Maryland Department of Transportation

State Highway Administration
Baltimore, Maryland
Request for Proposals

Contract No. WO6345270

F.A.P No. N/A

US 113

US 113 From North of Goody Hill Road to South of Massey Branch (Phase 2B)

Worcester County
Design-Build

Minority Business Enterprises are encouraged to respond to this Solicitation Notice.

The State Highway Administration will only be responsible for the completeness of documents obtained directly from the State Highway Administration Cashier's Office.
Failure to attach all addenda may cause the bid to be irregular.

VENDOR I.D. NUMBER

_____

S.H.A. USE ONLY

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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.

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.

OCCUPYING WETLANDS/WATERWAYS FOR DESIGN-BUILD

The Contractor is hereby alerted to the importance of preserving waterways and 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 waterways and wetland areas. Any design changes must result in further avoidance and minimization of disturbance of wetlands and waterways. 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 by orange safety fence or as directed by the Engineer. 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 and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without an appropriate permit. No storage of equipment or materials will be allowed in wetlands.

(c) The Contractor or sub-contractor shall not impact a wetland or waterway that is not covered by an existing wetland permit.

(d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for contacting the State Highway Administration's Environmental Programs Division prior to restoring the wetland areas and mitigating the wetland impacts to the full satisfaction of the environment regulatory 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.

(f) The Design-Builder will prepare permit modifications at the conclusion design and at the conclusion of construction. The modification will be based on surveyed as-built plans and will include standard 8.5"x 11.0" plates and a revised Joint State/Federal Nontidal Wetlands and Waterways Permit application.

(g) This Contract will include the oversight of an Environmental Monitor supplied by the Administration. His duties will be to make sure the Contractor abides by all conditions in the environmental permits. He will also assist the Contractor in developing ideas to minimize impacts to the wetlands. The Contractor will still be responsible for all violations occuring as stated above.

The importance of not abusing waterways and wetland areas cannot be overemphasized. It is possible that abuse of waterways and 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 the Contractor's expense. Non-compliance with these requirements will not be considered for an extension of Contract time.

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.

4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.

6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.

7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES:

   ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.)AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATIONOF THE SITE WHILE ALSO ALLOWING FOR THE

   VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT

MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.

8. AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.

9. TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

   A. USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
   B. USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THORUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
   C. USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10. STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.

11. CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF MINORITY BUSINESS ENTERPRISES
FOR STRAIGHT STATE CONTRACTS
(Where the Contractor's bid exceeds $50,000)

A. General

For the purpose of these requirements, the following terms as defined below shall apply:

Administration Representative – A Minority Business Enterprise (MBE) Officer of an Administration who enforces the laws and regulations pertaining to minority business enterprise and Contract compliance.

Affirmative Actions – Specific steps taken to eliminate discrimination and its effects, to ensure nondiscriminatory results and practices in the future, and to involve minority businesses fully in contracts and programs.

Business Enterprises – A legal entity which is organized in any form other than as a joint venture (e.g., sole proprietorship, partnership, corporation, etc.) to engage in lawful commercial transactions.

Certified Business – A business which by order of the Chair/MBE Advisory Council or his/her designee, has been certified as a bona fide MBE.

Director, Office of Equal Opportunity – The individual designated for the Administration's overall MBE compliance.

Joint Venture – An association of a MBE firm and one or more other firms to carry out a single, for profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the MBE is responsible for a distinct, clearly defined portion of the work of the Contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Minority Business Enterprise (MBE) – Any legal entity, other than a joint venture, organized to engage in commercial transactions which is at least 51 percent owned and controlled by one or more minority persons, or a nonprofit entity organized to promote interests of the physically or mentally disabled.

MBE Directory – A compilation of businesses certified by MDOT as minority or socially and economically disadvantaged businesses. The directory will be published annually with quarterly supplements. It will also be provided in automated format and on the Internet to be updated as changes are made.

MBE Program – A program developed by MDOT to implement the requirements of Title 14, Subtitle 3 of the State Finance Procurement Article, Annotated Code of Maryland and Title 10, Subtitle 3 of the State Finance Procurement Article of the Annotated Code of Maryland for Leases of State-Owned Property.

MBE Participation Packet – The documents submitted by the bidder or proposer pursuant to the appropriate special bid provisions. The MBE Participation Packet shall consist of the

MBE Utilization Affidavit and the MBE Participation Schedule, both of which must be submitted with your bid or initial price proposal. The MBE Participation Packet also includes the following documents which are submitted after bids or proposals are opened: MDOT Schedule of Participation of Minority Business Enterprise (Form OOC44), the MDOT Minority Contractor Project Disclosure and Participation Statement (Form OOC45), the MDOT Joint Venture Disclosure Affidavit (Form D-EEO-006) and the Minority Contractor Unavailability Certificate (Form OOC46).

Minority or Minority Person for Straight State Contracts - Member of one of the following socially and economically disadvantaged groups:

1. African American – An individual having origins in any of the Black racial groups of Africa;

2. American Indian/Native American – An individual having origins in any of the original peoples of North America and who is a documented member of a North American tribe, band, or otherwise organized group of native people who are indigenous to the continental United States or who otherwise have a special relationship with the United States or a state through treaty, agreement, or some other form of recognition. This includes an individual who claims to be an American Indian/Native American and who is regarded as such by the American Indian/Native American community of which he/she claims to be a part, but does not include and individual of Eskimo or Aleutian origin;

3. Asian – An individual having origins in the far East, Southeast Asia, or the Indian Subcontinent and who is regarded as such by the community of which the person claims to be a part;

4. Hispanic – An individual of Mexican, Puerto Rican, Cuban, Central or South American, Portuguese or other Spanish culture or origin regardless of race, and who is regarded as such by the community or which the person claims to be a part;

5. Women – This category shall include all women, regardless of race or ethnicity, although a woman who is also a member of an ethnic or racial minority group may elect that category in lieu of the gender category; or

6. Physically or Mentally Disabled – An individual who has an impairment that substantially limits one or more major life activity, who is regarded generally by the community as having such a disability, and whose disability has substantially limited his or her ability to engage in competitive business.

B. MBE and Good Faith Effort Requirements

1. This contract includes an MBE participation goal for subcontracting, and/or procurement of materials, and/or services. Bidders/Offerors must make a good faith effort to meet the MBE participation goal **before bids or proposals are due**, including outreach efforts. A bid or initial proposal must include both a completed and executed MBE utilization affidavit and MBE participation schedule. The failure of a bidder to complete and submit the MBE utilization affidavit and the MBE participation schedule shall result in a determination that the bid is not responsive. The failure of an offeror to complete and submit the MBE utilization affidavit and the MBE participation schedule shall result in a determination that the proposal is not susceptible of being selected for award.

2. In making a good faith effort to achieve the MBE goal, prior to completing the MBE utilization affidavit and participation schedule and prior to submitting a bid or initial proposal bidders (or offerors) including those bidders or offerors that are certified MBEs must:

a. Identify specific work categories within the scope of the procurement appropriate for subcontracting and/or procurement of materials and/or services;

b. **Solicit certified MBEs in writing at least 10 days before bids or initial proposals are due,** describing the identified work categories and providing instructions on how to bid on the subcontracts and/or procurement of materials and/or services;

c. Attempt to make personal contact with the certified MBEs solicited and to document these attempts;

d. Assist certified MBEs to fulfill, or to seek waiver of, bonding requirements; and

e. Attend prebid or other meetings the procurement agency schedules to publicize contracting opportunities to certified MBEs.

3. The bidder shall seek commitments from minority business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the established Contract goal of _____ percent of the total value of the prime Contract. The Administration has further established that, within this Contract goal, there shall be a sub-goal of a minimum of _____ percent participation by firms classified as African American-owned firms and a sub-goal of _____ percent participation by firms classified as Women-owned firms. A bidder may count toward its MBE goals expenditures for materials and supplies obtained from MBE regular dealers and/or manufactures provided that the MBE assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a MBE manufacturer (i.e., a supplier that produces goods from raw materials or substantially alters them before resale). The bidder may count sixty (60) percent of its expenditures to a MBE regular dealer, that is not a manufacturer, provided that the MBE supplier performs a commercially useful function in the supply process. The apparent low bidder shall submit to the Administration, within ten (10) business days after notification that it is the apparent low bidder, an acceptable Affirmative Action Plan for the utilization of Minority Business Enterprises in this Contract. The Contract will not be awarded without the bidder's Affirmative Action Plan being approved by the Administration.

Additionally, the Design-Builder's shall make a good faith effort to achieve MBE participation in professional services for this contract of no less than **X** percent of the total contract value. The goal shall include efforts to achieve DBE participation in performance of professional services under the Contract (including design, supplemental geotechnical investigations, surveying and other preliminary engineering; quality control as defined in the Contract; environmental compliance activities; utility coordination; permitting; and public information). The MBE professional services participation shall be attributed to the overall contract goal noted above.

4. The Affirmative Action Plan shall include as a minimum:

a. The name of an employee designated as the bidder's Minority Business Liaison Officer.

b. A complete Schedule for Participation (OOC44), of minority business enterprises, from among those whose names appear in the MDOT MBE Directory or who are otherwise certified by MDOT as being minority business enterprises. Except as permitted by law and approved by the Administration, the Schedule of Participation (OOC44) submitted after the opening of bids or proposals shall include all MBE firms identified on the MBE participation schedule submitted with the bid or initial proposal with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal.

c. A Minority Contractor Project Disclosure and Participation (OOC45) completed and signed by the bidder and MBE for each business listed in the Schedule for Participation.

5. When a bidder intends to attain the appropriate goal for minority business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (MDOT D-EEO-006-A) showing the extent of the MBE participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit shall be submitted through the bidder by the proposed subcontractor and signed by all parties.

6. When the proposed MBE participation does not meet the MBE Contract goals, information sufficient to demonstrate that the bidder has made good faith efforts to meet these goals shall be required.

7. Request for Exception to the MBE Goal

If the bidder is unable to secure from MBEs by subcontracting and/or by procurement of materials and/or services, commitments which at least equal the appropriate percent of the value of the prime Contract at time of bid, the bidder shall request, in writing, waiver of the unmet portion of the goal. This request must be initiated by checking the appropriate box on the MBE utilization affidavit submitted with the bid or initial proposal.

The waiver may be granted by the Administrator. To obtain approval of a waiver, the bidder shall submit the following:

a. A detailed statement of efforts made prior to bid to contact and negotiate with MBEs including the dates, names, addresses, and telephone numbers of MBEs who were contacted; a description of the information provided to the MBEs regarding the work to be performed, anticipated schedule for portions of the work to be performed; and a detailed statement of the reasons why additional prospective agreements with MBEs were not reached;

b. A detailed statement of the efforts made to select portions of the work proposed to be performed by MBEs in order to increase the likelihood of achieving the stated goals;

c. For each MBE that the Contractor considers not qualified, but from which a bid has been received, a detailed statement of the reasons for the bidder's conclusion; and

d. For each MBE contacted but unavailable, a Minority Contractor Unavailability Certificate, (OOC46), signed by the minority business enterprise, or a statement from the bidder stating that the MBE refused to sign the Certificate.

8. Guidance concerning good faith efforts

The following is a list of the types of actions and factors that will be used to determine the bidder's or offeror's good faith efforts to obtain MBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of certified MBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the MBEs to respond to the solicitation. The bidder must determine with certainty if the MBEs are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by MBEs in order to increase the likelihood that the MBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.

(3) Providing interested MBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) **(a)** Negotiating in good faith with interested MBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to MBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE subcontractors and suppliers, so as to facilitate MBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs to perform the work.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs is not in itself sufficient reason for a bidder's failure to meet the contract MBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders and offerors are not, however, required to accept higher quotes from MBEs if the price difference is excessive or unreasonable.

(5) Not rejecting MBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.

(6) Making efforts to assist interested MBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

(7) Making efforts to assist interested MBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs.

(9) In determining whether a bidder or offeror has made good faith efforts, the Administration may take into account the performance of other bidders or offerors in meeting the contract goal. For example, when the apparent successful bidder or offeror fails to meet the contract goal, but others meet it, the Administration may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder or offeror could have met the goal. If the apparent successful bidder or offeror fails to meet the goal, but meets or exceeds the average MBE participation obtained by other bidders or offerors, the Administration may view this, in conjunction with other factors, as evidence of the apparent successful bidder or offeror having made good faith efforts.

9. Bidder Use of MBE Special Services

The bidder shall consider, whenever possible, utilizing the services of minority-owned banks. Most minority banks are full-service corporations that can provide an array of financial services such as Treasury and Tax Loan fund accounts, time and demand deposit accounts, payroll services and if needed, organization investment counseling. It is the policy of MDOT to encourage its Contractors to utilize, on a continuing basis, MBE banks.

10. Bidder Records

The bidder shall maintain records showing actions which have been taken to comply with procedures set forth herein.

11. Bidders Cooperation

The bidder shall cooperate with the Administration representative in any review of the Contractor’s procedures and practices, with respect to the MBEs, which the Administration’s representative may, from time to time, conduct.

12. Bidder MBE Modifications

During the life of the Contract, all plans to modify the approved MBE participation program will require the approval of the Administrator or his authorized representative. This will include any changes to items of work to be sublet or materials and services to be obtained which differs from those in the original MBE participation program. All requests for revisions shall be directed to the appropriate District Engineer for disposition.

The low bidder's failure to participate in any of the above proceedings or failure to furnish information after written request may result in rejecting the bid and non-award of the Contract.

C. RECORDS AND REPORTS

1. The Contractor shall keep such records as are necessary to determine compliance with its Minority Business Enterprise utilization obligations. The records kept by the Contractor shall be designed to include:

a. The name of minority and non-minority subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, the monetary value of such work materials or services, the terms of performance and/or delivery, copies of all cancelled checks paid to subcontractors and suppliers and a record of all payments made to subcontractors and suppliers.

b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of minority business enterprises on this project.

c. The progress and efforts made in seeking out minority contractor organizations and individual minority contractors for work on this project.

2. The Contractor shall submit reports, on a quarterly basis, of those contracts and other business transactions executed with minority business enterprises, with respect to the records referred to in C. 1., above, in such form, manner and content as prescribed by the Administration. The quarterly reports shall be due on the 15th calendar day of January, April, July, and October. If the Contractor cannot submit their report on time, the Contractor shall notify the Administration's representative and request additional time to submit the report. Failure of the Contractor to report in a time manner may result in a finding of noncompliance. Additional report may be required by the Administration upon request.

3. To insure compliance with the certified MBE Contract participation goal, the Contractor shall:

a. Submit monthly reports listing all unpaid invoices over 30 days, from certified MBE subcontractors, and the reason payment has not been made.

b. Include in its agreement, with certified MBE subcontractors a, requirement that MBE subcontractors are to submit monthly, to the Administration, a report identifying the prime Contractor and listing the following:

(1) Payment received from the prime Contractor, in the proceeding 30 days;

(2) Invoices for which the subcontractor has not been paid.

4. All such records and reports shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the Maryland Department of Transportation and this Administration.

D. ADMINISTRATIVE PROCEDURES FOR ENFORCEMENT

1. Whenever the Administration believes the prime Contractor or any subcontractor may not be operating in compliance with the terms of these provisions, the Administration's representative will conduct an investigation. If the Administration representative finds the prime Contractor or any subcontractor is not in compliance with these provisions, the representative will make a report of noncompliance and notify such Contractor in writing of the steps that will, in the judgement of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration's representative will make a final report of the noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:

a. Suspension of work on the project, pending correction;

b. Withholding payment or a percentage thereof, pending correction;

c. Referral of MBEs to the MDOT office of MBE, for review for decertification, for review/referral to the Attorney General's Office for review/initiation of debarment or for review for criminal prosecution through the MDOT Office of General Counsel;

d. Initiation of suspension in accordance with COMAR regulations;

e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel;

f. Any other action as appropriate, within the discretion of the Administrator.

2. If the documents used to determine the status of a MBE contains false, or misleading or misrepresenting information, the matter will be referred to the MDOT Office of the General Counsel for appropriate action. In addition, when directed by the Administrator, the Contractor shall terminate, without liability to the Administration, its contract with a firm, which for any reason, is either no longer certified or no longer eligible to do business in the State. The Contractor shall promptly submit plans for maintaining the required MBE participation on the project or appropriate request for waiver of all or part of the Contract goal with appropriate documentation to support Good Faith Efforts (as established by COMAR including the MDOT MBE/MBE Program Manual). The program and all revisions require the Administrator's approval.

MBE/DBE COMPLIANCE FIELD MEETING

A MBE/DBE compliance Field Meeting will be conducted to review the responsibilities of the Administration and the Contractor's personnel relative to MBE/DBE Compliance and documentation. The meeting will be held within two weeks after starting work on the project.

The Construction Project Engineer, who will notify the following of the date, time and location, will arrange the meeting. At least one week advanced notice will be required.

(a) Administrative Representatives.

(1) Director, Office of Equal Opportunity or Designee

(2) District Equal Opportunity Officer

(3) Regional Constructional Engineer

(4) Construction Project Engineer

(5) Construction Inspection Division Inspector

(b) Contract Representatives.

(1) Superintendent - Prime Contractor

(2) Equal Opportunity Officer - Prime Contractor

(3) Owner/Superintendent/Foreman MBE/ DBE - Subcontractor

The Construction Project Engineer and Equal Opportunity Representative will jointly conduct the meeting. The Contractor shall notify the appropriate subcontractors and ensure their attendance.

TRAFFIC CONTROL PLAN CERTIFICATION FOR DESIGN-BUILD

PRIOR TO THE COMMENCEMENT OF WORK ON THIS PROJECT, THE SUCCESSFUL BIDDER WILL BE REQUIRED TO COMPLETE A TRAFFIC CONTROL PLAN CERTIFICATION, CONTAINING THE INFORMATION SHOWN BELOW. THE CERTIFICATION FORM WILL BE PROVIDED TO THE SUCCESSFUL BIDDER UPON AWARD OF THE CONTRACT.

The Administration's Traffic Control Plan (TCP) has been reviewed and the following course of action shall be followed:

Option 1 ___See Note Below____
The TCP is accepted and shall be used on this project.

Option 2 ___See Note Below___
The TCP is accepted; however, revisions and/or additions shall be submitted for approval in conformance with the Administration's Specifications 104.01.

Option 3
The TCP is not accepted and revision shall be submitted for approval in accordance with the Administration's Specifications 104.01.

