failures in performance or mixture shall then be corrected prior to the execution of the remainder of the work.

2. Test cores will also be taken from the completed work to insure that the control tests reflect the quality of material in the structure.

D. Surface Preparation

1. The Engineer or his authorized representative will inspect and test designated concrete surfaces by means of a geologist's hammer to determine the areas that have deteriorated and which require repairs. The Contractor shall not begin any repairs until directed to do so by the Engineer.

2. All loose, deteriorated, damaged, fouled and porous material shall be removed to clean, solid concrete and to such a depth that the thickness of the repairs will be at least two (2") inches; except at the perimeter of the cavity. The chipped cavity shall not contain off-sets which would cause abrupt changes in thickness of the repair. The perimeter of all prepared repair areas shall be perpendicular to the surface with a one-half inch (1/2" \pm) depth. No feathering at the edges will be permitted. Where the existing reinforcing is encountered, the bar's entire circumference shall be exposed by means of pneumatic hammers unless other means are approved by the Engineer.



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3. The structural integrity of the concrete piers, abutments, and other members shall be maintained at all times. If more than 10% of the reinforcing of any pier column, pier cap, abutment, or other member is exposed at any cross-section, the Engineer shall be consulted to determine if the strength of any member is in jeopardy. If so, the contractor shall take such measures or sequence of repairs to maintain the integrity of the structure.

4. After exposing the reinforcing of any member in accordance with Paragraph 3 above, the exposed areas shall be shotcreted within one week after exposure. Prior to shotcreting, the reinforcing steel and concrete shall be inspected for corrosion or contamination. Additional cleaning of surfaces may be required.

5. After all deteriorated concrete has been removed, the concrete surface shall be thoroughly cleaned prior to placing shotcrete. The entire surface shall be rinsed by flushing or scouring with water and compressed air to assure removal of all loose particles. The air pressure at the nozzle shall not be less than 50 psi and the water pressure shall be 20 psi greater unless otherwise directed by the Engineer.

E. Cleaning and Replacing Existing Reinforcing Steel

1. Existing reinforcing steel which has been exposed and is to be incorporated into the new work shall be thoroughly cleaned of all loose rust, concrete and other foreign materials. It is anticipated that most of this deleterious material will be removed by the surface cleaning of the concrete. However, any remaining rust, concrete and foreign material shall be removed by sandblasting or a method approved by the Engineer.

2. Reinforcement shall be used when voids are equal to or greater than 2 square feet in area and shall be well secured to insure no displacement from impact of the shotcrete during application. Reinforcement shall be anchored by means of 3/8 inch diameter expansion hook bolts spaced a maximum of 18 inches in each direction. The full area of mesh shall be held firmly in position by means of 16 gauge wire ties. The reinforcement shall not be less than 1/2 inch from the surface on which the shotcrete is to be placed, and there shall be not less than 3/4 inch between the reinforcement and the final surface of the shotcrete.

3. Where it is necessary to replace reinforcing steel, bars of equivalent cross sectional areas shall be welded to the existing steel with a continuous 3/16" fillet weld. A minimum lap of two inches (2") shall be required.



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4. In large voided areas the shotcrete shall be applied in layers no thicker than 4 inches.

5. Where more than one-half (1/2) the diameter of the steel is exposed, the concrete adjacent to the bar shall be removed to a depth of one (1) inch below the bar which will permit modified shotcrete to bond to the entire periphery of the bar so exposed.

F. Placing Micro Silica, Fiber Reinforced Shotcrete Mortar

1. Before any mortar is placed, the surface of the concrete and reinforcing shall be inspected for soundness and cleanliness by the Engineer. All unnecessary wires, chairs, etc. shall be removed. The Contractor shall notify the Engineer 24 hours in advance of performing any shotcreting operations so that visits to the site may be properly scheduled.

2. Before shotcreting begins and within twenty-four (24) hours, the entire concrete surface and rebars shall be sandblasted to white metal. The surfaces of previously placed shotcrete layers shall be sandblasted to remove the plastic film and air dried surface to promote bond. If the surface contains grease, oil, dirt or other foreign matter, sandblasting, detergent cleaning, water blasting and/or air blasting or any combination thereof shall be required to insure bond. All unchipped surfaces shall be mechanically roughened prior to receiving shotcrete. The prepared surface shall finally be washed with clean, fresh water and kept moist for a period of not less than thirty (30) minutes. Immediately following this wetting period, the shotcrete shall be applied. Forty-eight (48) hours of good curing shall have elapsed prior to chipping on adjacent concrete within fifteen (15) feet of shotcrete previously placed.