It is understood that the effective implementation of the approved TCP is the responsibility of the Contractor. Minor modifications may be made by the Traffic Manager if field conditions warrant and prior concurrence is obtained from the Engineer. Significant changes to the TCP will be submitted to the Engineer in writing, for approval, in conformance with the Administration's Specifications 104.01.

_____ _____

(DATE) (SIGNATURE)

_____

(PRINT SIGNATURE)

_____

(TITLE)

Note: Option 1 and 2 shall not be used on this project.
This is a Design-build project and the Design-Build Team must prepare a TCP based on the requirements in the Administrations Specifications 104.01.

PREVAILING WAGE
INSTRUCTIONS FOR THE CONTRACTOR

PAYROLLS.

Non-Federally Funded Contracts. For Non-Federally funded projects, which include prevailing wage rates**,** the prime Contractor and each subcontractor shall submit two copies of their payroll records. One copy shall be submitted to the Project Engineer and one shall be sent to the Maryland State Commissioner of Labor & Industry, Room 607, 1100 N. Eutaw Street, Baltimore, MD 21201, where they will be available for inspection during business hours. All wages shall be paid in conformance with the State Finance and Procurement Article, Section 17-201-17-226 of the Annotated Code of Maryland and the Fair Labor Standards Amendments of 1974 (P.L. 93259). If the award amount of a Non-Federally funded job is less than $500,000, the project will be exempt from prevailing wage requirements.

A review has been made of the wage conditions in the locality and, based on the information available, the wage rates and fringe payments listed are determined by the Commissioner of the Department of Labor and Industry to be prevailing for the Contract for the described classes of labor in conformance with the law. It shall be the responsibility of the Contractor to fully comply with the law and to contact the Office of the Commissioner of Labor and Industry for interpretation of the provisions of the law.

Federally Funded Contracts. For Federally funded projects, the prime Contractor and each subcontractor shall submit one copy of the certified payroll to the Project Engineer.

General Requirements for Federally and Non-Federally Funded Contracts. All payrolls are subject to the following requirements:

(a) All payrolls shall be numbered, beginning at No. 1, and consecutively numbered through the end of the Contract.

(b) Contract and FAP numbers shall be shown on all payrolls (as applicable).

(c) All payrolls shall include the employees' full name, classification, social security number, and home address.

(d) All payrolls shall show the employee's basic hourly wage rate, overtime rate (if applicable), and the number of hours worked (tabulated both daily and weekly).

(e) When fringe benefits are required, indicate separately the amount of employer contributions to fringe benefit funds and/or programs. The fringe benefits shall be individually identified, but may be tabulated on a separate sheet. When required fringe benefits are paid in cash, add the required fringe benefit amount to the basic hourly rate to obtain the total prevailing wage rate for the employee.

(f) The employee's net pay and the itemized deductions shall be included in all payrolls.

(g) A Contractor may make deductions that are required by law or required by a collective bargaining agreement (between the Contractor and a bona fide labor organization). Deductions are also permitted if they are identified in a written agreement between the employee and employer that was made at the beginning of employment, provided that the Contractor presents the agreement to the Administration before the employee begins working on the Contract. Each payroll shall also include the U.S. Department of Labor and Hour Public Contracts Division Statement of Compliance Form WH-347 (or its equivalent), signed by an appropriate official of the Contractor/subcontractor. The Contractor's name, address, and telephone number shall also to be shown.

(h) On Non-Federally funded projects, all apprentices shall be registered with the Maryland Apprenticeship and Training Council.

(i) Contractors employing a classification of worker for which a wage rate was not included on the original wage decision, shall submit to the Wage and Hour Team, a request for an additional classification and rate prior to the employee's employment at the project.

(j) Payrolls for Non-Federally Funded projects shall be submitted within 14 calendar days after the end of each payroll period.

(k) Payrolls for Federally Funded projects shall be submitted within 7 calendar days after the end of each payroll period.

OVERTIME.

Non-Federally Funded Contracts. Overtime rates shall be paid by the prime Contractors and subcontractors under their Contracts and agreements with their employees, which in no event shall be less than time and a half the prevailing hourly rate of wages for all hours worked in excess of ten hours in any one calendar day or forty hours in any one calendar week and work performed on Sundays and legal holidays. Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

Federally Funded Contracts. Overtime rates shall be paid as specified in Form FHWA 1273. Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

PENALTIES.

Non-Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance, pending receipt of the records. The Contractor shall be liable to the Administration for liquidated damages in the amount of $10.00 for each calendar day the records are late.

The Contractor shall be liable to the Administration for liquidated damages in the amount of $20.00 for each day that an employee is paid less than the prevailing wage.

Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance pending receipt of the records.

INQUIRIES.

Requests for information or questions shall be addressed to:

Maryland State Highway Administration
Highway Design Division
Wage and Hour Team
707 N. Calvert Streets, MS C-102
Baltimore MD 21203-0717
Telephone: 410-545-8795
Fax: 410-209-5001

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CONTRACTOR AFFIRMATIVE ACTION PROGRAM

1. GENERAL

a. The Contractor shall cooperate with the Maryland Department of Transportation in carrying out its equal opportunity obligations and in the Department's review of the Contractor's activities performed under this contractual agreement.

b. All contractors shall comply with the Governor's Code of Fair Practices, Promulgated July, 1976. The Contractor shall include these requirements in every subcontract with such modifications of language as is necessary to make these provisions binding on the subcontractor.

c. All contractors shall comply with Maryland Department of Transportation Minority Business Enterprise Program requirements.

2. APPLICABILITY

a. The Maryland Department of Transportation Contractor Affirmative Action/Equal Employment Opportunity Program requirements are applicable to all contractors doing business with the Maryland Department of Transportation.

b. The Maryland Department of Transportation Minority Business Enterprise Program requirements are applicable to construction contracts in excess of $100,000.

3. DEFINITIONS

a. Affirmative Actions - The efforts exerted toward achieving equal employment opportunity through positive, aggressive and continuous results-oriented measures to correct past and present discriminating practices and their effects on the conditions and privileges of employment.

b. Contractor/Subcontractor - The individual, partnerships, firm or corporation undertaking the execution of work under the terms of a contract and acting directly or through his agents or employees.

c. Corrective Action - A contractor's written and signed commitment outlining specific actions to be taken with time limits, goals, etc., to correct a violation of applicable EEO regulations.

d. Discrimination - A distinction in treatment, whether intentional or unintentional, based on political or religious opinion or affiliation, race, color, creed or national origin or sex, physical or mental handicap or age, except where sex, handicap or age involves a bona fide job requirement.

e. Equal Employment Opportunity Officer - A designated employee of the Contractor whose responsibility it shall be to implement and maintain the Affirmative Action Plan.

f. "Good Faith Effort" - A results-oriented positive action designed to achieve Affirmative Action objectives or goals.

g. Personnel Actions - All decisions respecting employment including, but not limited to hiring, upgrading, demotion, transfer, recruitment or advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training to include apprenticeship, pre-apprenticeship or on-the-job training.

4. LEGAL MANDATES

a. Title VI, Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin in all programs and activities which receive Federal Financial Aid. Employment discrimination is prohibited if a primary purpose of Federal assistance is a provision of employment, e.g., apprenticeship, training, work study, or similar programs. Revised guidelines in 1973 prohibit discriminatory employment practices in all programs if such practices cause discrimination in services provided to beneficiaries of the program.

b. Title VII, Civil Rights Act of 1964 (as amended by the Equal Employment Opportunity Act of 1972). Title VII prohibits discrimination because of race, color, religion, sex or national origin, in any term, condition, or privilege of employment.

c. Executive Order 11246 (as amended). This order, issued by the President in 1965, requires Equal Employment Opportunity/Affirmative Action Programs by all Federal contractors and subcontractors. It also requires that firms with contracts over $50,000.00 and 50 or more employees develop and implement written programs, which are to be monitored by the Federal Office of Contract Compliance. Specific requirements for such result oriented programs are identified in the Revised Order # 4 issued by the Federal Office of Contract Compliance, U.S. Department of Labor. These requirements include identifying areas of minority and female under-utilization, numerical promotional and hiring goals, and other actions to increase minority employment in classifications where they are currently under-utilized.

d. The Age Discrimination Act of 1967 prohibits employers of 25 or more persons from discriminating against persons 40-65 years of age in any area of employment due to their age.

e. National Labor Relations Act of 1935. Discrimination on the basis of race, religion, sex, or national origin constitutes an unfair labor practice. It shall be unlawful under this Act for employers to participate with unions in the commission of any discriminatory practices or to practice discrimination in a manner which gives rise to racial, or other division, amongst employees to the detriment of organized union activity. It shall be unlawful for unions to exclude individuals discriminatorily from union memberships, thereby causing them to lose job opportunities, to discriminate in the representation of union members or non-members in collective bargaining, in the processing of grievance, or in any other respect which may cause or attempt to cause employers to enter into discriminatory agreements, or otherwise discriminate against members and non-members.

f. Governor's Code of Fair Practices for the State of Maryland (Amended). The Governor of Maryland issued a revised Code of Fair Practices which was promulgated March 3, 1988, in recognition of the State's responsibility to root out the evils of discrimination on the basis of race, color, creed, national origin, sex and age. This Code was amended so as to be in compliance with Federal mandates regulating laws pertinent to Equal Employment Opportunity/Affirmative Action.

g. Rehabilitation Act of 1973 (Public Law 93-112). This law provides a statutory basis for the Rehabilitation Services Administration and to authorize programs to promote and expand employment opportunities in the public and private sectors for handicapped individuals.

h. Article 78A, Section 7A, Annotated Code of Maryland provides for nondiscrimination in State construction contracts and subcontracts. This provision obligates the Contractor not to discriminate in any manner against any employee or applicant for employment because of race, creed, color, or national origin and obligates subcontractors to the same.

i. Other Laws. Employment discrimination has also been ruled by courts to be prohibited by the Civil Rights Acts of 1866 and 1870, the equal protection clause of the Fourteenth Amendment of the Constitution of the United States, and the Equal Pay Act of 1963. Action under these laws on behalf of individuals or groups may be taken by individuals, private organizations, trade unions, or other groups.

5. ASSIGNMENT OF RESPONSIBILITIES

a. The Contractor will designate an Equal Employment Opportunity Officer. He/she will have the responsibility of implementing our Affirmative Action Plan. He/she will coordinate, advise and assist management and other key officials. He/she will render periodic reports to the responsible executives relative to the state of progress and make appropriate recommendations along these lines to the executives relative to the state of progress and make appropriate recommendations along these lines to the executives of this project.

b. The name of the EEO Officer, telephone number and address where he/she can be reached concerning any acts or alleged acts of discrimination, will be posted on the bulletin board at the home office as well as on the bulletin boards on all job sites.

6. DISSEMINATION OF POLICY

a. The Contractor will take appropriate steps to insure that all employees are advised of its policy of nondiscrimination of its interest in actively and affirmatively providing equal employment opportunity for all citizens. The steps include:

(1) Periodic meetings of supervisory and personnel office employees to be conducted at least every six months so that our EEO policy and plan may be revised and explained.

(2) All new supervisory and personnel office employees to be made aware of our EEO policy and plan as soon as practicable, but certainly within thirty (30) days following the date the first reporting for duty.

(3) Making our EEO policy known to all employees, prospective employees, and potential sources of employees, through schools, employment agencies, labor unions, college placement officers, etc., by taking the following actions:

(a) Notices and posters setting forth our EEO policy will be placed in areas readily accessible to employees and applicants for employment.

(b) Our EEO policy and the procedure for implementing the EEO policy will be brought to the attention of employees through meetings, employee handbooks, or other appropriate means.

7. RECRUITMENT

a. The Contractor will include in all advertising the following notation: "An Equal Opportunity Employer." We will insert all such advertisements in newspapers or other publications having large circulation among minorities and females in the area from which the project work is derived.

b. We will, unless precluded by a valid collective bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority and female applicants, including, but not limited to, State employment agencies, school, college, and minority/female organizations, i.e., the Urban League, NAACP, etc. To meet this requirement, we shall identify sources of potential minority/female employees and establish with such sources procedures whereby minority/female applicants may be referred to us for employment consideration.

c. We will develop procedures for promoting the employment of minority/female youth on an after-school, summer and vacation basis.

d. We will encourage our employees to refer minority/female applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority/female applicants will be discussed with employees.

8. PERSONNEL ACTIONS

a. To avoid discrimination in any of our personnel actions, the following procedures will be followed:

(1) We will conduct periodic inspections of projects sites to insure that working conditions and employee facilities do not indicate discriminatory practices.

(2) We will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

(3) We will periodically review personnel actions in depth to determine whether there is any evidence of discrimination. Where evidence is found, we will promptly take corrective action.

(4) We will investigate all complaints of alleged discrimination and shall attempt to resolve such complaints. Additionally, if the investigation indicates that the discrimination may affect persons other than the complainant, appropriate corrective actions will include other persons. Upon completion of each investigation, we will inform every complainant of all avenues of appeal.

9. TRAINING AND PROMOTION

a. To eliminate any discrimination in training and promotion, the following actions will be taken:

(1) We will assist in locating, qualifying, and increasing the skills of minority/female employees and applicants for employment.

(2) Consistent with our employment requirements and as permissible under State regulations, we will make full use of training programs, i.e., preapprenticeship, apprenticeship, and on-the-job training programs for the geographical area of contract performance.

(3) We will advise employees and applicants for employment of available training programs and entrance requirements for the programs.

(4) We will periodically review the training and promotional potential of minority/female employees and shall encourage eligible employees to apply for such training and promotions.

10. UTILIZATION OF UNIONS

a. In carrying out our Affirmative Action Plan, we will use good faith efforts to obtain the cooperation from unions we rely on, in whole or part, as a source of employees to increase opportunities for minority/female groups. We, either directly or through a contractor's association acting as our agent, will include the procedures set forth below:

(1) Use good faith efforts to develop, in cooperation with the unions, joint training programs aimed at qualifying more minorities/females for membership in the unions and increasing their skills so they may qualify for higher paying employment.

(2) Incorporate an Equal Employment Opportunity clause into all union agreements so that they shall be contractually obligated not to discriminate in the referral of job applicants.

11. UTILIZATION OF SUBCONTRACTORS

a. We will use good faith efforts to employ subcontractors whose employees reflect minority/female groups approximately equal to the number available in the current labor pool population, or owned by minority/female.

b. We will use good faith efforts to assure that all subcontractors comply with equal employment obligations as defined in the amended Code of Fair Practices.

12. RECORDS AND REPORTS

a. In accordance with the Governor's Code, Article III, Section A and C (2), we will keep such records as are necessary to determine compliance with our equal opportunity obligations. The records kept shall be designed to indicate:

(1) The number of minority/female and other persons employed in each work classification of the project.

(2) The progress and efforts being made in cooperation with unions, if any, to increase minority/female employment opportunities.

(3) The progress and efforts being made in locating, hiring, training, qualifying and upgrading minority/female employees.

(4) The progress and efforts being made in securing the services of minority/female subcontractors.

b. All such records will be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department of Transportation.

c. We will submit to the Administration a monthly report for the first three months after construction begins and, thereafter, upon request for the duration of the project. This report shall indicate the number of minority/female employees currently engaged in each work classification.

3. MONITORING

a. We will periodically evaluate our Affirmative Action Plan and the results achieved to insure that the plan is in compliance with our commitments.

SUGGESTED GOALS FOR TIMETABLES FOR MINORITY WORKHOUR UTILIZATION

For all trades, the following goals and timetables, as appropriate, for minority-workhour utilization shall be applicable:

(1) Baltimore Metropolitan SMSA - this area (Region 1) includes Anne Arundel, Baltimore, Carroll, Harford, Howard Counties and Baltimore City. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MINORITIES
From January 1, 1980 to October 3, 1980	23.5% - 27.5%
After October 3, 1980	23.0%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

(2) Eastern Shore Maryland NON-SMSA - this area (Region II) includes Caroline, Dorchester, Kent, Queen Annes, Somerset, Talbot, Wicomico, and Worcester Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MINORITIES
From January 1, 1980 to October 3, 1980	21% - 24%
After October 3, 1980	23.8%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
From August 16, 1980	6.9%

(3)

(3) Southern Maryland NON-SMSA - this area (Region III) includes Calvert, Frederick, Washington and St. Marys Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistant with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MINORITIES
From January 1, 1980 to October 3, 1980	25%
After October 3, 1980	25.2%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

(4) Washington, D.C. Metropolitan SMSA - this area (Region IV) includes Charles, Montgomery and Prince Georges Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistant with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MINORITIES
After October 3, 1980	28.0%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

(5) Western Maryland NON-SMSA - this area (Region V) includes Allegany and Garrett Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistant with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MIN0RITIES
From January 1, 1980 to October 3, 1980	3.0%
After October 3, 1980	4.8%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

(6) Wilmington Delaware SMSA - this area (Region VI) includes Cecil County only. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistant with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

	UTILIZATION:
	MINORITIES
From January 1, 1978 thru October 3, 1980	15% - 18.5%
After October 3, 1980	12.3%
	FEMALES
From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

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.

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.

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 January 2001 revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

In the following sections of the “Standard Specifications for Construction and Materials.” Dated January 2001, the word “Engineer” shall be taken to mean “Design-Build Engineer.”