3. Shotcrete shall be applied in layers so that no sagging or separating of the material will occur. The nozzle shall be held generally from three (3) to four (4) feet from the surface being covered and held such that the material strikes at as near perpendicular as possible without excessive impact. The water content shall be maintained at a practicable minimum so that the mix will properly adhere. The water content shall not be high enough to cause the mix to sag or fall from the surface being shotcreted nor to separate in horizontal layers. The shotcrete shall be built up to the original surface.

4. Sequence of application on vertical surfaces shall be from bottom to top with approximately a 45-degree slope, and that rebound be kept out of the work.



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5. Surfaces not to receive shotcrete shall be protected from mortar spray and rebound. Adjacent surfaces which are coated or damaged shall be restored to their original condition by the Contractor.

6. Shotcreting shall be suspended when:

- a. High wind separates the cement from the sand at the nozzle.
- b. Rains occur which may wash cement out of freshly placed material and cause sloughs in the work.
- c. Micro Silica, Fiber Reinforced Shotcrete mortar cannot be placed at temperatures lower than forty-five degrees F. It may be placed at forty-five (45) degrees F. and rising. Temperatures below fifty-five (55) degrees F. will require a longer cure period.

G. Finishing

After the surface has taken its initial set, excess material shall be removed with a sharp edged trowel or screed to produce a uniform surface. The surface shall then be given a thin flash coat of shotcrete mortar, which shall bring the surface to within 1/8" of the finished surface. The finish coat shall be applied to the fresh shotcrete mortar surface as soon as possible after the screeding. Surfaces exposed to view shall be given either a brushed finish or a steel trowel finish, whichever matches the existing adjacent surfaces. All finishing shall be done while the mortar is still plastic. Any over spray of shotcrete shall be cleaned by the Contractor at the direction of the Engineer.

H. Curing

If wet cure is employed, it shall be kept wet for the first 7 days and maintain temperature of 40 degrees F.

I. Safety

All scaffolding, ladders, belts, harnesses, lifelines and other safety equipment used to reduce hazards to the workers shall be in compliance with regulations set forth in the Occupational Safety and Health Act (OSHA) and provisions of the American National Standard Institute (ANSI).



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J. Certificates of Compliance

Prior to the delivery of material, the Contractor shall submit a certificate stating that the materials to be used meet the requirements of these specifications. Supporting test reports, physical properties, shall be submitted with the certificate showing actual values.

423.04 MEASUREMENT AND PAYMENT

The removal of concrete as required for the mortar shotcrete repair areas shall be incidental to the contract unit prices bid for the pertinent Pneumatically Applied Mortar Repairs items.

Measurement and payment for the micro silica, fiber reinforced shotcrete mortar repairs shall be made at the contract unit price bid per cubic foot of mortar in place.

The unit price bid shall include all materials, labor, tools, equipment and all incidentals necessary to complete this item of work including hauling, preparation of surfaces, sand, reinforcement, epoxy coating, anchor bolts, finishing, curing and cold weather protection as required by these Special Provisions and/or as directed by the Engineer.

All equipment, materials and labor including contingencies, operating costs, barges, boats, scaffolding, and staging to access the repair areas, any necessary marine closures, test panels, etc, will be considered incidental to the above pay items.



CATEGORY 900
MATERIALS

665 **DELETE:** SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS in its entirety.

INSERT: The following.

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.01 STORAGE. Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT. The manufacturer shall furnish certification as specified in TC-1.02. The certification shall also include:

- (a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.
- (b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.
- (c) Records of data accumulated by the quality control procedures shall be produced upon request.
- (d) A certified document shall accompany each shipment stating that the contents conform to all applicable requirements. Additionally, the document shall show the producer's name, mill location, carrier number, date loaded, weight contained in carrier, silo number, consignee, destination, Contract number, and type of cement. The signature and title of the signer shall be shown on the document.
- (e) The mill shall, upon request, supply certified chemical and physical test values that can be associated with any sample representing cement drawn from a particular silo on a given date.
- (f) Acceptance of cement by certification will be terminated if test results differ from mill results by more than the precision limits given in the test method. The acceptance procedure will then revert to storage testing and approval prior to shipment.

902.03 HYDRAULIC CEMENT.

902.03.01 Portland Cement. M 85, with the fineness and the time of setting determined using T 153 and T 131, respectively.