Category 100 Preliminary

Section 101.03.02	¶ 1, Line 1
Section 101.03.04	¶ 1, Line 2
Section 104.05.04	¶ 1, Line 6
Section 104.08.03	¶ 5, Line 2
Section 104.11.03	¶ 2, Line 5
Section 107.03.01	¶ 1, Line 1
Section 107.03.01	¶ 8, Line 1
Section 107.03.01	¶ 9, Line 2
Section 107.03.03	¶ 1, Line 2
Section 107.03.05	¶ 1, Line 4, 13
Section 107.03.06	¶ 7, Line 2

Category 200 Grading

Section 201.03.04	¶ 5, Line 2
Section 201.03.06	¶ 1, Line 4
Section 201.03.10	¶ 1, Line 5
Section 204.02.03	¶ 1, Line 1
Section 205.03	¶ 2, Line 2
Section 206.04.02	¶ 5, Line 2

Category 300 Drainage

Section 301.03	¶ 1, Line 2
Section 303.03.06	¶ 1, Line 2
Section 306.03.03	¶ 1, Line 6
Section 306.03.04	¶ 4, Line 2
Section 306.04.03	¶ 1, Line 1
Section 309.03.07	¶ 1, Line 2
Section 310.03.02	¶ 1, Line 7, 8
Section 314.02.03	¶ 1, Line 6

Category 400 Structures

Section 402.03.04	¶ 2, Line 2
Section 410.03.09	¶ 1, Line 6
Section 411.03	¶ 1, Line 1, 7
Section 411.03	¶ 5, Line 1
Section 430.03.14	¶ 1, Line 6

Category 500 Paving

Section 507.03.05	¶ 5, Line 2
Section 507.03.08	¶ 1, Line 2
Section 522.03	¶ 1, Line 2

Category 600 Shoulders

Section 602.01	¶ 1, Line 4
Section 602.03.01	¶ 2, Line 7
Section 602.03.01	¶ 7, Line 3
Section 602.03.01	¶ 8, Line 3
Section 602.03.02	¶ 2, Line 3
Section 604.01	¶ 1, Line 3
Section 604.03.01	¶ 2, Line 4
Section 604.03.03	¶ 1, Line 4
Section 605.01	¶ 1, Line 3
Section 605.03.07	¶ 1, Line 10
Section 606.01	¶ 1, Line 3
Section 606.03.01	¶ 1, Line 7
Section 606.03.01	¶ 5, Line 3
Section 607.01	¶ 1, Line 3
Section 607.03.01	¶ 3, Line 3
Section 608.01	¶ 1, Line 3

Category 700 Landscaping

Section 701.01	¶ 1, Line 4
Section 701.03.01	¶ 2, Line 3, 6
Section 704.01	¶ 1, Line 5
Section 705.01	¶ 1, Line 4
Section 706.01	¶ 1, Line 4
Section 707.01	¶ 1, Line 3
Section 708.01	¶ 1, Line 3
Section 709.01	¶ 1, Line 3

Section 709.03.02	¶ 1, Line 3
Section 710.01	¶ 1, Line 4
Section 710.03.01	¶ 2, Line 4
Section 711.01	¶ 1, Line 4
Section 711.03.02	¶ 1, Line 3
Section 712.01	¶ 1, Line 4
Section 712.03.01	¶ 1, Line 2
Section 713.01	¶ 1, Line 5
Section 713.03.02	¶ 2, Line 2
Section 713.03.02	¶ 3, Line 1, 2, 8
Section 713.03.03	¶ 2, Line 1
Section 713.03.04	¶ 1, Line 3
Section 714.01	¶ 1, Line 2

Category 800 – Traffic

Section 801.01	¶ 1, Line 4
Section 804.03.03	¶ 1, Line 7
Section 804.03.03	¶ 2, Line 2
Section 810.03.04	¶ 1, Line 3

Category 900 – Materials

Section 902.11	¶ 6, Line 2
Section 910.02.02	¶ 2, Line 5
Section 910.02.03	¶ 1, Line 4
Section 915.01.06	¶ 1, Line 4, 7
Section 921.10	¶ 1, Line 3

NOTICE TO CONTRACTOR

PROJECT SCHEDULE. Section 109 shall only apply when a CPM Project Schedule item is included in the Schedule of Prices. Otherwise, all Project Schedules shall conform to Section 110.

NOTICE TO BIDDERS. The Proposal Form Packet in this Invitation for Bids requires the following information be submitted for the Bidder and each firm quoting or considered as subcontractors:

(a) Name of firm.

(b) Address of firm.

(c) MBE, Non-MBE, DBE, or Non-DBE.

(d) Age of firm.

(e) Annual gross receipts per last calendar year.

Note that there are provisions for submitting copies for additional subcontractors, and that an "X" is required to indicate whether or not additional copies have been submitted.

AFFIRMATIVE ACTION PLAN (AAP) CONTRACT GOALS. In order to be in compliance with the revised MBE/DBE laws effective October 1, 2004 the bidder is required to complete the AAP information on pages 17, 18, 19, 20, and 21 of 25 of the Contract Provisions, Proposal Form Packet —Federal, or complete the AAP information on pages 16, 17, 18, 19 and 20 of 25 of the Contract Provisions, Proposal Form Packet—State, or complete the AAP information on pages 17, 18, 19, 20, and 21 of 26 of the Contract Provisions, Proposal Form Packet—State Small Business Reserve Procurement. Failure to complete the information may be grounds for the bid to be declared non-responsive.

BOOK OF STANDARDS. The Book of Standards for Highway and Incidental Structures is now available only on the Administration's Internet Site at www.marylandroads.com. The Book of Standards can be located by clicking on Business with SHA; Business Standards and Specifications; and Book of Standards for Highway and Incidental Structures. Hard copies of the Book of Standards will no longer be sold in the Cashiers Office and hard copy distributions of the Standard updates will no longer be made.

PAYMENT OF STATE OBLIGATIONS. Electronic funds transfer will be used by the State to pay the Contractor for any Contract expected to exceed $200,000 and any other State payments unless the State Comptroller's Office grants the Contractor an exemption.

Therefore, by submitting a response to this solicitation, the Bidder/Offeror agrees to accept payment by electronic funds transfer unless the State Comptroller's Office grants an exemption.

Prior to the Award of the Contract the selected Bidder/Offeror shall register using the X-10 Vendor Electronic Funds (EFT) Registration Request Form. The instructions and the form are located on the internet at compnet.comp.state.md.us/gad.

Any request for exemption shall be submitted to the State Comptroller's Office at the address specified on the X-10 form and shall include the business identification information as stated on the form and include the reason for the exemption.

RIGHT-OF-WAY STATUS

REQUIRED PERMITS

ETC.

Permit
Wetland Plats
Will Be
Inserted
Here

GENERAL PROVISIONS

GP - SECTION 2
BIDDING REQUIREMENTS AND CONDITION FOR DESIGN BUILD – COMPETITIVE SEALED PROPOSALS

GP-2.19 BID EVALUATION AND AWARD.

(a) General.

DELETE: In its entirety.

INSERT: The following:

General. The Contract is to be awarded to the responsible and responsive bidder whose Technical Proposal compared to the Stipulate Sum meets the requirements and evaluation criteria set forth in the Request for Proposals, and is the best overall value for the Administration.

(b) Determination of the Lowest Bidder.

In the heading, substitute “Most Favorable Evaluated Proposal” for “Lowest Bidder”.

In the first paragraph, substitute “most favorable evaluated proposal” for “lowest cost”.

(c) Award.

In the first sentence, substitute “most favorable evaluated proposal” for “lowest bidder”.

In the second sentence, substitute “most favorable evaluated proposal” for “lowest responsive”.

TERMS AND CONDITIONS

TC SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR COMPETITIVE SEALED PROPOSALS (DESIGN-BUILD)

TC-2.03 VALUE ENGINEERING CHANGE PROPOSALS

DELETE: This entire section.

ADD: Value Engineering proposals will not be entertained on this project.

TC-2.06 PARTNERING

DELETE: This entire section.

INSERT: The following:

Partnering on this project will be mandatory. The partnership will be structured to draw on the strengths of each organization through open communication, teamwork and cooperative action to identify and achieve reciprocal goals. The objectives are effective and efficient Contract performance, completion within the Contract bid price, completion ahead of or on schedule, and in conformance with the Contract Documents. This partnership will not change the legal relationship of the parties to the Contract nor relieve any party from any of the terms of the Contract.

The Administration's Assistant District Engineer of Construction, the Project Design Engineer and the Contractor's management representative will meet, plan, and organize a partnering development team. Persons recommended to be on the team are: The Administration's District Engineer, Assistant District Engineer, Area Engineer, Construction Project Engineer, Project Design Engineer, Bridge Design Engineer, Landscape Architect, Representative from Office of Traffic and Safety, Representative from the Pavement and Geotechnical Division, Representative from the Engineering Geology Division, Representatives from the Noise Abatement Team, District 1 Traffic, Highway Hydraulics Engineer; the Contractor's designated on-site project manager and key project supervision personnel of both the Contractor and principal subcontractors and suppliers. FHWA and key federal, state and/or local government representatives will also be invited to attend as necessary. The initial workshop team meeting will be held prior to the Pre-construction Conference. Follow-up workshops will be held regularly as agreed by the Contractor and the Administration. The frequency of meetings shall be based upon the need for additional coordination and may occur weekly at the discretion of the Administration. All cost of partnering meetings shall be shared equally between the Design-Build Team and the Administration.

The Design Quality Control Plan (DQCP) must be available for discussion at the first Partnering meeting. The DQCP is discussed in Section 3.06.06.

TC 2.07 REQUEST FOR PROPOSALS (RFP)

The Request for Proposals- Technical Proposal / Price Proposal for this Project is structured to provide the best overall value for the Administration and the citizens of Maryland. The concept of "Competitive Sealed Proposals" procurement is that there are certain factors that provide tangible benefits to the Administration and the public. These factors will be specified in the Technical and Price Proposals to be submitted by bidders in response to this RFP.

This Contract is a Stipulated Sum, design-build contract procured using the "Competitive Sealed Proposals" procurement method as defined in the Code of Maryland Regulations (COMAR) 21.05.03. The intent of the Maryland State Highway Administration is to award the Contract to the responsible Design-Build (DB) Team whose Proposals are determined to be the best overall value for the Administration and the citizens of Maryland for the stipulated sum set forth in this RFP.

Selection by the "Competitive Sealed Proposals" approach is a combination of the submitted Price Proposal and the submitted Technical Proposal score as determined by the Administration's Advisory Board. The submitted Price Proposal will NOT be considered until the scoring for all Technical Proposals has been completed. Proposal Price must be submitted using the Proposal Form included in this RFP.

The Stipulated Sum is the Administrations budget for this contract and has been valued at **$15,300,000.00**. The Stipulated Sum is considered a fixed price not to be changed.

The Stipulated Sum has been defined in this RFP as a lump sum value, and shall include all engineering, design, construction, labor, equipment and materials, and all incidentals necessary to complete the design and construction of this project.

TC 2.08 DESIGN-BUILD CONCEPT

The Administration is soliciting Technical Proposals and Price Proposals for the design and construction of improvements to US 113 from North of Goody Hill Road to South of Massey Branch. This project is located in Worcester County, Maryland. The basis of payment for this work will be "lump sum" which price shall include all costs associated with design and construction of the project in accordance with the requirements of this RFP.

The use of the term "Contractor" or "Design-Builder" within the Contract Documents furnished by the Administration shall be taken to mean Design-build (D/B) Contractor. These terms are interchangeable.

The use of the term "Designer" or "Design-build Engineer," within the Contract Documents furnished by the Administration, shall be taken to mean the Engineer working for the Design-build Contractor. The use of the term "Engineer," within the Contract Documents furnished by

the Administration, shall be as defined in Section GP-1.03 of the General Provisions for Construction Contracts.

2.08.01.1 Restrictions on Participation in Design-Build Contracts:

An individual or entity that has received monetary compensation as the lead or prime design consultant under a contract with the Administration to develop the concept plan and/or have been retained to perform construction phase services on behalf of the state, or a person or entity that employs such an individual or entity, may not submit a technical proposal or a price proposal for this procurement and is not a responsible bidder under COMAR 21.06.01.01. The technical proposal or price proposal from such an individual or entity will be rejected pursuant to COMAR 21.06.01.01 and COMAR 21.06.02.03.

The following is a list of consultants and/or subconsultants that have received monetary compensation under a contract with the Administration as the prime consultant to develop the concept plan or has been retained by the Administration to perform construction phase services on the behalf of the state for this procurement. SHA makes no representations regarding the completeness of the list:

A. Whitman, Requardt & Associates, LLP

B. The Constellation Design Group Incorporated

C. Parsons Brinckerhoff Quade & Douglas Incorporated

D. Mahan Rykiel & Associates

E. HNTB

In addition, the State Ethics Commission administers the provisions of the State Ethics Law, including § 15-508 of the State Government Article that contains various restrictions on participating in State procurements. Any questions regarding eligibility must be appealed to the Commission.

No official or employee of the State of Maryland, as defined under State Government Article, §15-202, Annotated Code of Maryland, whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall during the pendancy and term of this contract and while serving as an official or employee of the State become or be an employee of the Consultant or an entity that is a subcontractor on this contract.

No official or employee of the Maryland Department of Transportation (MDOT), during his tenure or for one year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof, regardless of whether they participated in matters relating to this contract while in the employ of the MDOT.

2.08.02 Project Description

The project consists of the design and construction of two additional lanes along the existing US 113 alignment to create a dual divided highway. The project is located in Worcester County and begins North of Goody Hill Road and continues to south of Massey Branch. The project consist of design and construction of two additional lanes on the west side of existing US 113 for approximately 0.95 miles and on the east side of existing US 113 for approximately 1.47 miles. The project also includes design and construction of new service roads to maintain access to residential and commercial properties. Roadway improvements include new full depth construction, wedge and leveling, resurfacing of existing roadways and shoulders, reforestation, closed/open drainage systems, stormwater management quality and quantity facilities, signing, intersection lighting, pavement markings, culvert replacement and culvert extensions.

The project's conceptual design has been described herein.

The overall concept design must be evaluated and design completed by the Design-Builder to ensure all project requirements are met, including drainage and stormwater management all within the right of way. The completion of the project documents shall be performed by the Design-Builder and approved by the Administration, subject to language included elsewhere in this Request for Proposal/Invitation for Bids.

The current status of aspects of the project is as outlined below.

2.08.02.1 Survey

Aerial photogrammetry was at 1" = 50' prepared from photographs. A contour surface model and topographic base map were prepared on the basis of this photogrammetry. Supplemental data collector surveys were performed along all roadways to refine pavement elevations, ditch inverts, and pipe culverts. The data from these supplemental surveys was incorporated into the plan and the surface. This information is available in electronic format on projectwise. All surveys were performed in the Maryland State Plane Grid, NAD 83/91 and NAVD 88.The Design-Builder must obtain all additional survey data necessary for their design, construction, and verification of surface model for all design activities.

2.08.02.2 Plans

A set of conceptual plans for the highway construction has been prepared in Microstation V8. Files are available in electronic format on ProjectWise.

2.08.02.3 Cross-Sections

Field-surveyed cross-sections were not taken. Conceptual cross sections were prepared for the mainline and intersecting streets on the basis of the terrain model surface for the baseline, typical section and profile shown on the plans. These cross sections are being provided in electronic format on ProjectWise for informational

purpose only. The Design-Builder must perform field-run cross-sections to complete design and construction activities to address design and/or construction issues and provide clarification where necessary. Cross-sections showing existing and proposed ground must be prepared by the Design-Builder using the appropriate computer software.

2.08.02.4 Geotechnical

The Administration has obtained soils borings at selected locations along the project corridor and performed laboratory testing of the samples. The boring logs and laboratory test data are included on ProjectWise.

The Administration has performed a topographic survey and topsoil testing. Results of the survey and laboratory test data are included on ProjectWise.

These studies were performed with reasonable care and recorded in good faith. The Administration considers the information Engineering Data and will stand behind its accuracy at the location it was taken. The Administration assumes no responsibility in respect to the sufficiency of the studies for design. The Contractor will need to perform additional geotechnical testing and analysis to complete the project. The Design-Build Team is responsible for performing a complete geotechnical program including additional borings, sampling, in-situ and laboratory testing, analysis, and design, as necessary to complete design and construction.

2.08.02.5 Utilities

All utility data of which the Administration is aware is reflected on the survey information. The Administration has had a utility designating service locate underground utilities which identified the existence of the utility at it's horizontal location. Inaccuracies in information regarding the locations of an underground utility based on utility designation information shall be considered material only if the utility's actual centerline location is more than three (3) feet distant from the horizontal centerline location shown in that information, without regard to vertical location. Additional utilities may be present in the area. Utility test hole data was field collected at single point locations. Once uncovered, the utility's horizontal and vertical location was verified using accurate survey techniques. The Administration considers this information Engineering Data and will stand behind its accuracy at the locations that it was taken. The Design-Builder is responsible for obtaining all information that will be required to complete the roadway design and construction. The Administration has conferred with the utility companies with facilities in this area concerning the potential impact of this roadway construction. The Design-Builder must coordinate and cooperate with other contractors that are expected to be relocating utilities during the construction of this Project. The Design-Builder is responsible for determining the status of all designs and relocations and for identifying all additional required relocations and for coordinating the design and construction of the utilities with the design and construction of the roadway improvements of this Project.

2.08.02.6 Right of Way

All right of way will be cleared before Notice to Proceed is given. The Design-Builder may revise the roadway alignment and other details of the project to alter the limits of construction or disturbance, subject to environmental constraints, and the Administration's approval but all construction must be contained within the Right of Way.

The Design-Builder will be responsible for acquiring, at its expense, all other rights in land needed for construction staging, yarding, construction, or otherwise.

2.08.02.7 Permits

The following permits and/or approvals are anticipated to be required for this project:

- Erosion and Sediment Control Approval (from MDE)
- Stormwater Management Permit (from MDE)
- Reforestation Permit (DNR)
- Nontidal Wetlands and Waterway Permit, and Water Quality Certification

Changes to the Conceptual Plans may result in the need for a permit modification in which case the Design-Build Team is responsible for supplying to the Administration all information needed in order to obtain approval and authorization from the regulatory agencies. The Design-Build Team shall be responsible for addressing any comments or issues the regulatory agencies and/or Administration may have, including those pertaining to avoidance and minimization measures. The Design-Build Team shall also be responsible for designing, implementing, and monitoring mitigation, if required. It is not the responsibility of, nor guaranteed by, the Administration that approval or authorization will be granted by the regulatory agencies.

Several wetlands and waterways were identified and delineated within the project area. A copy of the delineation report will be made available to the Design-Build Team upon request. Surveyed boundaries of waterways, wetlands, and 25-foot wetland buffers are depicted on the Conceptual Plans, and will be provided to the Design-Build Team in electronic format as part of the Project Files. Prior to performing any work on the project, the Design-Build Team shall be responsible for installing temporary orange construction fence and prohibitive signage around the wetland and waterways areas within the immediate work area, as described in the Special Provisions. Impacts to all delineated resources have been minimized.

Changes to the Conceptual Plans may result in permit modifications, which may or may not be approved. The Design-Build Team is responsible for supplying to the Administration all information needed to obtain any necessary permit modifications.

Status of Joint 404 Permit (JP) and Water Quality Certification (WQC):

The 404 Permit and Water Quality Certification have been obtained for the entire US 113 corridor and has been continuously modified through the Maryland Department of the Environment providing permits for each phase. The permit for this phase is currently under review (with both the Maryland Department of the Environment and the U.S. Army Corps of Engineers) and is anticipated to be delivered to the State Highway Administration prior to Proposal Due Date.

Status of Maryland Department of Natural Resources Reforestation Permit:

The Administration has coordinated with the Maryland Department of Natural Resources (DNR) Reforestation site review for forested impacts for this project based upon the proposed activities and contingent upon the submission of plans that are consistent with the proposed activities for which the approval was given. The completion of final design and construction activities might result in revocation of this approval if impacts exceed those for which the approval was granted. In this case, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to SHA-Landscape Operations Division for approval, who will then submit the modification request to DNR for approval.

Status of Stormwater Management Review:

A Stormwater Management (SWM) concept design was developed to establish Right of Way needs and to demonstrate to MDE that all of the SWM needs of the project can be met within that right-of-way. The SWM methodology is currently under review by MDE. Approval of the concept SWM report and a Letter of Intent is anticipated to be issued prior to Bid Opening. The Design-Build team is responsible to finalize the SWM design and obtain the final approvals. Status of Erosion and Sediment Control Approval:

No erosion and sediment control design has been provided by the Administration.

Status of Maryland Historic Trust Approval:

N/A

2.08.03 RFP Package

The following materials are being provided to all prospective bidders:

A. One copy of this RFP.

The following materials are being provided in electronic format on ProjectWise. This material is considered Engineering Data and the Administration will stand behind its accuracy unless otherwise specified in the contract documents.

B. Survey/Topographic Files

- Topographic files

- Text files
- Existing Contour files
- Triangle files
- Photogrammetry files
- Environmental Features file
- Bridge Location files *include if applicable*
- Flood Plain Cross Sections *include if applicable*
- Existing Surface files (.dtm or .tin)
- Intergraph Output/Coordinate files (.dmp)

C. Utility Files

- Utility designation files
- Utility Test Pit files
- Drain Field files *include if applicable*

D. Right-of-Way

- Metes & Bounds file
- Work Map files
- Proposed Right-of-Way Line file

E. Landscaping, Reforestation & Wetland Plates (.dgn files)

F. Appendices (.pdf files)

- Soil Survey Boring Logs
- Soils Laboratory Test Results
- Summary of Topsoil Results
- Topography Tabulation
- Existing and Proposed Traffic Data
- Utility Test Hole Reports

The following materials are being provided in electronic format on Projectwise. This material is considered Conceptual and the Administration makes no representation regarding its accuracy.

G. Conceptual Plan Sheets

- Title Sheet
- Typical Section Sheets
- Geometry Sheets
- Miscellaneous Detail Sheets *(include if applicable)*
- Roadway Plan Sheets
- Roadway Profile Sheets
- Conceptual Structure Plans (.dgn file) *(include if applicable)*

H. Design Files

- Horizontal Baseline file
- Vertical Alignment file
- Shading file
- Conceptual Cross Section files
- Border files
- Conceptual/Potential SWM area files

The following materials are being provided in electronic format on Projectwise. This material is considered necessary for the Design-Build Team to submit a technical proposal, prepare a bid and/or finalize the Stormwater Management/Drainage designs.

I. Design-Builder's Information Forms (.doc files)

- Design-Builder's Key Management and Staff Information (Form A-1)
- Design-Builder's Project Description (Form A-2)
- Erosion Sediment Control Past Performance Form

J. Stormwater Management and Surface Drainage Information

- Drainage Design Guidelines
- Concept Stormwater Management Report (.pdf file)

- BMP Checklists and As-Built Certification Formats
- SWM Report Format Guidelines
- SHA BMP Identification Form
- Grass Channel Credit Paper
- Water Quality Summary Sheet Format and Definitions
- Bioretention Facility Suggested Plants
- Geotextile Guidelines
- MDE Guidelines
- Stormwater Management Facility Visual/Environmental Quality and Safety Criteria: Review Guidelines, SHA Highway Hydraulics Division, October 2006.

In general, the Microstation files included on the Projectwise are in conformance with the MDSHA Microstation V8 CAD Standards Manual.

It is likely that most bidders will use plot drivers that differ from the drivers used to produce the provided plans. Some of the drawings screen existing features through level symbology color 250. The manipulation of the drawing files to produce any requirements (as found elsewhere in the Invitation for Bids) for as-built plans will be the responsibility of the selected Design-Builder.

Bidders are also provided with a file index provided on Projectwise. The file is a Word Document describing all the files and files names as outlined above.

2.08.04 Description of Work

2.08.04.1 Engineering/Construction Services

The required engineering and construction services to be provided by the Design-Builder will include, but not be limited to:

- Roadway Design and Construction.
- Structural Design and Construction for All Bridges, Culverts, Walls and any and all other incidental structures specifically required for this project.
- Hydraulic Analysis, Design, Construction and Agency Approval for Specific Structures identified in the Contract Documents.
- Signing, Lighting, and Pavement Marking Design and Construction.

- Roadside Landscape Planting, Stormwater Management Landscape Planting, Reforestation Design and Construction of the aforementioned.
- Utility Coordination for utility modifications whether designed and/or constructed by the Design-Builder.
- Geotechnical Engineering and Pavement Design.
- Storm Water Management (SWM) Design, Approvals, Construction and As-Built Certification (including MDE approval).
- Erosion and Sediment Control (E&S) Design, Implementation and Approvals (including NPDES and MDE Approvals).
- Engineering Studies.
- General Coordination with Administration (includes obtaining required approvals).
- Additional Data Collection (includes surveying, geotechnical, etc.).
- Produce Required Deliverables.
- Environmental Permit Activities (including obtaining permits as described herein).
- Community Relations.
- Traffic Control Design and Implementation including the preparation of a Traffic Management Plan (TMP.
- Maintenance of project site(s) including mowing, watering, and dust control.
- Obtaining all required permit modifications from the appropriate regulatory agencies for any additional impacts to wetlands, their buffers, waterways, floodplains, roadside trees, stormwater management, erosion and sediment control, or any other impacts not authorized by the original permits.
- Clearing and Grubbing.
- Excavation, embankment, borrow, undercutting, backfill, disposal of unsuitable material and disposal of excess material.
- Storm drainage, including culvert structures, ditches, spring control and underdrains.
- Roadway overlay of existing pavement.
- Signing/removal of existing sign foundations.
- Intersection lighting.

- Installation of plowable raised pavement markers.
- Turf establishment, tree protection, tree removal and pruning.
- Stabilization of existing failing outfalls.
- Preparation of required permit applications for modifications tree removal.
- Traffic Barrier Design
- Verification that existing traffic barrier and traffic barrier end treatment meet current standards and the National Cooperative Highway Research Program Report 350. Replacement of all nonconforming traffic barrier and traffic barrier end treatments within the limits of work described above and shown in the concept plans. This includes the entire length of traffic barrier that starts within the limits of work and extends outside the limit of work.
- Surface Drainage Design and Approvals including Waterway Construction Permit Review and Approval for Culverts in Jurisdictional Waters
- Any other items required to successfully complete the project.

TC 2.09 PROPOSAL SUBMISSION REQUIREMENTS

2.09.01 Responsibilities of the Bidders

2.09.01.1 Review of RFP and Plans

Before submitting a proposal, the Prospective Bidder is responsible for examining the RFP and materials furnished to each prospective Design-Builder. The Design-Builder is responsible for all site investigation and preliminary design necessary to submit proposals and accept responsibility that their technical and price proposal is sufficient to complete all design and construction.

2.09.01.2 Site Investigation

The Administration is acquiring the Right of Way necessary to construct this project. All necessary Right of Way will be acquired prior to Notice to Proceed. **As of the issuance of this RFP, the Administration has advanced sufficiently in this process to permit Design-Builder's to inspect all of the project site except for the areas specified in Right of-Way Status Special Provision.** The Design-Builder's invited to submit a Price Proposal must first examine all of the project site that is under Administration control. Examination of all other areas must be arranged with the owner.

The Prospective Bidder is solely responsible for all site conditions discoverable from a reasonable site examination. A reasonable site examination includes all utility and/or geotechnical investigation that the Prospective Bidder determines is necessary to properly price the Work. If the Prospective Bidder determines, before submission of the proposals, that additional utility designation, geotechnical and/or subsurface investigation or analysis are necessary to properly price the Work; it is the responsibility of the Prospective Bidder to perform such investigation and analysis at its expense. The Administration has performed a preliminary utility designation and geotechnical survey of the project site. The boring logs and test results have been included in the project files. The utility information is included in the data provided including utility test hole data included on ProjectWise. It is the Bidder's responsibility to verify that information as part of its utility and/or geotechnical investigation. The Technical Proposal and Price Proposal submission will be considered conclusive evidence that the Prospective Design-Build Team has determined that it has performed a reasonable site investigation to submit Technical Proposal and Price Proposal, necessary to design and construct the project.

All subsurface investigations performed by the Prospective Bidder, including sampling and laboratory testing, shall be performed by a Geotechnical firm experienced in subsurface investigations and in accordance with the 1988 AASHTO Manual on Subsurface Investigations, AASHTO Standards, the Maryland State Highway Administration Standard Specifications for Subsurface Explorations, MSMT Standards, the Maryland State Highway Administration Book of Standards for Highway and Incidental Structures, and ASTM Standards. The Prospective Bidder shall be responsible for utility clearance and any traffic control required for his investigation. The Prospective Bidder shall submit all Maintenance of Traffic concepts related to site investigation to the SHA District 1 Traffic Division for approval. Any investigative methods that pose a safety threat to the traveling public shall not be used. Any borings taken in roadway or shoulder areas shall be backfilled before the area is re-opened to traffic. The Prospective Bidder shall restore to its current condition, any area of the site disturbed by his site investigation operations. If the Prospective Bidder encounters any abnormal conditions that indicate the presence of hazardous materials or toxic waste during his site investigation, he shall immediately suspend work in the area and notify the Administration. A Geotechnical Engineer who is registered in the State of Maryland shall supervise all subsurface investigations conducted by the Design-Builder.

2.09.01.3 Utility Coordination

Prior to submitting a Price Proposal, the Prospective Bidder must conduct utility research and coordination with all utility companies along with additional site research to determine:

a. What utility relocation work is planned, what is the status and anticipated schedule impact of this work.

b. What utility facilities actually exist within the project limits.

c. What additional utility relocation work must be included in their design and impact to the schedule that will result from the Design-Builder's activities.

d. What permitting modifications result from additional utility relocations.

The Price Proposal must represent a thorough consideration of these elements.

2.09.01.4 Additional Surveys

The Prospective Bidder will require additional survey or topographic information (including utility locations). The Design-Builder must account for these services within their project schedule and design submittals. It is the responsibility of the Prospective Bidder at its expense to obtain all additional information and the Administration accepts no responsibility for the lack of this information.

2.09.01.5 Duty to Notify if Errors Discovered

Bidders shall not take advantage of any error, omission, or discrepancy in the RFP or related materials, including all Project information. If a Bidder discovers such an error, omission or discrepancy, he shall immediately notify the Administration in writing; failure to do so notify shall constitute a waiver of any claim based upon such error, omission, or discrepancy. After such notification, the Administration will confirm or modify the RFP in writing as the Administration determines may be necessary to fulfill the intent of the RFP.

2.09.02 Pre-Submittal Requirements

2.09.02.1 Communications During Proposal Preparation

All requests for additional information or clarification of the RFP and any other communication concerning this Project shall be submitted in writing by Proposers. All such requests must be submitted to:

Mr. Kirk G. McClelland
(Attn: David Phillips)
Director, Office of Highway Development
State Highway Administration
707 North Calvert Street
Mail Stop C-102
Baltimore, MD 21202
e-mail address: dphillips@sha.state.md.us

Only e-mailed inquires (confirmed by mail by the requester) will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered. No verbal requests or personal visits will be honored.

No inquiries shall be directed to any Administration personnel other than the individual named above. The Administration has no duty to respond to any such inquiries, and the Administration will not be responsible for any responses from any other source other than the Contract Representative in writing.

As discussed in GP 2.09, during the Procurement Phase, bidders may make inquiries up to 4:00 p.m. (prevailing local time, 10 calendar days prior to the proposal due date. Inquiries received after that date and time will not be accepted.

2.09.02.2 Addenda

Interpretations, clarifications or modifications to this RFP will be made by Addenda. Only interpretations, clarifications and answers to the questions included in Addenda or such writings shall be binding on the Administration.

2.09.02.3 Alternative Technical Concepts

The Administration has chosen to use the alternative technical concept (ATC) process to allow innovation and flexibility to be incorporated into the Proposals and considered in making the selection decision, and to avoid delay's and potential conflicts in the design associated with deferring of technical concept reviews to the post-award period, and ultimately to obtain the best value for the public.

The ATC process allows Proposers to submit for pre-approval proposed alternatives to the RFP requirements. The Administration will not approve any ATC that entails a deviation from the requirements of the as-issued Contract Documents, unless the Administration determines, in its sole discretion, that the proposed end product based on the deviation is equal to or better than the end product absent the deviation and is permitted by the Permit Approvals.

Any ATC that has been pre-approved may be included in the Proposal, subject to the conditions set forth herein.

The ATC process may be used to allow a Proposer to submit technical concepts for review by the Administration to determine if those technical concepts are consistent with the requirements of the RFP documents. The ATC submittal should clearly stipulate this reason for the review.

2.09.02.4 ATC Submittal and Review

The Proposer may submit an ATC for review by the Administration on or before November 11, 2008 at 4:00 p.m. (prevailing local time). Inquiries received after that date and time will not be accepted.

All ATCs shall be submitted in writing to the Procurement Officer at the address identified in RFP Section 2.09.03.1.d, with a cover letter clearly identifying the submittal as a request for review of an ATC. If the Proposer does not clearly designate its submittal as an ATC, the submission will not be treated as an ATC by the Administration

The Administration will review each ATC submitted. If an ATC is summarily approved or not approved, the Administration's comments will inform the Proposer that its technical concept appears to be generally acceptable, or the Administration will identify areas in which the approach appears to be incompatible with the Project requirements. If the Administration needs more information to determine whether or not the ATC will be approved or not approved, the Administration will submit written questions to the Proposer and/or request a one-on-one meeting in order to better understand the details of the ATC. The Administration may conditionally approve an ATC based on required revisions to a portion or portions of the ATC.

If an ATC is not approved or conditionally approved and the Proposer feels that the non-approval or the conditions for approval were due to an incorrect conclusion on the part of the Administration, it may re-submit the ATC for one additional review to the Procurement Officer at the address identified in RFP Section 2.09.03.1.d. If a re-submittal is made, it shall be accompanied by a cover letter clearly identifying such submission as an ATC submitted for an additional review.

The Proposer shall advise the Administration in its ATC if it believes a one-on-one meeting is appropriate.

The Administration will return its approval, non-approval, conditional approval, or additional questions pertaining to any specific ATC no later than two weeks after receipt of that ATC. If the Proposer does not receive a return response from the Administration within two weeks of the Administration's receipt of the ATC, the Proposer shall presume that the Administration has rejected the ATC.

2.09.02.5 Content of ATC Submittal

Each ATC submittal shall include five copies and shall include the following:

A) Description: A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, .If appropriate product details (i.e. specifications, construction tolerances. special provisions), and a traffic operational analysis);

B) Usage: Where and how the ATC would be used on the Project;

C) Deviations: References to any requirements of the RFP Documents or to any elements of the Contract Documents that are inconsistent with the proposed ATC, an explanation of the nature of the proposed deviation and a request for approval of such deviations or a determination that the ATC is consistent with the requirements of the RFP Documents;

D) Analysis: An analysis justifying use of the ATC and why the deviations from the requirements of the RFP Documents should be allowed:

E) Impacts: Discussion of potential impacts on vehicular traffic, environmental impacts (favorable and unfavorable) identified on appropriate environmental documents, community impacts, safety and life-cycle Project and infrastructure costs (including impacts on the cost of repair and maintenance);

F) History: A detailed description of other projects where the ATC has been used under comparable circumstances, the success of such usage, and names and telephone numbers of project owners that can confirm such Statements:

G) Risks: A description of added risks to the Administration and other Persons associated with implementing the ATC;

2.09.02.6 Determination By The Administration

The Administration will make one of the following determinations with respect to each properly submitted ATC:

A) The ATC is approved.

B) The ATC is not approved.

C) The ATC is not approved in its present form, but is approved subject to satisfaction, in the Administration's sole judgment, of specified conditions

D) The submittal does not qualify as an ATC but may be included in the Proposal without an ATC (i.e., the concept complies-with the RFP requirements)

E) The submittal does not qualify as an ATC and may not be included in the Proposal.

F) Decision on the ATC is pending receipt of additional information and/or one-on-on meeting

Approval of an ATC will constitute a change in the specific requirements of the Contract Documents associated with the approved ATC and for that specific Proposer. Should the Design-Builder be unable to obtain required approvals for any ATC incorporated into the Contract Documents, or if the concept otherwise proves to be infeasible, the Design-Builder will be required to conform to the original RFP requirements. Each Proposer, by submittal of its Proposal, acknowledges that the opportunity to submit ATCs was offered to all Proposers, and waives any right to object to the Administration's determinations regarding acceptability of ATCs.

2.09.02.7 Incorporation Into Proposal

Proposer may incorporate zero, one or more pre-approved ATCs into its Proposal including conditionally approved ATCs. If the Administration responded to an ATC by identifying conditions to approval, Proposer may not incorporate such ATC into the Proposal unless all conditions have been met. Copies of the Administration's ATC approval letters for each incorporated ATC shall be included in the Proposal. Proposals with or without ATCs will be evaluated against the same technical evaluation factors, and the inclusion of an ATC, including an ATC that provides technical enhancements, may or may not receive a higher technical rating.

The Stipulated Sum identified in RFP Section 2.07 is considered a fixed price not to be changed. Any approved ATCs may not increase or decrease this cost.

Except for incorporating approved ATCs, the Proposal may not otherwise contain exceptions to or deviations from the requirements of the RFP Documents

2.09.02.8 ATC Confidentiality

ATCs properly submitted by a Proposer and all subsequent communications regarding its ATCs will be considered confidential. If a Proposer wishes to make any announcement or disclosure to third parties concerning any ATC, it shall first notify the Administration in writing of its intent to take such action, including details as to date and participants, and obtain tile Administration's prior approval to do so.