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902.03.02 Ground Iron Blast Furnace Slag. M 302, Grade 100 or 120. The Contractor may request to substitute a maximum of 50 percent of the weight of cement with ground iron blast furnace slag. When ground iron blast furnace slag is used, the minimum cement factor and water/cement ratio will be determined on the basis of the combined weight of the portland cement and ground iron blast furnace slag. When ground iron blast furnace slag is used to control alkali silica reactivity, see Table 902 B for percentage.

902.04 BLENDED HYDRAULIC CEMENT. M 240, Type I (PM) or a Type IP containing 15 to 25 percent pozzolan by weight of cement. Maximum loss on ignition is 3.0 percent. Do not use ground iron blast furnace slag for blending. The requirement for a manufacturer's written statement of the chemical composition is waived.

902.05 MASONRY CEMENT. C 91, except the water retention and staining tests are waived.

902.06 CONCRETE ADMIXTURES. Do not use concrete admixtures that contribute more than 200 ppm of chlorides based on the cement content when tested per MSMT 610. Use only prequalified admixtures.

Do not use pozzolan and Type I (PM) or Type IP cement in the same mix. Since the strength gains are delayed with these materials, a longer period of time may be required for curing and form removal.

902.06.01 Air Entraining Admixtures. M 154.

902.06.02 Chemical Admixtures. M 194, Type A, D, or nonchloride C.

902.06.03 High Range Water Reducing Admixtures. M 194, except that it shall be a liquid, the water content shall be a maximum of 85 percent of that of the control, and the durability factor shall be a minimum of 90. Use Type F for early strength, which shall produce a minimum compressive strength in 12 hours of 180 percent of that of the control. Use Type G when early strength is not specified. The manufacturer shall furnish certification as specified in TC-1.02. The certification shall include curves indicating the fluid ounces of admixture per 100 lb of cement as related to water reduction and strength gain for 12 hours when used with a minimum cement factor of 700 lb.

902.06.04 Pozzolans. The use of pozzolans may be requested to control alkali silica reactivity or for other reasons. When a pozzolan is used, determine the minimum cement factor and water/cement ratio on the basis of the combined weight cement and pozzolan. See Table 902 B for percentage of fly ash, and microsilica.

(a) **Fly Ash.** M 295, pozzolan Class C or F, except that the maximum permissible moisture content shall be 1.0 percent, and when used in concrete Mix Nos. 3 and 6 the maximum loss on ignition 3.0 percent.

(b) **Microsilica.** C 1240, except that the oversize requirement is waived.



902.06.05 Corrosion Inhibitors. Corrosion inhibitors shall be calcium nitrite based and contain a minimum of 30 percent active ingredients by mass. The gallonage of corrosion inhibitor used in the concrete mixture shall be included as water when determining the water/cementitious materials ratio.

902.07 PORTLAND CEMENT CONCRETE CURING MATERIALS. Use burlap cloth, sheet materials, liquid membrane forming compounds, or cotton mats.

902.07.01 Burlap. M 182, Class 1, 2, or 3.

902.07.02 Sheet Materials. M 171 with the following exceptions:

- (a) **White Opaque Burlap Polyethylene Sheeting.** Tensile strength and elongation requirements are waived. Use sheeting having a finished product weight of not less than 10 oz/yd².
- (b) **White Opaque Polyethylene Backed Nonwoven Fabric.** 902.07.02(a), with the thickness requirement waived. Use material having a finished product weight of not less than 5 oz/yd².
- (c) **White Opaque Polyethylene Film.** Tensile strength and elongation requirements are waived.

902.07.03 Liquid Membrane. M 148. Field control testing of the white pigmented curing compounds is on the basis of weight per gallon. The samples shall not deviate more than ± 0.3 lb/gal from the original source sample.

902.07.04 Cotton Mats. Cotton mats consist of a filling material of cotton bats or bats covered with unsized cloth and tufted or stitched to maintain the shape and stability of the unit under job conditions of handling.

Use coverings of either cotton cloth, burlap or jute having the following properties:

- (a) Cotton cloth covering shall weigh not less than 6.0 oz/yd² and have an average of not less than 32 threads/in. of warp and not less than 28 threads/in. of filling. Use raw cotton, cotton comber waste, cotton card strip waste, or combinations thereof as the raw material used in the manufacture of the cotton cloth.
- (b) Burlap or jute covering for cotton mats shall weigh not less than 6.4 oz/yd² and shall have not less than 8 threads/in. of warp and not less than 8 threads/in. of filling. Use the grade known commercially as "firsts" and they shall be free from avoidable imperfections in manufacture and from defects or blemishes affecting the serviceability.