2.09.02.9 One-On-One Meetings

Prior to or after submission of ATCs, the Administration may conduct one-on-one meetings with a Proposer to gain information or a better understanding regarding its ATC and to discuss issues and clarifications regarding the ATC. The Administration reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings. However, the Administration will not disclose any information pertaining to an individual Proposer's ATCs or other technical concepts to other Proposers.

2.09.03 Proposal Delivery Formalities

2.09.03.1 Organization of Proposal Submittals

Prospective bidders shall organize submittal of their Technical Proposal and Price Proposal to match the organization specified in this RFP.

a. Separate Proposal Packages

Proposal submissions shall consist of two separate sealed packages, a Technical Proposal and a Price Proposal.

- Technical Proposal

The Technical Proposal may be submitted in container(s) of the Prospective Bidder's choice provided that the material is neat, orderly, and incapable of inadvertent disassembly. Technical Proposal shall be submitted and bound using a three (3) ring binder with all pages are numbered consecutively.

- Price Proposal

The Price proposal shall be submitted on the Price Proposal Form supplied by the Administration and shall be delivered in a sealed envelope capable of holding 8½" x 11" documents without folding.

b. Submittal Marking

Each submittal must be clearly marked as follows:

Prospective Bidder's Name

US 113 From North of Goody Hill Road to South of Massey Branch (Phase 2B)

Container ____of _____

Proposal submittal type, labeled as appropriate:

- US 113 - Technical submittal
- US 113 - Price submittal

c. Proposal Guaranty

The Proposal Guaranty shall be delivered with the Price Proposal in a sealed business-sized envelope clearly marked as follows:

Prospective Bidder's Name

Proposal Guaranty
US 113 From North of Goody Hill Road to South of Massey Branch (Phase 2B)
WO6345270

d. Location and deadline for submittal of Technical and Price Proposals

Technical Proposals and Price Proposals must be delivered no later than **January 9, 2009 prior to 12 noon** (prevailing local time). The proposal must be delivered to the following location:

Mr. Robert Gay
Director, Office of Consultant Services
Fourth Floor, C-405
707 N. Calvert Street
Baltimore, Maryland 21202

e. Number of Copies

One original and six (6) copies of the complete Technical Proposal shall be submitted. A single original of the Proposal Guaranty and a single original of the Price Proposal shall be submitted.

2.09.03.2 Effect of Submitting Proposal

Signing of the Design-Build Proposal Submission Form and Price Proposal Form, and delivery of the Proposal represents (a) an offer by the bidder to perform the Work for the Price submitted within the time(s) specified in accordance with all provisions of this RFP and (b) the Prospective bidder's agreement to all the provisions of the RFP and Contract governing requirements and procedures applicable through execution of the Design – Build Contract. The Technical Proposal will become part of the Design – Build Contract.

By so signing the above referenced terms and by delivering the Proposals, the Prospective Bidder makes the following affirmative representations.

a. The bidder has reviewed all documents and undertaken all investigations that could significantly impact the cost, timeliness, quality, or performance of the Work. Specifically, the bidder has (a) carefully examined the RFP and all documents included or referenced therein, (b) carefully examined all available reports and data related to subsurface conditions, (c) become familiar with all applicable federal, state and local laws and regulations, (d) visited the site and made all reasonable visual investigations, and (e) correlated the information obtained from the above examinations and investigations.

b. The bidder has given the Administration written notice of all errors, omissions, or discrepancies in the RFP in accordance with Section TC 2.09.01.5.

c. The bidder has determined that the RFP are generally sufficient to convey an understanding of all terms and conditions that could significantly impact the cost, timeliness, quality, or performance of the Work.

2.09.03.3 Withdrawals and Resubmittals of Proposals

A bidder may withdraw Proposals after delivery, provided the request for such withdrawal is made in writing or in person before the date and time set for submission of Proposals. The bidder may revise and resubmit a Proposal so withdrawn before said date and time.

TC-2.10 PROPOSAL CONTENTS AND FORMAT

2.10.01 Technical Proposal

- General: The Technical Proposal submittal shall contain concise narrative descriptions and graphic illustrations, drawings, charts, plans and specifications that will enable the Administration to clearly understand and evaluate the capabilities of the Design - Build team and the characteristics and benefits of the proposed technical solutions.
- No Price Information: No price information of any kind shall be included in the Technical Proposal submittal.
- Proposal Organization: Organization of the Technical Proposal shall comprise six parts, meet the specified page limitation, and correspond to the outline as follows:
    - Cover Letter

- Project Technical Elements & Approach
- Environmental Approach
- Project Management
- Project Schedule
- Legal and Financial Information

- Format:
  - Paper. The Technical Proposal submittal shall be submitted on 8.5”-by-11” paper printed back to back where practical. Charts, exhibits, and other illustrative and graphical information may be on 11”-by-17” paper, but must be folded to 8.5”-by-11”, with the title block showing.
  - Type Font and Margins. The type face of all narrative text shall be at least 12-pt, either Arial or Times New Roman font, and all page margins must be at least ½” from sides and 1” from top and bottom. All pages shall be sequentially numbered not including the cover letter.
  - Page Limits. The Technical Proposal submittal shall be limited to the number of pages defined below. No page limit will be imposed on the appendices, although the size of the appendix should be kept within reason.
  - Finding tools, such as tables of contents and page dividers shall be utilized to make the submittals easily usable.

2.10.01.1 Cover Letter (Limit 2 Pages)

A Major Participant is defined as the legal entity, firm or company, individually or as a party in a joint venture or limited liability company or some other legal entity, that will be signatory to the Design – Build Contract with the Administration. Major Participant(s) will be expected to accept joint and several liability for performance of the Design – Build Contract. Major Participants are not design subconsultants, construction subcontractors or any other subcontractors to the legal entity that signs the Design – Build Contract. A cover letter, signed by all Major Participants must:

a. Provide the names and the roles of all Major Participants. Also identify the lead design firm.

b. Identify a single, primary point of contact for the Design-Build Team with address, phone number, fax number, cell phone number, and E-mail address where all communications from the Administration should be directed for the proposal and bidding phases and duration of the Contract. A secondary contact for the Design-Build team shall be included (with the above information) for use when the primary contact is not available. The primary and/or secondary contact must be available 24 hours a day for the duration of the design and construction activities and during normal business hours during the bidding phase. **The Administration prefers that the primary and secondary points of contact are key staff members that will be directly involved during the proposal development, pre-bidding phase, design and construction stages.** In the event that the primary and secondary contact are not assuming their responsibility until after the bidding phase the Design-Build

Team must identify the primary point of contact for the bidding phase. At least one of the key members must be involved in all phases.

c. Include an affirmative declaration that to the best of each Major Participant's knowledge and belief, the information supplied by said Participant is true and accurate.

d. Include a general authorization for the Administration to confirm all information contained in the Technical Proposal.

e. The Design-Build Team is alerted to their responsibility to confirm that all Design-Build Team members, suppliers, etc. have received all addenda. The Design-Build Team is solely responsible to ensure that their team has the correct information.

2.10.01.2 Project Technical Elements & Approach (Limit 12 Pages)

- Technical Elements of the Scope of Work: The Maryland State Highway Administration has established the design and construction of two additional lanes along the existing US 113 alignment to create a dual divided highway and all related design and construction activities referenced in Section 2.08.04 from approximate Station 1629+80.07 to approximate Station 1749+00.00 as the minimum responsible limits for this project. Technical Proposals received that describe improvements that are less than the minimum limits will be considered nonresponsive.

  The Maryland State Highway Administration has procured the Right-of Way to facilitate the design and construction of two additional lanes along the existing US 113 alignment to approximate Station 1612+50 and for the design and construction of Access Road M and has established this as the maximum limit of the project.

  In words, graphic illustrations and drawings, and technical data necessary for the Administration to evaluate, describe your project limits and what usable project improvements will be developed between the minimum responsible limits and the maximum limit. Your discussion shall include how your proposed project improvements beyond the minimum responsible limits will maximize the following:

  - Lane Miles Open to Traffic
  - Access to Residential and Commercial Properties
  - Highway Capacity and Operational Efficiencies
  - Safety Betterment
  - Benefit to Future SHA Dualization Projects
  - Environmental Benefits
  - Maintenance Benefits

Your discussion shall be guided not only by this RFP Section and the Scope of Work, but also by the guidelines, performance requirements, and design and construction criteria set forth throughout other parts of the RFP Documents.

2.10.01.3 Environmental Approach (Limit 8 Pages)

- Environmental Technical Elements of the Scope of Work: Demonstrate an understanding in words, and technical data necessary for the Administration to evaluate your approach to each of the two (2) major environmental technical elements of the Project, as specified herein. Your discussion shall be guided not only by this RFP Section and the Scope of Work, but also by the guidelines, performance requirements, and design and construction criteria set forth throughout other parts of the RFP Documents.

  Describe the Design-Build Teams technical understanding and approach of the major technical environmental aspects of the Project:

  - Storm Water Management (SWM) Design and Approvals and As-Built Certification.

  - Erosion and Sediment Control (E&S) Design and Approvals

- Environmental Permitting Elements: Demonstrate an understanding in words, necessary for the Administration to evaluate your approach to each of the seven (7) major environmental permitting elements of the Project, as specified herein. Your discussion shall be guided not only by this RFP Section and the Scope of Work, but also by the guidelines, performance requirements, and design and construction criteria set forth throughout other parts of the RFP Documents (including all RFP appendices).

  - Approach to coordinating with Federal, State, and local agencies to secure environmental permits.

  - Measures for ensuring compliance with requirements of the environmental approvals and laws relating to cultural and/or environmental resources.

  - Approach to implementing an effective Storm Water Management Plan.

  - Approach to implementing an effective Erosion and Sediment Control (E&S) plan including; interim E&S measures required during construction phasing, maintenance of controls while in place and frequency of inspecting E&S controls.

- Measures for ensuring a proactive approach to maintaining/correcting effective E&S control devices.

- Approach to obtaining Wetland permit modifications for MDE's Non-tidal wetland and Corps of Engineers 404 permits, if required.

- Approach to interacting with MSHA's Environmental Monitor.

The Design-Build team is advised that the Administration, as per the permit conditions, shall retain the services of a qualified, independent environmental monitor, who will monitor the design and construction of the Project full-time to assure that all regulatory permit conditions are met.

The role of the independent environmental monitor will include; (a) reviewing design plans to ensure permit requirements have been met and that all practical avoidance and minimization efforts are incorporated; (b) monitoring the construction to assure that the work is in compliance with the authorized activity; (c) recommend measures to keep the project in compliance; (d) informing the owner and the regulatory agencies, concurrently, of any problems regarding the construction in association with Waters of the United States, including jurisdictional wetlands; and (e) recommend measures to bring the project into compliance.

Present your plan for obtaining and maintaining all permits required for the Project. Include the permit item, agency involved, your approach to coordinate with that agency, and a summary description of the documentation required to obtain each permit. Indicate the person(s) who will have lead responsibility for agency coordination. Outline procedures for establishing working relationships, including how the Design - Build team intends to coordinate its design and construction schedule with the applicable agency.

- Submit a resumes for the Environmental Compliance Manager. The resume shall be no longer than one page, and shall address the following topics:
  - The proposed Project position
  - Education, including specialty courses
  - Experience in performance of required tasks
  - Experience on similar projects, especially design – build projects
  - Certification of the ability to perform the work

2.10.01.4 Project Management (Limit 8 Pages)

- General: The Design - Build team shall substantiate its ability to accomplish the Work by explaining its approach to project management, as well as its capability

of providing the personnel, facilities, materials and equipment to complete the Project and meet schedule requirements.

- Management Organization and Capabilities: The Design - Build Contractor shall provide the following:

  Include an organization chart indicating the basic structure of the Design - Build team's organization and the roles and responsibilities of each suborganization. The chart shall show the interrelationships of project management, design, project controls, construction, and quality control functions. The organizational chart shall reflect all Key Individuals as identified in the RFQ, in addition to persons proposed for the following positions:
  - Design Quality Manager
  - Construction Quality Manager
  - Construction Traffic Manager (having passed SHA's Traffic Manager Course)
  - Environmental Compliance Manager
  - Project Utilities Coordinator
  - Public Relations Coordinator

  The chart shall indicate the planned approximate percent of time for each Key Individual as indicated above that will be dedicated to the Project throughout the duration of the Project.

- Project Management Key Functions. Explain how the organization will perform the following functions:

  - Communications Management: Document and control communications between the Design – Builder and its designers, suppliers and constructors, and between the Design-Builder and the Administration. Discussion shall include the planning and coordination of Design – Builder submittals to the Administration. Provide means and methods for communicating with the public, both community officials and the general public. Also, indicate your approach toward team building within the Design – Build team, and expected benefits from participating in a formal Partnering Program with the Administration.

  - Change Management: Discuss how the Design – Builder will advise and discuss with the Administration any potential changes in advance of any actual impact to the scope of work or the contract for which the Design – Builder believes the Administration is responsible. In addition, discuss how the design firm will be involved and have decision-making authority with respect to any changes to the "issued for construction" drawings, and

for inclusion of such changes in a complete set of as-built drawings and specifications.

- Design and Construction Management: Indicate your preliminary list of technical design submittals for Administration review, and your plan for developing and providing these submittals. The work packages shall be identified in the Project Summary Schedule submitted in the Technical Proposal.

  Identify your planned approach to defining and sequencing the execution of construction work packages. Including planning and performing the construction, of the following:

  - Staging, material delivery/storage and office utilization
  - Subcontractor plan to meet Project requirements.
  - Wage rate compliance
  - Site access
  - Protection of completed works or works in progress during Construction
  - Noise and dust control
  - Utility coordination and relocations, including any planned shut downs
  - Quality Assurance

- Safety and Health Management: Discuss your plan for safety management, including safety of the traveling public, and safety of site visitors.

2.10.01.5 Project Schedule (Limit 5 Pages)

- Baseline Project Summary Schedule

  - Submit a Baseline Project Summary Schedule and supporting text that addresses the work requirements, including but not limited to the following:
    - Engineering and modeling
    - Geotechnical investigations
    - Design and issue of plans and specifications for construction (by defined construction work package)
    - Permitting
    - Construction mobilization, including temporary construction works, such as haul and access roads,
    - Construction and completion of permanent works
    - Major utilities relocations, if applicable.

- Site restoration and clean-up
- The Baseline Project Summary Schedule shall not exceed 250 activities, and represent the entire project execution from design through completion and turnover.

▪ The Baseline Summary Schedule will define major activities and construction work packages, including the planned duration, start date and completion dates that are critical for meeting the Design-Build Teams proposed completion date.

▪ The Baseline Summary Schedule will establish major milestones to measure and assess progress, which includes any critical schedule dates indicated by the Administration in the schedule requirements of this RFP.

2.10.01.6 Legal & Financial Information (Limit 8 Pages Maximum, excluding copies of underlying team agreements)

The structure of the Legal and Financial information shall include:

o Design - Build team Organization. Briefly describe the proposed legal structure of the Design –Build Contractor and team, and provide copies of underlying agreement(s). Confidential price data may be excluded or eradicated from the organizational legal documents provided.

o Liability: State whether Major Participant firm(s) who will be party to the prime design – build contract with the Administration will have joint and several liability, and how liability is being apportioned between other firms of the design-builder team. Provide documentation that you have met the requirements for Professional Liability Insurance including agreements between participants.

o Bonding Capability: Provide evidence that the design – builder entity is capable of obtaining a Performance Bond and a Payment Bond in accordance with the requirements in Maryland's January 2001 Standard Specifications for Construction and Materials, GP – Section 3 and appropriate for the upper range of a Project Classification H as defined in Maryland's Standard Specifications for Construction and Materials, Section TC 2.01.

Such evidence shall take the form of a letter from a surety company indicating that such capacity is anticipated to be available for the contracting entity. Letters indicating "unlimited" bonding capacity are not acceptable. The surety company providing such letter must be rated at least A- by two nationally recognized credit rating agencies or at least A-VII by A.M. Best & Company. The letter should recognize the firm's backlog and work in progress in relation to its bonding capacity.

TC-2.11 EVALUATION OF PROPOSALS, BID OPENING AND SELECTION

2.11.01 Two-Part Evaluation Process

The Administration will use a two-part evaluation process to select the successful bidder for this Project; evaluation of a Technical Proposal and evaluation of a Price Proposal.

The Technical and Price proposals shall be evaluated by independent teams of Administration employees. The technical factors to be evaluated shall be listed in the RFP in descending order of importance. The evaluation of the price proposal shall be based on the Administrations Stipulated Sum and compared to the proposed improvements detailed in the Proposers technical proposal. The technical proposal shall be based on a variety of criteria to be described in the RFP. For the purpose of the RFP evaluation, the technical proposal shall determine award of the contract. **The Environmental Approach section of the technical proposal must receive an overall "GOOD" rating to be considered for award of this project.**

During the evaluation of the technical proposals, a quality rating will be assigned for each technical factor and for the overall quality rating of each proposal based on the following quality rating criteria:

EXCEPTIONAL – The Proposer has demonstrated an approach that is considered to significantly exceed stated criteria in a way that is beneficial to the Administration. This rating indicates a consistently outstanding level of quality, with very little or no risk that this Proposer would fail be meet the requirements of the solicitation. There are essentially no Weaknesses.

GOOD – The Proposer has demonstrated an approach that is considered to exceed stated criteria. This rating indicates a generally better than acceptable quality, with little risk that this Proposer would fail to meet the requirements of the solicitation. Weaknesses, if any, are very minor.

ACCEPTABLE – The Proposer has demonstrated an approach that is considered to meet the stated criteria. This rating indicates an acceptable level of quality. The Proposer demonstrates a reasonable probability of success. Weaknesses are minor and can be readily corrected.

SUSCEPTIBLE TO BECOME ACCEPTABLE – The Proposer has demonstrated an approach that fails to meet stated criteria as there are Weaknesses an/or Deficiencies, but they are susceptible to correction through discussions. The response is considered marginal in terms of the basic content and/or amount of information provided for evaluation, but overall the Proposer is capable of providing an acceptable or better Proposal.

UNACCEPTABLE – The Proposer has demonstrated an approach that indicates significant Weaknesses/Deficiencies and/or unacceptable quality. The Proposal fails to meet the stated criteria and/or lacks essential information and is conflicting and/or unproductive. There is no reasonable likelihood of success. Weaknesses/Deficiencies are so major and/or extensive that a major revision to the Proposal would be necessary.

In assigning ratings the Administration may assign"+" or "-" (such as "Exceptional – ", "Good +". "Acceptable +" to the ratings to better differentiate within a rating to more clearly differentiate between the Proposals.

Upon completion of the evaluation of the technical proposal, the Administration may elect to conduct discussions with each DB Team. The purpose of these discussions shall be two fold; first so that the MSHA fully understands what is being offered by the DB Team. Second, the MSHA will have an opportunity to identify any critical weakness (inconsistency w/MSHA's expectation) in a DB Teams proposal.

The Administration reserves the right to award the contract without entering into discussions.

Upon completion of the technical discussions, the DB Teams may be asked to submit best and final offers (BAFO) at a time and date to be specified. The notification of the time and date shall be in writing after the completion of all technical discussions. The BAFOs shall be evaluated and will be part of the final determination when recommending a DB Team for award. The selected team shall be notified of the recommendation.

2.11.01.1 Request for Communications

The Proposer shall provide accurate and complete information to the Administration. If information is not complete, the Administration will either declare the proposal non-responsive or notify the Proposer, who will be allowed an opportunity to provide the information required. Any insufficient statements or incomplete affidavits will be returned directly to the Proposer by the Administration with notations of the insufficiencies or omissions and with a request for Communications seeking clarifications and/or submittal of corrected, supplemental or missing documents. If a response is not provided, the proposal may be declared non-responsive.

The Administration may waive technical irregularities in the proposal of the Proposer that does not alter the quality or quantity of the information provided.

The Administration may, at its sole discretion, request Communications and/or supplemental information from Proposers during the proposal evaluation. All requests and responses shall be in writing by certified mail, courier or fax and, if by fax, confirmed by priority mail/express delivery service. Responses shall be limited to answering the specific information requested by the Administration.

The unsuccessful teams shall also be notified in writing and provided an opportunity for a debriefing.

NOTE: All materials, conferences, proposals and other matters related to this project shall remain confidential until the contract is executed with the successful DB Team. However, the

Administration does reserve the right to use the knowledge of good ideas of one team in discussions with the successful Team.

2.11.02 Technical Proposal - Part 1

The Administration will first review and evaluate all Technical Proposals submitted. The following elements of the Technical Proposal will be evaluated and rated on their content, accuracy and presentation. The elements that will be used in the evaluation process are listed in the descending order of importance.

- Project Technical Elements and Approach
- Environmental Approach
- Project Management
- Project Schedule

The elements of the Project Technical Elements and Approach section of the Technical Proposal that will be used in the evaluation process are listed in the descending order of importance.

- Lane Miles Open to Traffic
- Access to Residential and Commercial Properties
- Highway Capacity and Operational Efficiencies
- Safety Betterment
- Benefit to Future SHA Dualization Projects
- Environmental Benefits
- Maintenance Benefits

The following will be evaluated on a Pass/Fail basis and will be based on the clarity and completeness of information provided, as well as the stability and collective capabilities of the Design - Build team relative to this Project to perform as an integrated team. Each Proposal must achieve a rating of “Pass” on any “Pass/Fail” factor listed in Section 2.12.01.6 to receive further consideration. Failure to achieve a “Pass” rating on any “Pass/Fail” factor will result in the Proposal being rated UNACCEPTABLE, the price proposal will not be rated and the Proposer will be disqualified.

- Legal & Financial Information

2.11.02.1 Technical Proposal Evaluation Teams

General: The Administration will assemble a "Technical Proposal Evaluation Teams" consisting of key staff from appropriate offices within the Administration. The Evaluation Teams will review the Technical Proposals to verify that all requirements of the RFP have been met, and to evaluate the proposals based on the evaluation factors.

For the successful Design – Build team, their Technical Proposal will become part of the Design – Build Contract documents and all concept ideas provided to the

Administration are expected to be included in the Price Proposal and integrated into the Project.

2.11.03 Price Proposal – Part 2

Price Proposals will be accepted only from those Bidders invited by the Administration in writing to submit a proposal. The Stipulated Sum will be defined on the Proposal Form included in this RFP.

The Stipulated Sum will be shown as a lump sum price, and shall include all design, detail, construction, labor, materials, and all incidentals necessary to complete the details and construction of this project. In addition, a lump sum breakdown will be required as part of the Price Proposal submittal as defined in TC 7.09. The lump sum breakdown shall be submitted in a format of the Design-Build Teams choice.

The evaluation of the price proposal shall be based on the Administrations Stipulated Sum and compared to the proposed improvements detailed in the Proposers technical proposal.

2.11.04 Contract Completion Incentive Procedure

There is no incentive procedure on this project

2.11.05 Wetland and/or Waterway Impact Reduction Incentive

See Section 3.20.07.04.03

2.11.06 Erosion Sediment Control Incentive/Liquidated Damages Payment

The Design-Build Team is advised that both an incentive and a liquidated damage will be imposed on this contract related to their erosion sediment control and will be tied to the Quality Assurance Ratings. See Special Provisions 308.01.03, Quality Assurance Ratings contained within this RFP for the contract requirements.

2.11.07 Bid Irrevocable

The Contractor's bid prices are irrevocable for 180 days following receipt of the Price Proposal.

2.11.08 Proposal Guarantee

The Contractor's bid guarantee shall represent 5% of the Stipulated Sum in accordance with the provisions of GP 2.07.

2.11.09 Liquidated Damages

In the event a complete usable facility is not provided by the calendar date, a liquidated damage will be charged in accordance with the provisions of GP 8.09. The dollar amount of **liquidated damages is stated on page 24 of 24** in the Proposal Form of the Invitation for Bids. The Administration will be the sole approving authority in determining when the project is considered a usable facility.

TC-2.12 AWARD AND EXECUTION OF CONTRACT

All conditions of award and execution procedures will be in accordance with GP-Section 3 of the Specifications and Special Provision GP-Section 2.19 contained within this RFP.

The Design-Builder will be given Notice to Proceed after Execution of the Contract has been completed. At this point, additional field investigation may continue and design work may proceed with payment to be made as outlined in Section 7.08.

The Administration understands the probability that the successful low bidder will need to start design activities as soon as possible after notification as the apparent low bidder and prior to issuance of the Notice to Proceed. The Administration understands this approach is an effort to maximize the available time for construction activities. The Administration also recognizes the benefits to the public by providing an opportunity to accelerate project activities and project completion. It is reasonable that these design activities should not place the Design-Builder at risk should the Administration not issue a Notice to Proceed for events outside of the control of the Design-Builder.

The Administration will diligently process contract documents and procedures to issue a Notice to Proceed within the shortest time frame possible. In the event that the Administration does not issue a Notice to Proceed to the successful low bidder for reasons beyond the control of the bidder, the Administration will reimburse actual documentable design costs up to a maximum of $50,000 or 1% of the construction bid, whichever is greater, incurred by the Design-Builder after approval of the Bid Bond. To receive reimbursement, the Design-Builder must submit all design calculations, plans, surveys, boring data, updated electronic files, personnel time sheets and other materials to the Administration for its use.

Actual construction work may not begin until the additional requirements specified elsewhere in this RFP/IFB have been satisfied, including but not limited to receipt of erosion and sediment control plan approval, permits, design approval including appropriate maintenance of traffic approval, and pre-construction conference.

TC-2.13 STIPEND

The Administration understands that firms invited to submit price proposals on Design-build projects may incur higher than normal bid preparation costs in their engineering effort to submit responsive bids for the project. Such efforts are likely to involve geotechnical investigations, development of horizontal and vertical geometry, development of concept design plans, cross sections, field surveys, stormwater management investigation,

preliminary storm drain design, development of extensive design details to establish materials and quantities to prepare and submit a bid.

The Administration will agree to pay the design-build firms invited by the Administration to submit bids, which are not deemed the successful low bidder, a stipend of $20,500. Those firms invited to submit price proposals will be required to sign a contract with the Administration for payment of the stipend in exchange for electronic copy and hard copy of all documents used to develop the price proposal. The firm submitting the responsive winning bid shall not be eligible to receive the stipend.

In payment for the services covered by this Agreement, the Design-Build Team agrees that all materials, electronic files, marked up drawings, cross sections, quantity lists and other material used in the development and submission of the price proposal will become the property of the Administration and may be used in any manner at their discretion without any additional compensation to the Design-Build Team. **Three completed, signed originals of the enclosed Agreement must be submitted to Mr. Kirk G. McClelland, Director, Office of Highway Development, in the time frame outlined in the Stipend Agreement, Section 2.2(a).**

One original invoice signed (in blue ink) and two copies along with supporting engineering materials noted above must be submitted to Mr. Kirk G. McClelland, Director, Office of Highway Development, in the time frame outlined in the Stipend Agreement, Section 2.3. Invoices shall contain the following information:

Invoice # - created by the Design-Build Team

Federal Tax I.D. number

Remittance Address

Contract # - WO634A52

Contract Description – US 113 from Goody Hill Road to South of Massey Branch (Phase 2B)

Construction # - WO6345170

Payment Amount - $20,500

Description of Work: example: "payment for Design-Build team to perform preliminary design work to prepare a bid for contract"

STIPEND AGREEMENT

Contract No. WO6345270
Project Description: US 113 from Goody Hill Road to South of Massey Branch (Phase 2B)

THIS STIPEND AGREEMENT (the "Agreement") is made and entered into as of the ___ day of _____, 200_, by and between the STATE OF MARYLAND, acting by and through the Maryland Department of Transportation, State Highway Administration (the "SHA"), and _____ ("Proposer"), with reference to the following facts:

A. On _____, 200_, the SHA issued a Invitation for Proposals ("IFP") for design and construction of two additional lanes along the existing US 113 alignment to create a dual divided highway Design-Build Project ("Project"), pursuant to procurement authority granted in State Finance and Procurement Article of the Annotated Code of Maryland and the Code of Maryland Regulations ("COMAR"), Title 21. The US 113 Phase 2B will be owned and operated by the State Highway Administration (SHA or Administration), which owns all non-tolled state highways and bridges in the State of Maryland ("State"). The Administration is responsible for administration of design and construction of the Project.

B. The IFB requires each Proposer to complete and deliver a Stipend Agreement to the SHA within the time frame noted below in 2.2 (a).

NOW, THEREFORE, Proposer hereby agrees as follows:

1. <u>Work Product.</u>

1.1 The SHA hereby retains Proposer to prepare and submit, in response to the IFB a price bid that conforms in all material respects to the requirements of the IFB, as determined by the SHA, are timely received by the SHA, and satisfy the provisions set forth in the IFB.

1.2 All work performed by Proposer and its team members pursuant to this Agreement shall be considered work for hire, and the Work Product (as defined below) shall become the property of the SHA without restriction or limitation on its use. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

1.3 Proposer agrees that all Work Product is, upon receipt by the SHA, the property of the SHA. The term "Work Product" shall mean all submittals made by Proposer during the IFB process, including the Proposal, exchanges of information during the pre-proposal and post-proposal period. However, the term "Work Product" shall specifically exclude patented rights in previously existing proprietary technology.

1.4 In consideration for the SHA's agreement to make payment hereunder, Proposer agrees that the SHA shall be entitled to use all Work Product, without any further compensation or consideration to the Proposer, in connection with the IFB, the Contract Documents, the Project and future procurements by the SHA. Notwithstanding the foregoing, SHA shall not be entitled to use information submitted by Proposer to the SHA in which the SHA determines is exempt from disclosure under the Maryland Public Information Act

("PIA"), Title 10, Subtitle 6, Part III of the State Government Article of the Annotated Code of Maryland, unless the IFB otherwise provides.

1.5 The SHA acknowledges that the use of any of the Work Product by the SHA or the Design-Builder is at the sole risk and discretion of the SHA and the Design-Builder, and shall in no way be deemed to confer liability on the unsuccessful Proposer.

2. <u>Compensation And Payment.</u>

2.1 Compensation payable to Proposer for the Work Product described herein shall be $20,500 if all of the following conditions are met:

(a) Proposer's Proposal, was not the apparent low bidder or was not selected for award or it was awarded the Contract but the Contract was terminated by SHA for its convenience prior to issuance of a notice to proceed.

2.2 In its sole discretion, the SHA may pay compensation to Proposer, in an amount to be determined by the SHA, for the Work Product described herein under the following conditions:

(a) For any Proposer meeting the criteria identified in Section 2.1, above.

Any amount paid under this subparagraph (a) will not exceed $20,500 and will be subject to audit of the costs incurred by the Proposer in preparing its Technical Proposal and price bid. Auditors shall have access to all books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred. Failure of the Proposer or its team members to maintain and retain sufficient records to allow the auditors to verify all or a portion of the claim or to permit the auditors access to the books and records of Proposer and its team members shall constitute a waiver of the right to be paid a stipend and shall bar any recovery hereunder.

Any Proposer wishing to apply for a stipend under this subparagraph (a) shall submit the completed Agreement to the SHA within 10 days of price proposals being opened. Eligibility of receipt of a stipend is dependent upon meeting the conditions set forth in Section 2.1. of this Agreement and TC Section 2.12.05 of the IFB.

(b) If the procurement is cancelled prior to the Bid Opening Date.

Proposers will be provided the opportunity, at their option, of delivering to the SHA the Work Product of their Proposal preparations to date. There is no specific format required for such Work Product. Those Proposers that choose to deliver their Work Product may be paid an amount that the SHA deems to be appropriate consideration for the Work Product. No portion of the stipend amount will be paid in the event a Proposer chooses not to deliver its Work

Product. Any amount paid under this subparagraph (b) will not exceed the amount identified in Section 2.1 and will be subject to the audit criteria in Section 2.2 (a).

2.3 Any payment of compensation owing hereunder will be made (i) within 30 days after receipt of a proper invoice submitted to the SHA under this Section 2.3 or (ii) if an award is made, when any complaint against award is administratively and judicially resolved. Such invoice and supporting engineering work may not be submitted until one business day after the earlier to occur of (a) notice by SHA that award of contract has occurred, or (b) cancellation of the procurement. **Invoices must be received within 30 days of said notification by SHA to be honored for payment.**

3. <u>Indemnities.</u>

3.1 Subject to the limitations contained in Section 3.2, Proposer shall indemnify, protect and hold harmless the SHA and its directors, officers, employees and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising in whole or in part from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives or subcontractors or breach of any of Proposer's obligations under this Agreement.

3.2 This indemnity shall not apply with respect to any claims, demands or suits arising from use of the Work Product by the SHA or its contractors.

4. <u>Compliance With Laws.</u>

4.1 Proposer shall comply with all federal, state, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

4.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract except a subcontract for standard commercial supplies or raw materials; and (c) to post and to cause subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

5. <u>Assignment.</u>

Proposer shall not assign this Agreement without the SHA's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

6. Miscellaneous.

6.1 Proposer and the SHA agree that Proposer, its team members, and their respective employees are not agents of the SHA as a result of this Agreement.

6.2 All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend and include the singular. All words used in any gender shall extend to and include all genders.

6.3 This Agreement, together with the IFB, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the IFB, and this Agreement shall supersede all previous communications, representation, or agreements, either verbal or written, between the parties hereto.

6.4 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of Maryland, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

6.5 This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

6.6 This Agreement shall be governed by and construed in accordance with the laws of the State of Maryland.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

STATE OF MARYLAND by STATE HIGHWAY ADMINISTRATION

WITNESS/ATTEST:

_____

_____

Approved for Execution:

_____

Authorized Signature

Director, Office of Highway Development

Date:_____

Approved as to form and legal sufficiency:

_____

Assistant Attorney General

[Signature for Corporations/LLCs]

WITNESS/ATTEST:

_____ _____
Proposer Name

By_____(Seal)

Title:_____

_____ _____
Printed Name Printed Name

_____
Federal ID # or Social Security #

TC SECTION 3
SCOPE OF WORK FOR DESIGN-BUILD
TERMS AND CONDITIONS

TC 3.03 CONTINGENT ITEMS

DELETE: This section in its entirety.

ADD: After section TC 3.05

TC 3.06 DESIGN-BUILD - DESIGN AND CONSTRUCTION SCOPE OF SERVICE

This project includes, but is not limited to the following items of work, which the Design-Build Team shall perform and provide. This section sets forth provisions that are design and construction related; however, this section also impacts construction activities and other work.

Specific design and construction criteria are discussed separately following this section.

3.06.01 General Requirements

The Design-Build Team shall complete all design and construction work in two phases, Phase IV - Final Design and Phase V – Partnering during design and construction, Review Shop Drawings, Revisions, Redesign Under Construction, As-Built Plans and provisions for expert court testimony.

The Design-Build Team shall provide the services and perform tasks described in this Invitation for Bids in compliance with the policies and procedures of the Administration and requirements set forth in "Volume II -Specifications for Consulting Engineers' Services," dated April 1986, Sections as follows:

- Section V Highway Design - (Phase IV)
- Section VI Structure Design - (Phase IV & V) Parts I through III
- Section VII Surveys and Plats (Phase IV)
- Section VIII Traffic Engineering (Phase IV)
- Section IX Landscape Architecture
- Section XI Critical Path Method

The Design-Build Team shall comply with all Federal, State and local laws, ordinances and regulations applicable to the activities and obligations associated with this project.

The Design- Build Team shall also comply with

3.06.02 Design Personnel Identified in Proposal

The designer and design subcontractors shall utilize the key personnel identified in their Technical Proposal to manage the project and supervise engineers and technicians in completing the design in a timely manner to permit construction activities. **Changes in key staff identified in the technical proposal must be approved in writing by the Administration, and replacement personnel must have equal or better qualifications than the key personnel identified in the proposal.** The format for replacement staff resumes must be in the same format as required for the technical proposal including requirements thereof. The Administration shall be the sole judge as to whether replacement staff members are acceptable.

3.06.03 Qualified

The Design-Build Team shall have experienced personnel qualified in the development of plans, specifications and estimates for the following: Highway Design; Hydrologic/Hydraulic Engineering (including stormwater management, erosion & sediment control); Structural Engineering; Geotechnical/Pavement Engineering; Arboriculture and Landscape Architecture including roadside planting, SWM planting and Reforestation; Traffic Engineering including signing, marking, lighting, and traffic control. The Design-Build Team shall be knowledgeable in coordinating utility designs, utility connections and working with other agencies and the public.