Use a cotton bat, or bats made of raw cotton, cotton waste, cotton linters, or combinations thereof, as the filling material for the mats. Mats shall weigh not less than 12 oz/yd².



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902.08 FORM RELEASE COMPOUNDS. Use form release compounds that effectively prevent the bond of the concrete to the forms. Form release compounds shall not cause discoloration of the concrete or adversely affect the quality or rate of hardening at the interface of the forms.

The flash point of the form release compound shall not be less than 100 F when tested per T 73.

902.09 PARAFFIN WAX. Use clear paraffin wax for use as a bond breaker for concrete. The flash point shall not be less than 380 F when tested under D 92.

902.10 PORTLAND CEMENT CONCRETE. Section 915 and as specified herein.

902.10.01 Proportioning. Prior to the start of construction, submit to the AME the source and proportions of materials to be used for each concrete mix. The mixture shall meet 902.10.03.

The concrete, with the exception of water and chemical admixtures, shall be proportioned by weight. Water and chemical admixtures may be proportioned by volume or weight. The mix shall be uniform and workable.

902.10.02 Materials.

Coarse Aggregate	901.01
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Synthetic Fibers	902.15
Water	921.01

902.10.03 Portland Cement Concrete Mixtures.



The concrete mixes shall conform to the following:

TABLE 902 A

PORTLAND CEMENT CONCRETE MIXTURES									
MIX NO.	28 DAY SPECIFIED COMPRESSIVE STRENGTH	STANDARD DEVIATION	CRITICAL VALUE	MIN CEMENT FACTOR	COARSE AGGREGATE SIZE	MAX WATER/CEMENT RATIO	SLUMP RANGE	TOTAL AIR CONTENT	CONCRETE TEMPERATURE
	psi	psi	psi	lb/yd ³	M 43 / M 195	by wt	in.	%	F
1	2500	375	2430	455	57, 67	0.55	2 — 5	5 — 8	70 ± 20
2	3000	450	3010	530	57, 67	0.50	2 — 5	5 — 8	70 ± 20
3	3500	525	3600	580	57, 67	0.50	2 — 5	5 — 8	70 ± 20
4	3500	525	3600	615	57, 67	0.55	4 — 8	N/A	70 ± 20
5	3500	525	3600	580	7	0.50	2 — 5	5 — 8	70 ± 20
6	4500	675	4770	615	57, 67	0.45	2 — 5	5 — 8	65 ± 15
7	4200	630	4420	580	57	0.50	1½ — 3	5 — 8	70 ± 20
8	4000	600	4180	750	7	0.42	2 — 5	5 — 8	65 ± 15
9	3000 (a)	N/A	N/A	800	57, 67	0.45	4 — 8	5 — 8	70 ± 20
10	4500	675	4770	700	¾" — No. 4	0.45	2 — 5	6 — 9	65 ± 15
11	4200	630	4420	—	57, 67	0.45	2 — 5	5 — 8	65 ± 15
12	4200	630	4420	—	¾" — No. 4	0.45	2 — 5	6 — 9	65 ± 15

Note 1: When concrete is exposed to water exceeding 15,000 ppm sodium chloride content, Type II cement shall be used. In lieu of Type II cement, a Type I cement may be used in combined form with an amount of up to 50 percent replacement with ground iron blast furnace slag, or an amount of up to 25 percent replacement with Class F fly ash. The Contractor shall submit to the Engineer the proposed mix proportions and satisfactory test results per C 1012 showing a sulfate resistance expansion not exceeding 0.10 percent at 180 days

Note 2: The temperature of Mix No. 6 when used for other than superstructure work as defined in TC-1.02 shall be 70 ± 20 F.

Note 3: Type A or D admixture shall be added to bridge, box culvert, and retaining wall concrete.

Note 4: Nonchloride Type C admixtures may be used when approved by the Engineer.

Note 5: Other Slump Requirements:

When a high range water reducing admixture Type F or Type G is specified, the slump shall be 4 to 8 in.

When synthetic fibers are specified, the slump shall be 5 in. maximum.

When concrete is to be placed by the slip form method, the slump shall be 2-1/2 in. maximum.

When the absorption of the coarse aggregate is greater than 10 percent, the slump shall be 3 in. maximum.

Note 6: Mix 9 shall contain a Type F high range water reducing admixture.

Note 7: Mix 10 and 12 shall be proportioned as specified in 211.2 of the ACP's Recommended Practices for Selection

Proportions for. Structural Lightweight Concrete. The maximum average Density of Cured Concrete shall be 118 lb/ft³.

Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd³, or fraction thereof, as specified in M 195.

Note 8: Mix 11 and 12 shall also conform to all requirements as specified in Table 902 C.

(a) Acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours. Design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 12 hours. Testing shall conform to 902.10.08 except that cylinders shall remain in the molds until tests are conducted.

Coarse and fine aggregate having an expansion up to 0.10 percent when tested for alkali silica reactivity (ASR) MSMT 212 may be used without restriction. Aggregates having an expansion greater than 0.10 but less than 0.35 percent are considered reactive and may only be used when one of the options in table 902 B are employed. Those having an expansion of 0.35 percent and greater are prohibited.



TABLE 902 B

OPTION	ALKALI CONTENT OF CEMENT % max	REPLACE CEMENT WITH		SPECIFICATION
		MATERIAL	% BY WEIGHT	
1	1.50	Class F Fly Ash	15 – 25	M 295
2	1.50	Ground Iron Blast Furnace Slag	25 – 50	M 302 Grade 100 or 120
3	1.50	Microsilica	5 – 7	C 1240
4	—	Blended Cement (a)	100	M 240
5	0.60 (b)	Low Alkali Cement	100	M 85

- (a) Pozzolan content of 15 – 25 percent by weight of cement
- (b) For mix 9 used for Portland cement concrete pavement repairs; the maximum allowable percentage of alkalis in Portland cement shall be 0.70.

When reactive aggregate is used, designate which option will be used to control the formation of the ASR gel. If an option other than option 5 in Table 902 B above is chosen, conduct tests per MSMT 212 using the reactive aggregate and the proposed cementitious material. The expansion test results shall not be greater than 0.10 percent. When more than one reactive aggregate is used in a concrete mix, each shall be tested individually and the maximum amount of pozzolan required to reduce the expansion of all the aggregates to 0.10 percent or less shall be used. Submit the aggregate source, test results, and the percent and type of replacement cement to the Engineer. The Engineer may withhold source approval pending verification testing.



TABLE 902 C

MIX PHYSICAL PROPERTIES		
TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Minimum Cementitious Materials Factor, lb/yd ³	—	580
Maximum Content of Portland Cement, lb/yd ³	—	550
Water/Cementitious Materials Ratio by Wt.	—	0.45
Corrosion Inhibitor, gal/yd ³	902.06.05	2.0
Synthetic Fibers, lb/yd ³	902.15	1.5
Permeability of Field Concrete, moving average of three tests, coulombs max	T 277 Modified	2500
Permeability of Field Concrete, individual test, coulombs max	T 277 Modified	3000
Shrinkage at 28 days, microstrains	C 157	400

Note 1: Only Type I or II Portland cement shall be used.

Note 2: Mixes shall contain ground iron blast furnace slag, fly ash or microsilica.

Note 3: The water to cement ratio shall be based upon the total water to cementitious materials ratio. The gallonage of the corrosion inhibitor shall be included in the water/cementitious materials ratio.

Note 4: The permeability test value of field concrete shall be the average of two test specimens representing production concrete. Test specimens shall be molded on the project site in 4 x 8 in. molds conforming to M 205. Test specimens shall be handled under same conditions as compressive strength test specimens in conformance with C 31 for the first seven days. When seven days old, they shall be cured in a 100 F water bath for the remainder of the 28 day curing. The 28 day rapid chloride permeability of the specimens will be determined in conformance with T 277. Test for the geometry of test specimens will be waived.

Note 5: Shrinkage tests will be performed on trial mixes only.

Note 6: High range water reducing admixture may be used except the water reducing requirements will be waived.

Note 7: A sealer conforming to 902.12 shall be used on the finished surface.

902.10.04 Trial Batch. A trial batch shall be prepared to certify that each mix meets 902.10.05 and 902.10.06. Approval will be given when the test results meets the minimum required average strength.

Make arrangements with the AME at least two weeks in advance, to have an authorized representative present during the batching and testing. Each trial batch shall consist of at least 3 yd³ of concrete. Supply all equipment, and labor required to produce the trial batches and conduct the required tests at no additional cost to the Administration.

The AME may waive the requirement for a trial batch when past performance records show that the required average strength requirement has been met.



902.10.05 Design Required Average Strength.

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' \leq 5000$	Use the larger value computed from Eq. (A-1) and (A-2) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = f_c' + 2.33s - 500$ (A-2)
Over 5000	Use the larger value computed from Eq. (A-1) and (A-3) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = 0.90 f_c' + 2.33s$ (A-3)

where:

f_c' = the 28 day specified compressive strength.
 s = the standard deviation as specified in 902.10.06.