3.06.04 Design Constraints

The Design-Build Team shall construct the project within available right of way. This includes the final Project, as well as any and all work required to maintain drainage and traffic during construction (including detour roads) and any and all work required to control erosion and sediment laden water. The Design-Build Team may have to use features not shown on the Concept Plans to keep work in the right-of-way, including but not limited to mechanically stabilized embankment slopes, block retaining walls, concrete barrier retaining walls, drainage pipes, etc.

3.06.05 Design Exceptions

Any elements of design that fall below the design standards listed in TC-3.09 through 3.21 and AASHTO will require a design exception or design waiver.

The Design-Build Team shall submit the design exception or waiver request to the Administration's Director, Office of Highway Development, and receive written approval before proceeding with the design. Requests for design exceptions or waivers that affect construction underway or complete shall not be a basis for approval of the exception.

The request will explain and justify the use of the proposed design and include the following information (at a minimum):

- A description of existing conditions, including existing design values and design

speeds.

- A description of AASHTO or other design standards that would normally be applied.
- A description of the actual design values proposed.
- A description of R/W impacts, environmental considerations or other factors that justify the exception.
- A 3-year accident history within the area an exception is being sought.

The Administration reserves the right to deny design exceptions or waivers that, in its judgment, are unsafe, otherwise contrary to normal practice, and/or inconsistent with the project or community goals.

3.06.06 Quality of Design and Construction

3.06.06.1 Design Quality Control Plan

The Design-Build Team shall submit a Design Quality Control Plan (DQCP) for review and approval by the Administration, before notice-to-proceed will be given to begin work. The DQCP must be a complete and clear plan to achieve a high quality design, including all related elements and lower tier subcontractors/Design-Build Teams. The DQCP shall present both the overall organization plan for design quality control and detailed plan elements to meet the CMP requirements for this project. The DQCP must include an organization structure and reporting requirements that demonstrate that quality control personnel have sufficient independence to allow them to be primarily concerned with quality, as opposed to the schedule and budget. As a minimum, the DQCP shall include calculations, plans, specifications, design coordination, construction coordination for material activity and document control.

The Design-Build Team must adhere to the approved DQCP throughout the duration of the project.

The DQCP must be available for review and discussion at the first partnering meeting.

3.06.06.2 Responsibility of Design-Build Team

The Design-Build Team shall be fully responsible for performing a complete, coordinated, economical, timely, fully functional quality design, including survey and geotechnical elements, all in compliance with the RFP. The Design-Build Team shall follow the DQCP and receive written authorization from the Administration for modification to the plan. The Design-Build Team shall request from the Administration, in writing, all exceptions to the plan, and the Administration will respond in a timely

fashion to each request in writing.

The Design-Build Team shall include a complete check of all design and other calculations, plans and specifications in this plan. This check shall include both the overall concept and various element coordination check and the detail check of the calculations for each plan and specification. The design and the check shall be performed by experienced design professionals, licensed in the State of Maryland that have not participated in any of the design up to the checking process. These individuals may be employed either by the Designer or by an independent design firm other than the Design-Build Team.

All plans and specifications required for construction of a work element shall be checked prior to their transmittal to the Administration.

The Administration may require that the Design-Build Team provide checked calculations to the Administration for specific elements of the design prior to approving the design. The Administration will endeavor to provide the Design-Build Team with written requests for such submittals at least 7 days prior to the date the Administration requires the submittal. The Administration may request that checked calculations be submitted on demand. In such instances, the Design-Build Team shall provide the checked calculations immediately.

The checked calculations shall be submitted to the Administration with the other Record Documents submitted at the appropriate milestone reviews.

3.06.07 Calculation Certification

The Design-Build Team shall provide the following certifications concerning the calculations:

3.06.07.1 Designer

Within 30 days of the Notice of Award the corporate officer responsible for quality for the Design-Build Team and the Designer shall certify that the calculations, plans, specifications and other technical documents for which they are responsible shall be prepared in conformance with the DQCP.

3.06.07.2 Checker

Within 30 days of the Notice of Award, the corporate officer responsible for quality for the Design-Build Team and all organization(s) that will check the calculations shall certify, in writing, that the design check shall be performed in conformance with the DQCP.

3.06.07.3 Transmittals

On the transmittal for each submittal of calculations, plans, specification, shop drawings, as-builts and other technical documents, the Design-Build Team, Designer (as appropriate) and the checker shall certify that the documents were prepared and checked in conformance with the DQCP.

3.06.07.4 Conclusion of Work

At the conclusion of the Work and with the transmittal of the Record Documents to the Administration, the corporate officer responsible for quality for the Design-Build Team, the Designer, and all organizations that have checked the documents shall sign, seal, and certify in writing, that all calculations, plans, specifications and technical documents, for which they were responsible, were prepared in conformance with the DQCP.

3.06.07.5 Professional Seals

All calculations, plans, specifications and other technical documents transmitted to the Administration shall be signed and sealed by both of the Professional Engineers licensed in the State of Maryland who are responsible for the design and checking of that document. Landscape plans shall be prepared, signed, and sealed by a Landscape Architect licensed in the State of Maryland. Reforestation plans and application shall be signed and sealed by either a Maryland Licensed Landscape Architect, Licensed Forester, or a qualified professional that is certified by the MD DNR/Forest Service. The certifications at the start and conclusion of the Work, required in Section TC 3.08.03, shall also be sealed by a Professional Engineer licensed in the State of Maryland and signed by the corporate representative of the Design-Build Team, Designer and checker(s).

The Design-Build team must retain the services of a Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer to review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

3.06.07.6 Design Quality Assurance

The Administration may periodically audit the Design-Build Team's, the Designer's, and the checker's work to ensure that it is being done in conformance with the Contract requirements. The Administration will endeavor to perform these audits so as not to interfere with the progress in the work. The Design-Build Team shall fully cooperate with and assist the Administration in conducting such audits. The Design-Build Team shall maintain all records and any other elements of the work in a current and readily available manner so that, should the Administration audit the work, everything shall be readily available.

Any quality assurance reviews or audits conducted by the Administration shall in no way remove from the Design-Build Team the responsibility for designing and constructing all elements of the Work in conformance with its Design Quality Control Plan and all requirements of the Contract. The Administration shall at all times have the authority to require the Design-Build Team to re-perform any work that the Administration determines is not in conformance with any of the provisions of the Contract or with any drawings, specifications, other documents prepared by the Design-Build Team. Any re-work shall not serve as the basis for claims for additional compensation or time by the Design-Build Team.

3.06.08 Highway Engineering

The Design-Build Team shall prepare roadway, typical section, drainage, geometry, superelevation, profile, maintenance of traffic, erosion sediments control and special detail plans as part of the highway construction plans using the latest CADD Standards.

3.06.09 Structural Engineering

The Design-Build Team shall develop all structural calculations, details, reports and plans for the all bridges, culverts (those meeting MD SHA criteria for classification of a Small Structure), retaining walls, and any other incidental structure specifically design for this project. All plans developed shall meet the prescribed CADD Standards established for the overall project.

3.06.10 Noise Abatement

N/A

3.06.11 Geotechnical Engineering

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification.

3.06.12 Pavement Engineering

The Design-Builder shall design and construct all pavement sections and perform all pavement engineering in accordance with the criteria established in the Pavement Performance Specification. All pavement sections shall perform under the given loading and environmental conditions for the specified service life periods.

The Design-Builder will have the flexibility to make Project changes that produce benefits or savings to the Administration or for the Design-Builder without impairing the essential functions, characteristics, or quality of the Project, such as safety, traffic operations, ride, long term durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

3.06.13 Traffic Engineering

The Design-Build Team shall prepare signing, signal, roadway and sign lighting, and final pavement marking plans as part of the highway construction plans using the latest CADD Standards available from the SHA Office of Traffic & Safety (OOTS).

OOTS and District Traffic will review and approve all signing, signal, lighting, and pavement marking plans for this project. All catalog cuts and working drawings pertaining to traffic items shall be reviewed and approved by the Design-Build Team.

The Design-Build Team shall maintain all existing traffic control devices operations throughout the project limits. All traffic control device modifications to existing and/or temporary signals shall be reviewed and approved by the Office of Traffic & Safety Traffic Engineering Design Division.

3.06.14 Roadside Landscape Planting and Reforestation

The Design-Build Team shall prepare landscape and reforestation plans with a scale appropriate for the project, but not less than 1”=50’. Plans shall include schedules of all materials proposed for use.

The Design- Build Team shall prepare the necessary documents to obtain final reforestation site review approval from the Maryland Department of Natural Resources (MDNR). In addition, the Design-Build Team shall prepare the necessary documents to obtain a Roadside Tree Removal Permit from MDNR, for trees in areas under one acre of contiguous woodland. The Design-Build Team shall submit all these documents to the SHA-OED-LOD & LAD for review and to MDNR for approval. Should the Design-Build Team's submittals not be approved by the MDNR, the Design-Build Team is responsible for modifying submittals at no additional cost.

3.06.15 Utility Relocations and Permits

The Design-Build Team shall be responsible for coordination of all activities during design and construction with regard to utilities and permits. See the Section 875 - Utility Statement contained elsewhere in this RFP for the appropriate contacts for each Utility Company.

3.06.16 Stormwater Management (SWM) Design and Approvals

The Design-Build Team shall ensure that copies of the most current approved plans are available to all personnel involved in the construction and inspection of the project. The Design-Build Team shall be responsible for coordinating all reviews and approval submissions with the appropriate review entities.

Once the MDE review process is complete, the Design-Build Team shall obtain final approval from the Administration.

3.06.16.1 Maryland Department of the Environment (MDE) Review and Approval

A SWM concept design was developed to demonstrate to MDE that all of the SWM needs of the project can be met within the project corridor. MDE approved the methodology in the concept SWM report and issued a Letter of Intent to issue approvals. The Design-Build Team is responsible to finalize the SWM design. The final design shall be acceptable to both MDE and SHA. MDE will issue final SWM Approvals.

A Pre-Permitting meeting must be held once Notice to Award has been issued. This meeting will be scheduled by the Administration upon request by the Design-Build Team and will include the Design-Build H&H engineer, Design-Build Construction manager, Design-Build Project Design manager, Design-Build E&S manager, MDE reviewer and Administration Highway Hydraulics Division and Highway Design Division managers. The purpose of the meeting is to preview and discuss the SWM and erosion and sediment control concepts developed by the Design-Build Team, submission schedules proposed by the Design-Build Team, permitting timeframes, submission requirements and the Administration's quality expectations.

The Design-Build team's Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer must review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

Submissions for MDE and the Administration approval shall be delivered to both agencies concurrently. The SWM submission to the Administration shall be submitted directly to the Highway Hydraulics Division. The Administration shall be copied on all correspondence delivered to MDE at the same time it is delivered to MDE including comment letters, phone conversation transcripts, transmittals, reports, plans, revisions to plans and report, computations, and/or point-by-point response letters.

Deviations from the Concept SWM Report by the Design-Build Team are the sole responsibility of the Design-Build Team. The Administration will not pay for any additional design, MDE review coordination, construction or other costs incurred due to deviations from the Concept SWM Report.

SWM locations have been suggested by the Administration in the Concept SWM Report and on the Plans. If the Design-Build Team chooses other locations for SWM facilities, they must be reviewed and approved by the Administration prior to obtaining approval from MDE. Any proposed location shall not result in a net increase in wetland and/or waterway impacts.

The Concept SWM report proposes certain locations of SWM facilities. The Letter of Intent was issued based upon the locations. Other types of facilities may be used, but they shall meet all requirements of the 2000 Maryland Stormwater Design Manual and subsequent changes and be approved by the Administration's Highway Hydraulic Division. Once approval is gained from the Administration, the Design-Build Team shall

acquire all other approvals and necessary permits.

3.06.16.2 Stormwater Management (SWM) Visual and Environmental Quality and Safety Review and Approval

All stormwater management facilities shall be designed in accordance with the Stormwater Management Facility Visual and Environmental Quality and Safety Criteria Review Guidelines, prepared by the Administration's Highway Hydraulics Division.

The SWM facilities shall be designed with the input of a licensed landscape architect and shall adhere to the accepted standards for the profession concerning aesthetics and site planning. This includes not only planting but also grading, landforms, site layout, safety criteria and choice of materials.

The SWM facilities shall integrate well visually with the surrounding environment, developments, communities, roadways, and corridor landscaping. This means that facility types, outfall structure designs, detailing, colors, planting palette, landforms, surface area shapes, and fencing (if required) should be consistent or complementary.

3.06.16.3 Stormwater Management (SWM) As-Built Certifications

The Design-Build Team shall provide an SWM As-Built (AB) Inspector to inspect the various stages of construction for each SWM facility and provide documentation to the Administration that certifies that the SWM facilities have been constructed as specified in the Contract Documents including certification that the constructed SWM facilities provide the functionality as designed. The AB Inspector shall be a licensed Professional Engineer or Land Surveyor in the State of Maryland with experience in SWM design and construction.

The As-Built Certification Package shall be prepared according to the special provision, 300 – Stormwater Management Facility As-Built Certification, included in this package. The As-Built Certification signature block, checklists and tabulations are also included on ProjectWise.

The Contractor shall submit the completed As-Built Certification Package to:

Highway Hydraulics Division Chief, Mail Stop C-201
Maryland State Highway Administration
707 North Calvert Street
Baltimore, Maryland 21202

3.06.17 Surface Storm Drainage Design and Approvals

The Design-Build Team shall design all surface drainage conveyances including but not limited to open channels, inlets, closed storm drainage systems, cross culverts, and pipes under entrances

and driveways. Approval for the drainage design and report shall be obtained from the Administration prior to construction.

If Waterway Construction (COMAR 26.17.04) review and approval is required, submittals for MDE approval shall be delivered to the Administration for review and approval prior to submittal to MDE. At the discretion of the Administration, Highway Hydraulics Division, subsequent submittals may be delivered directly to MDE. If this is allowed, a copy of the complete MDE submittal package, including MDE comment letter and point-by-point response to comments, shall be concurrently delivered to the Administration, Highway Hydraulics Division.

If the Design-Build Team adds any culverts within US Waters that were not previously reviewed by MDE, they shall obtain approval from MDE according to the process described above.

3.06.18 Erosion and Sediment Control (ESC) Design and Approvals

Approval for ESC has not been obtained from MDE. The Design-Build Team shall be responsible for producing a completed set of ESC plans for the roadway construction activity. These plans shall be submitted to MDE for approval with final approval being issued by the Administration's Highway Hydraulics Division. The Design-Build Team shall be responsible for addressing any comments that MDE and the Administration supplies. The Design-Build team must retain the services of a Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer to review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

A Pre-Permitting meeting shall be scheduled as discussed under SWM Design and Approvals section above. Submittals for ESC approval shall be delivered concurrently to MDE and the Administration according to the review process for SWM approval described above under SWM Design and Approvals.

The Administration will not provide any ESC design. The Design-Build team will be responsible for 100% of design and for obtaining approvals for the erosion and sediment control plans from all appropriate agencies such as MDE.

Once the MDE review process is complete, the Design-Build Team shall obtain final approval from the Administration.

If the total earth disturbance is one acre or more, the Design-Build Team must submit to the Administration's Highway Hydraulic Division a complete Notice of Intent (NOI) form in accordance with the NPDES General Permit for Construction Activities. No disturbance is allowed until this form is accepted by MDE. The Design-Build Team shall be responsible for any fines, shutdowns, or fees associated with non-compliance, at no cost to the Administration.

3.06.19 Engineering Studies

The Design-Build Team shall be responsible for engineering studies as required to determine

solutions to any unforeseen situations that may be discovered during this project, and submission of these studies to the Administration for approval. These studies shall be prepared as per the SHA Consultant Services Specifications, Volume II.

3.06.20 Coordination with the Administration

3.06.20.1 Design Submission Requirements

3.06.20.1.1 Review Timeframes

The Design-Build Team **must notify the Administration 14 days prior to the date** of all intended submissions. If the Design-Build Team elects to break the project into smaller separate design packages or to employ a "rolling" process, the Administration will review the plan submittals and return comments **within 21 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. If the Design-Build Team elects to submit plans using the normal milestone process, the Administration will review the plan submittals and return comments **within 45 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. The Administration will require the use of Project Wise as means to post plans, reports etc. for review. Comments will also be posted on Project Wise. Third party reviews such as Utilities, Local Jurisdictions and Environmental Agencies will still require hard copies. The Design-Build Team shall provide 10 sets of plans for third party reviews. The Design-Build team shall deliver plans directly to third parties.

The intent of this section is to provide some flexibility for the Design-Build Team in the schedule for design and construction such that the construction work may begin on one portion of the project before all of the design has been reviewed and approved for the entire project. For example, the Design-Build Team may elect to break the project into smaller separate design packages or to employ a "rolling" process of design and construction. Earthwork, for example, could begin after receipt of the MDE approval for a particular section and after all other requirements are met, but prior to final approval of the completed design for that section. However, all roadway geometry, superelevation data, cross culverts and associated drainage design must be submitted and approval received prior to construction of earthwork.

Any adjustments made necessary by changes during the completion of the design and approval process shall be made at the Design-Build Team's expense. Use of this process will not alter the need to formally submit each element of the design for approval using the review process described below.

The Design-Build Team may follow the Administration's normal milestone review process in completing the design. Plans and specifications would be submitted for review and approval of the Administration's Director, Office of

Highway Development, at the milestones listed below. The intent would be for the Administration to review the plans as design progresses, so that major changes can be avoided late in the process.

The Administration may conduct formal review meetings at these milestones and provide comments for the Design-Build Team to address. In either case, the Design-Build Team shall be required to address all issues identified, to the satisfaction of the Administration, before the Director will grant the milestone approval.

The Design-Build Team may, at their own risk, prepare the plans for any segment to the Final Plans and Specifications stage (100 percent). Any changes required to plans or field adjustments as a result of Administration comments shall not be the basis of a claim or time extensions against the Administration.

The traffic control plans for a particular phase of work must be approved by the Administration's District Traffic Engineer before Final Plans and Specifications approval will be given and before construction can begin for that phase of work.

For the protection of both the Design-Build Team and the Administration, all submittals prepared by the Design-Build Team shall be dated and initialed by the Design-Build Team as a file copy submission.