A test is defined as the average strength of two companion cylinders.

902.10.06 Standard Deviation.

- (a) When past performance records are available, a standard deviation will be established from documented performance records of the producer consisting of a minimum of 15 consecutive 28 day compressive strength tests obtained within the last 12 months.

The standard deviation will be established as the product of the calculated standard deviation and multiplier.

NUMBER OF TESTS	MULTIPLIER FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

Interpolate for intermediate number of tests.



(b) When past performance records are not available, the required average strength shall meet to the following:

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' < 3000$	$f_{cr}' = f_c' + 1000$
$3000 \leq f_c' \leq 5000$	$f_{cr}' = f_c' + 1200$
$f_c' > 5000$	$f_{cr}' = 1.10 f_c' + 700$

902.10.07 Standard of Control. The average of all sets of three consecutive strength tests shall equal or exceed the critical value as specified in 902.10.03 which shall be computed using the following formula:

$$\text{Critical Value} = f_c' + (1.14 \times S) - 500$$

Failure to conform to this criteria shall be cause for immediate investigation and remedial action up to and including suspension of production. A design standard deviation equal to 15 percent of the specified strength shall be used for calculation until a minimum of 15 test results are obtained.

The actual average strength and standard deviation shall be computed upon the availability of 28 day strength data comprising a minimum of 15 tests. Should this determination indicate an excessive margin of safety, the concrete mix may be modified to produce lower average strength as approved by the Engineer. If these calculations indicate a coefficient of variation greater than 15, the quality of the concrete and testing will be evaluated.



902.10.08 Testing. Sampling per T 141. Testing as follows:

TEST	METHOD	MINIMUM TEST FREQUENCY	RESPONSIBILITY
Temperature (e)	T 309	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Slump (a)(e)	T 119	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Air Content (a)(e)	T 152 T 196	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d)	T 23	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d) Mix No. 7 Only	T 23	3 per Day	Project Engineer

- (a) A second test will be made when the first slump or air content test fails. Acceptance or rejection will be based on the results of the second test.
- (b) Compressive strength tests are defined as the average of two companion cylinders.
- (c) The Contractor shall be responsible for the making of all early break cylinders and furnishing the molds, stripping, curing/delivery of all cylinders, including 28 day cylinders, to the testing laboratory.
- (d) The Project Engineer will be responsible for making, numbering and signing the 28 day cylinders.
- (e) When constructing plain and reinforced concrete pavements, the testing frequency for slump, air content, and temperature shall be 1 per 100 yd³ or fraction thereof.

902.10.09 Acceptance. Concrete will be acceptable if both of the following requirements are met:

- (a) The average of all sets of three consecutive strength tests equal or exceed the specified design strength.
- (b) No individual strength test (average of two companion cylinders) falls below the specified design strength by more than 500 psi.

902.10.10 Price Adjustment. A price adjustment will be based on the Contract unit price per cubic yard of concrete. If the unit is a lump sum item, the price per cubic yard for the concrete will be determined by dividing the cubic yards into the Contract lump sum price.

- (a) **Test Results More Than 500 psi Below the Specified Design Strength.** Failing strength tests will be considered individually with a price adjustment being applied on the percentage basis as shown below.

(Price per yd³) X (quantity of yd³ represented by the failing concrete strength) X (percent of failure).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times [1 - (3600 / 4500 \text{ psi})] = \$4,000.00$$



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No payment will be allowed when the test results fall below 50 percent of the specified design strength for structural concrete or 40 percent for incidental concrete.

The Engineer will determine when the strength of the concrete represented by the failing tests is sufficient to remain in place or whether it must be removed and replaced with Specification concrete.

- (a) **Test Results 500 psi or Less than the Specified Design Strength.** Strength failures 500 psi or less than the specified design strength will be averaged with the next two consecutive tests. If those two tests include a failure greater than 500 psi, those tests will be evaluated as in 902.10.10(a) and replaced with the next consecutive test. If the resulting average falls below the specified design strength, a price adjustment will be applied as specified in the table below. Any failure will only be included in one grouping.

STRENGTH BELOW THE SPECIFIED (avg of 3 tests) DESIGN LEVEL, psi	ADJUSTMENT FACTOR
MIX NO. 1 THRU MIX NO. 7	
1 – 100	0.005
101 – 200	0.01
201 – 300	0.02
301 – 400	0.04
401 – 500	0.08

Adjustment price equals (price per yd³) X (quantity of yd³ represented by the failing cylinders) X (the adjustment factor).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times 0.01 = \$200.00$$

902.11 MORTAR FOR GROUT. Mortar used for grouting anchor bolts, pipe, handrail posts, and miscellaneous items shall be composed in accordance with one of the following:

- (a) One part Portland cement or blended hydraulic cement and one part mortar sand by dry loose volume.
- (b) Prepared bag mixes consisting of Portland cement or blended hydraulic cement and mortar sand. The prepared mixes shall produce a mortar meeting the strength requirements specified in the Contract Documents.
- (c) Use nonshrink grout when specified. The grout shall have a minimum compressive strength of 5000 psi in seven days when tested as specified per T 106, except that the cube molds shall remain intact with a top firmly attached throughout the curing period. The nonshrink grout shall have a minimum expansion of 0.0 percent after seven days when tested as specified per T 160.



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- (d) Epoxy grout shall consist of sand and epoxy mixed by volume in per the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 6500 psi in 72 hours when tested per MSMT 501. Sand for epoxy grout as specified in 901.01.
- (e) An epoxy or polyester anchoring system may be used when approved by the Engineer in accordance with the manufacturer's recommendations. Strength values shall be as specified in the Contract Documents.

902.12 LINSEED OIL. Shall consist of a 50-50 mixture (by volume) of boiled linseed oil meeting Federal Specification TT-L-190 and kerosene per D 3699.

902.13 LATEX MODIFIED CONCRETE. Portland cement concrete containing prequalified Laboratory approved styrene butadiene latex emulsion is defined as Latex Modified Concrete (LMC).

Latex emulsion shall have a minimum of 90 percent of the nonvolatiles as styrene butadiene polymers. The latex emulsion as specified in Table 902.13 A. The material shall be stored in suitable containers and be protected from freezing and exposure to temperatures in excess of 85 F.

LMC shall be proportioned using volumetric mixing and designed as follows:

LATEX MODIFIED CONCRETE	
MATERIAL	SPECIFICATION LIMITS
Portland Cement, CWT/yd ³ , min	6.6
Latex Emulsion/Cement Ratio	0.31 – 0.34
Water/Cement Ratio, max	0.22
Entrained Air, %	6.0 ± 3
Slump, in.	5 ± 1

The physical properties of LMC shall conform to Table 902.13 B. The Contractor shall furnish the necessary 3 X 6 in. molds per M 205 to be used for the fabrication of compressive strength cylinders.

Control and Acceptance Sampling.

- (a) Submit a two qt minimum sample, of the styrene butadiene latex emulsion to the AME daily for each lot of material used in a day's production.
- (b) A batch for LMC is defined as the capacity of the equipment being used on the project. Slump and air samples will be taken and tested before the placement of a batch is permitted. The slump shall be measured four to five minutes after discharge from the mixer. The test material shall be deposited off the deck and not be disturbed during this



waiting period. One additional sample for slump and air will be taken randomly during the placement of each batch. For seven day compressive strength, two tests each per batch are required. A test is defined as consisting of two companion cylinders. The samples for these tests will be taken at random while the placement is in progress.

TABLE 902.13 A

REQUIREMENTS FOR CHEMICAL PROPERTIES OF LATEX EMULSION MATERIALS				
PROPERTY	SPECIFICATIONS		QUALITY ASSURANCE TESTS	
	LIMITS	TOLERANCE	PREQUALIFICATION TESTS	CONTROL AND ACCEPTANCE
Color	White	—	X	X
pH	9.0 – 11.0	—	X	X
Weight, lb/gal	8.40 – 8.47	—	X	X
Solids Content, %	46 – 53	—	X	X
*Butadiene Content, % of polymer	30 – 40	—	—	—
Viscosity @ 10 rpm-cps	Match Original	± 20	X	X
*Surface Tension, dynes/cm max	50	—	—	—
*Mean Particle Size, polymer – Å	1400 – 2500	—	—	—
Coagulum, % max	0.10	—	X	X
*Freeze-Thaw Stability, coagulum, % max	0.10	—	X	X
Infrared Spectra of Latex Film	Match Original	—	X	X
Infrared of Alcohol, Soluble Portion of Latex	Match Original	—	X	X
Shelf Life, min	1 yr	—	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 612 except those denoted by an * shall be conducted as specified in FHWA RD – 78-35.

Note 2: The original or prequalification sample shall be accompanied by the producer's certification on all of the tests and properties noted above and as specified in TC-1.02. The certification shall contain actual test values of the product and the infrared spectrograph.

Note 3: A separate certification is required for each lot of material. The certification shall note the date of manufacture, lot size, and whether or not the material is identical to the formulation of the original sample.



TABLE 902.13 B

LATEX MODIFIED CONCRETE PHYSICAL PROPERTIES			
TEST PROPERTY	TEST VALUES	QUALITY ASSURANCE TESTS	
		PREQUALIFIED TESTS	CONTROL AND ACCEPTANCE
7 Day Compressive Strength, psi min	3000	X	X
28 Day Compressive Strength, psi min	3500	X	—
42 Day Compressive Strength, psi min	3500	X	—
7 Day Flexural Strength, psi min	550	X	—
28 Day Flexural Strength, psi min	650	X	—
42 Day Shear Bond Strength, psi min	2000	X	—
Durability Factor, 300 cycles, % min	85	X	—
Chloride Permeability, Ppm max	510	X	—
Scaling Resistance, 50 cycles, max	3	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 721.

Note 2: Seven Day Compressive Strength Test will be used for Control & Acceptance of the material. The minimum specified design strength is 3000 psi at seven days. The mix design approval and acceptance will be based on a coefficient of variation of 10 percent with a probability of 1 in 10 tests falling below the specified strength. Only test values 80% or greater than the specified strength will be accepted

902.14 RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE PAVEMENT REPAIRS. Materials shall be a dry, packaged cementitious mortar having less than 5 percent by weight of aggregate retained on the 3/8 in. sieve and meet the following requirements:

Classification.

- Class I — For use at ambient temperatures below 50 F.
- Class II — For use at ambient temperatures of 50 to 90 F.
- Class III — For use at ambient temperatures above 90 F.

Chemical Requirements. C 928 except that no organic compounds such as epoxy resins or polyesters as the principal binder.



Physical Requirements. Meet the following when tested per MSMT 725:

COMPRESSIVE STRENGTH, psi min				
CLASSIFICATION	< 2 hr	2-6 hr	6 hr	28 days
Type I — Slow	—	—	2000	4500
Type II — Rapid	—	2000	—	4500
Type III — Very Rapid	2500	—	—	4500

TEST RESULTS	
TEST PROPERTY	LIMITS
Bond Strength, 7 days, psi min	2000
Length Change, increase after 28 days in water, based on length at 3 hr, % max	+ 0.15
Length Change, decrease after 28 days, % max	- 0.15
Freeze Thaw, loss after 25 cycles in 10% CaCl ₂ solution, % max	8
Initial Setting Time, minutes min	10

Marking. All packages delivered to the project shall be marked with the following information:

- (a) Date material was packaged.
- (b) Approximate setting time.
- (c) Recommended dosage of water or liquid component.
- (d) Mixing instructions.
- (e) Class or temperature range.

Certification. The manufacturer shall furnish certification as specified in TC-1.02 showing the actual test results for each class and type of material submitted to the Laboratory.

902.15 SYNTHETIC FIBERS. When synthetic fibers are specified in the Contract Documents, the fibers shall be 1/2 to 1-1/2 in. long and conform to C 1116, Type III. The manufacturer shall furnish certification as specified in TC-1.02. The quantity of fibers used and their point of introduction into the mix shall conform to the fiber manufacturer's recommendations.



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**CATEGORY 900
MATERIALS**

SECTION 950 - TRAFFIC MATERIALS

950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES.

DELETE: 950.03.03 Type IX Retroreflective Sheeting in its entirety.

INSERT: The following.

950.03.03 Permanent Signs Retroreflective Sheeting. Retroreflective sheeting for permanent signs shall conform to ASTM D 4956-05, except as modified below:

MINIMUM REFLECTIVE INTENSITY VALUES FOR RETROREFLECTIVE SHEETING Minimum Coefficient of Retroreflection (R_A) cd/(lx · m²) Per ASTM E-810 (Average of 0 and 90 degree orientation)									
Observation Angle°	Entrance Angle°	White	Yellow	Fluor. Yellow	Fluor. Yellow- Green	Red	Green	Blue	Fluor. Orange
0.2	-4	570	425	340	455	114	57	26	170
0.2	30	215	160	130	170	43	21	10	64
0.5	-4	400	300	240	320	80	40	18	120
0.5	30	150	112	90	120	30	15	6.8	45
1	-4	120	90	72	96	24	12	5.4	36
1	30	45	34	27	36	9	4.5	2	14

INSERT:

950.03.07 Permanent Traffic Signs (PTS) Unless otherwise specified in the Contract Documents, retroreflective sheeting for permanent signs shall conform to 950.03.03.