Plan reviews that result in "conditional approval" means the comments are minor in nature and should not have an adverse effect on construction activities. If "conditional approval" is granted, the Design-Build Team shall post a copy of their point-by-point responses on Project Wise outlining how the Design-Build Team will address the comments. If the comments are identified to be addressed as part of an "As-Built Drawing", the Design-Build Team shall follow the process outlined in Section 3.06.27.2.2. If the Design-Build Team elects to address all comments prior to proceeding towards construction, then the Design-Build Team shall follow the process for plan "approved" as noted below. In order to proceed towards construction the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team's Engineer to the SHA Design Project Manager. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of the Administration. The Design-Build Team shall then submit 20 sets of plans specifications and post a copy of their point-by-point responses on Project Wise for SHA internal distribution. One set of Reproducibles shall also be submitted. The Design-Build Team is responsible for any external distributions associated with the Design-Build Teams personnel, subcontractors, sub consultants, suppliers etc.

Once the plans are "approved", the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team's Engineer to the SHA Highway Design Project Manager. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of the Administration.

The Design-Build Team shall then submit 20 sets of plans and specifications to the Administration for the SHA internal distribution. One set of Reproducibles shall also be submitted. The Design-Build Team is responsible for any external distributions associated with the Design-Build Teams personnel, subcontractors, sub consultants, suppliers etc.

The Design-Build Team shall not proceed with the final construction of a particular portion of the project until:

a. All Final Plans and Specifications comments have been addressed to the satisfaction of the Administration for that portion.

b. All required permits for that portion of work have been received.

c. Final Plans and Specifications approval is received in writing from the Administration for that portion.

d. A title sheet is signed and sealed by the Design-Build Team's Engineer and appropriate officials of the Administration.

Final contract plans submission shall meet file storage requirements and will be considered the record plan set for seals and signature. Electronic files shall be for documentation purposes only. All revisions to approved plans and as-built revisions shall be made on both the hard copy originals and in the electronic files.

3.06.20.2 Normal Milestone Review Process

If the normal milestone review process is chosen, the following submissions shall be made:

3.06.20.2.1 Semi-Final Review

The Design-Build Team shall post plans and specifications to Project Wise and provide an email to the Administrations Project Manager that defines the link to where the plans and specifications reside. The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. One set of reproducible plans shall also be submitted when the design is approximately 60 percent complete (including drainage layout, utility locations, TCP concept plans, SWM, etc.).

3.06.20.2.2 Final Plans and Specifications

The Design-Build Team will be required to submit Final Plans and Specifications when the portions of the design are 100 percent complete. The Design-Build

Team shall post plans and specifications to Project Wise and provide an email to the Administrations Project Manager that defines the link to where the plans and specifications reside. The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. One set of reproducible plans shall also be submitted.

This review will verify that all comments from semi-final review have been addressed and may include additional comments on the plans, and/or specifications due to the Design-Build Team's subsequent design submittals.

3.06.20.3 Structural Review Process

All structure plans for structures, including bridges, culverts (those meeting MD SHA criteria for small structure), and retaining walls shall follow the process outlined in TC-3.11.

3.06.21 Additional Services

The Design-Build Team shall be responsible for all necessary field surveys required for the project, which shall conform to Maryland Grid System NAD 83/91 and NAVD 88.

3.06.22 Environmental Permits

The Design-Build Team shall procure all other approvals, permits and licenses pay all charges, fees and taxes and give notices necessary or appropriate for the prosecution of the Work. This includes approvals for on-or off-site staging, stockpiling areas, disposal sites and borrow pits.

The Design-Build Team cannot alter the concept activities in such a manner that increases or creates new wetland, buffer, waterway, floodplain impacts compared to those impacts which were authorized by the original permit, without obtaining all required permits or modifications from the appropriate regulatory agencies. If the Design-Build team determines that wetlands, buffers, or floodplains will be impacted, the Design-Build team shall be responsible to obtain the permits from MDE and USACE. The Design-Build Team shall be responsible for addressing any comments or issues the regulatory agencies and/or the Administration may have, including those pertaining to avoidance and minimization measures. The Design-Build Team shall also be responsible for designing, implementing, and monitoring any mitigation which may be required due to the additional wetlands, buffers, or floodplain impacts proposed by the Design-Builder. It is not the responsibility of, nor guaranteed by, the Administration that approval or authorization will be granted by the regulatory agencies.

If the Design-Build Team determines that additional trees must be removed, the Design-Build Team shall request a field review with the LAD/LOD and is responsible for providing the Administration with all information requested. If the Administration concurs with the request, it shall be the responsibility of the Design-Build Team to obtain and comply with the terms of the modified permit(s) from MDNR at no additional cost.

3.06.23 Phase V Services

Phase V services consist of partnering during design and construction, checking shop drawings, redesign under construction, revisions, as-built plans, and provisions for expert court testimony.

The Design-Build Team shall provide all services and perform tasks described in compliance with the requirement policies of Administration as stipulated throughout this resume and Volume II.

3.06.24 Construction Personnel Identified in Proposal

The Design-Build Team, all key staff and construction-related key personnel, and all other Major Participants identified in the proposal shall be utilized in the same manner and to the same extent set forth in said Statement and for the duration of the project. **Changes regarding the Design-Build Team shall not be allowed. Changes regarding key staff, construction-related key personnel and all other Major Participants require prior written approval by the Administration.** Requests for such changes must be submitted to the Administration in writing and replacement personnel must have equal or better qualifications than the key personnel identified in the technical proposal. The format for replacement staff must be the same format as required for the technical proposal including the requirements thereof. The Design-Build Team acknowledges that any such changes are for the convenience of the Design-Build Team alone and shall not increase the Design-Build Team's Price or change the project schedule. The Administration will approve such requests only if it determines that such change will not detrimentally affect the long term quality, durability, maintainability, timeliness of the Work.

3.06.25 Conformance with Contract and Proposal

All construction, construction-related work, and all other work must conform to the Contract, to the Technical Proposal submitted by the Design-Build Team and to the construction plans prepared by the Design-Build Team.

3.06.26 Check Shop Drawings

The Design-Build Team shall check all shop drawings for hydraulic structures, non-standard drainage structures and all other designed structures prior to manufacture and/or placement of such structures. The Design-Build Team shall check all such shop drawings and stamp their approval prior to sending approved shop drawings to the Administration. The shop drawings for larger hydraulic structures and designed structures should be submitted to SHA according to TC-4.01, Working Drawings. The approved shop drawings for hydraulic structures, non-standard drainage structures (including stormwater management) along with the necessary structural computations shall be submitted to Abdul Wakil; Highway Hydraulics Division, C-201, Maryland State Highway Administration, 707 North Calvert Street, Baltimore, MD 21202.

All shop drawings relating to the structures shall be reviewed in accordance with *SHA OBD PPM No. OP-82-34 (G), Checking of Working Drawings, Form Plans and/or Erection Plans*. The primary review shall be undertaken by the Design-Build Team. A secondary review shall be

undertaken by SHA. Once reviewed and approved by SHA, the structural shop drawings shall be stamped as approved and returned to the Design-Build teams with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by SHA.

The Design-Build Team shall correct any errors or omissions found by the Administration during QA-QC of such approved shop drawings at no additional cost to the Administration.

The Design-Build Team shall challenge all the work of the detailer, approving that, which is correct, or most appropriate and red lining and commenting on incorrect or less appropriate details or design. The importance of this approach is emphasized since inferior detailed design could negate the benefits of quality general design. Each shop drawing shall bear the official stamp of the Design-Build Engineer, attesting to their review and approval by the Design-Build Engineer. This work is to be done under the supervision of and shall be the responsibility of a Maryland Registered Professional Engineer.

3.06.27 Conformance with Approved Plans and Specifications

3.06.27.1 Construction Plans and Project Specifications

All work shall be done in conformance with the details and dimensions shown on the approved Final Plans and Specifications, and shall meet the requirements in the specifications/special provisions approved as a part of the Final Plans and Specifications submission and portions thereof.

3.06.27.2 Plan Revisions after Approval of Final Plans and Specifications

All plan revisions made after Final Plans and Specifications approval shall have approval of the Administration prior to implementation.

3.06.27.2.1 Revisions

Redesigns after Final Plans and Specifications approval shall be superimposed on the original project plans in green. Old design details, dimensions and notes shall not be erased, but X'd out in green. The date that the revision was made shall be indicated in the title block of each revised plan sheet. Revisions require prior approval of the Division that is affected by the change and finally the Administration's Director, Office of Highway Development.

Any revisions to the structural drawings must be submitted in writing to the Administration’s Director, Office of Bridge Development and approved prior to proceeding with any change to the approved structural drawings. All changes must be documented as Red Line Revisions in accordance with *SHA OBD PPM No. P-75-6(4), Revisions to Advertised Plans*. The Design-Build team is

responsible for preparation of all Red Line Revisions. All Red Line Revisions shall be reviewed and approved by SHA prior to implementing any changes to the contract documents.

3.06.27.2.2 As-Built Drawings

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the approved set of drawings in green. Old details, dimensions and notes shall not be erased, but X'd out in green. Each revision must be identified with a Hexagon with the letter A in the center. This symbol is available in MD SHA's Cad Standards. The date that the revision was made shall be indicated in the title block of each revised plan sheet. The As-Built Plans shall reflect any field revision made during construction.

The Design-Build Team shall submit one comprehensive set of As-Built plans at the completion of the project that are signed and sealed by the Engineer. The comprehensive set of As-builts will include an index sheet and a key plan which graphically represents and annotates each phase of the plan submittal if there are multiple submittals. The comprehensive set of as-builts will be assembled and numbered consecutively, beginning with sheet one of the first submittal and ending with the last sheet of the final submittal. The index and key plan will allow for more easily understood and navigatable drawings within the overall project limits in the future.

3.06.27.2.3 Computer Files

The Design-Build Team shall also submit Black and White images, at 200 DPI-TIF and PDF files, of the As-Built Plans on CD ROM. The As-Built plans shall be scanned starting with the Title Sheet. The file names will be the Construction Contract Number, followed by a dot (.), followed by a sequential number beginning with 1001. The sequential number must correspond with the plan sheet numbering. This number is followed by another (.) and then the TIF and PDF extension. Example: WO6345270.1001.tif. All scanned TIF and PDF images will be scanned in such a way that they do not appear upside down upon opening. The cover of the CD ROM shall be labeled with the SHA contract number, date, route number, and project description.

3.06.27.2.4 Traffic Control Plans

Any deviations from the approved traffic control plans, details or concepts must have prior approval of the Administration's Assistant District Engineer, Traffic.

3.06.27.2.5 Permits

The Design-Build Team shall obtain approvals from the appropriate regulatory agencies for any changes in design and/or construction activities that affect any permit conditions.

3.06.28 Coordination with Other Contractors

The Design-Build Team shall coordinate all design and construction, including that of any subcontractors, with other designers, contractors, the utility companies, governmental agencies, Worcester County; Administration personnel, and operating personnel concerning site access, establishment and use of temporary facilities, work schedules, and other elements of the specified work, which require interfacing with others.

It is anticipated that CHOPTANK ELECTRIC and VERIZON will relocate their underground and overhead facilities prior to and during the construction operations. See the Section 875 - Utility Statement contained elsewhere in this RFP for the appropriate contacts for each Utility Company.

3.06.29 Community Relations

The Design-Build Team will establish a program of public contact for conducting effective relationship with the community and businesses that are in proximity to construction areas. This program is to be a written plan submitted to the Administration in the Technical Proposal and included as part of the Lump Sum Price for this Contract. As part of this program, the Design-Build Team shall establish and maintain continuing liaison with persons occupying property or doing business in the immediate area of the work site for the purpose of minimizing inconveniences resulting from construction. The plan will detail how the Design-Build Team intends to keep the property owners and businesses informed of the work schedule and include a program for notifying them at a minimum of every 30 days of what will occur within the next 30 days. The Design-Build Team's Technical Proposal shall also name a Public Relations Officer who is responsible for this work and who the Administration and citizens can contact for project information and answers to project related questions. See TC Section 3.21, Public Outreach Performance Specification, for all the requirements.

3.06.29.1 Toll Free Telephone Number

The Design-Build Team shall establish a toll free telephone number. This telephone number shall be used for the public to contact the Design-Build Team in the case of an emergency. The Design-Build Team shall maintain a log of all calls made to the number, including date, time, name of caller, reason for call, caller's address and phone number. These logs shall be accessible to SHA for review and submitted every two months once the phone line is made available to the public. The Design-Build Team shall respond in person or by telephone within one hour of the time of the call and shall arrange for resolution of any issues as soon as possible. The Design-Build Team shall post the toll free telephone number prominently within the project limits and the Administration project field office. The telephone number shall be shown on all flyers distributed on the

project.

3.06.29.2 Public Relations Materials

All public relations materials, advertisement, flyers, and meeting handouts and graphics shall be approved by the Administration's Project Manager and Office of Communications prior to public release.

TC 3.07 ADMINISTRATION SERVICES

The Administration will provide the following services:

3.07.01 General Administration Services

- Provide CADD standards, engineering standards, design criteria, as-built plans, existing R/W plats and prints of other design projects for use as examples or guides.
- Provide erosion and sediment control standard sheets, traffic design standard details, Maintenance of Traffic (MOT) standard plates, etc.
- Schedule and coordinate all milestone meetings for this project.
- Provide accident statistics and other traffic data Average Daily Traffic (ADT), Design Hourly Volume (DHV), percentage of trucks, etc.
- Provide review of all redesign and revisions.
- Provide overall management and liaison services related to project phases.
- Coordinate times and places of all of the Design-Build Team's community and public meetings.
- Review and approve design concepts, plans, contract drawings, documents and estimates.
- Provide existing Right-of-Way plats and/or Right-of-Entry agreements.
- Acquire Right-of-Way for roadway construction as determined by the Administrations design concept plans.

3.07.02 Traffic Services

The Administration's Office of Traffic and Safety (OOTS) will provide the following:

- A review of signing, signal, pavement marking and lighting plans.
- Design charts for ground mounted sign supports and foundations.
- Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.
- Functional operation and requirements for the traffic signals.
- When the Design-Build Team proposes any item that differs in any way from the Administration's Standards, OOTS will review those shop drawings for signs, foundation details for sign structures, fabrication drawings for sign structures, and catalog cuts for electrical items.
- Handwritten Structure Design Sheets.
- Once notified by the Design-Build Team when each service drop is needed, SHA may arrange the final electrical service request letters when directed by the utility company.
- SHA will supply all controllers and cabinets and the related internal equipment, the required traffic signal mounted signing and the ground mounted W3-3 signs only. The Design-Build Team shall install all SHA traffic signal supplied equipment.

3.07.03 Structural Services

The Administration's Office of Bridge Development (OBD) will provide the following:

- A review of all plans, reports, calculations, shop drawings etc. related to the structures on this project.
- Respond to all Requests for Information on the structures during the design and/or construction.
- Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team and/or SHA.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.

3.07.04 Construction Inspection

The Administration will follow its normal construction inspection policies and procedures. However, measurement of quantities will serve to verify that the plan and specification requirements are met and for other purposes at the discretion of the Administration. The Design-Build contract does not alter the authorities of the Administration's District Engineer, Project Engineer, or construction inspection personnel in their Administration of the construction contract.

3.07.05 Conduct Pre-Construction Conference

The Administration will conduct the conference and take minutes. Representation at the conference shall include:

3.07.05.1 Preconstruction Conference Attendees

- A responsible officer of the Design-Build Team;
- The Project Manager;
- The SHA Construction Project Engineer;
- The SHA Highway Design Engineer;
- Public Affairs Representative;
- Maryland DNR and SHA Landscape Operations representative;
- SHA Landscape Architecture representative;
- A responsible officer of any major subcontractors.
- The Environmental Monitor and SHA Environmental Programs Division representative.
- SHA Highway Hydraulics Division representative
- SHA Bridge Design Division representative

3.07.05.2 Pre-Construction Conference Topics

The Design-Build Team should be prepared to discuss the following issues at the conference (at a minimum):

- Designation of responsible personnel;

- Design Quality Control Plan;
- Correspondence/communication;
- Distribution of contract documents;
- Approval of subcontractors;
- Tree Impact Minimization and Avoidance Report;
- Locations and protections devices of forested areas.
- Stake out and approval of tree protection devices and fence locations.
- Progress schedule (design and construction);
- Critical work sequencing;
- Permits and licenses;
- Submission schedule;
- Submittal of Shop Drawings, project data and samples;
- Itemized schedule listing dates by which other submissions will be forwarded to the Administration;
- Major equipment, deliveries and priorities;
- Site utilization plans;
- Office and storage area;
- Construction constraints;
- Coordination of all interface activities;
- Training;
- Availability of utilities/need for temporary services;
- Procedures for maintaining Record Documents;
- Material submittals and approvals;
- Processing of field decisions and change orders;

- Close-out procedures;
- Review of miscellaneous procedures;
- Safety;
- Utility relocations, and
- Utility connections to all existing and proposed TCD's.

3.07.06 Conduct Progress Meetings

The Administration will conduct progress meetings on a regular basis, as scheduled at the project initiation meeting and pre-construction conference. The Design-Build Team shall prepare all meeting minutes and distribute them to attendees and team members for review and comment weekly. Additional progress meetings may be necessary at the discretion of the Administration to maintain coordination of design and construction activities. Representatives at the meetings shall be qualified and authorized to act on behalf of the entity each represents.

3.07.06.1 Progress Meeting Attendees

- The Design-Build Manager, Design-Build Project Manager and associates as needed,
- The Administration's Project Engineers, Construction, Design and associates as needed,
- Subcontractors as appropriate to the agenda,
- Representatives from FHWA, the Worcester County Department of Public Works; utility companies, and other concerned parties as appropriate.

3.07.06.2 Progress Meeting Topics

The meetings will serve as a forum to establish and maintain close coordination of work activities, resolve problem issues and expedite construction operations. Schedules, change orders, work activities, DQCP reviews, and other issues will also be addressed.

3.07.07 Permits

As part of this RFP, the Administration is providing the following permits and approvals based on the proposed activities:

- Joint Federal / State MDSPGP-3 Permit (From MDE and USACE)

- Reforestation Site Review Permit (from DNR)
- Stormwater Management Letter of Intent

TC 3.08 DELIVERABLES

Deliverables will be produced in both the design and construction phases. They include construction documents, reports, an engineer's office, public relations materials, design exceptions and property owner information.

3.08.01 Plans

At a minimum, the following separate plan sheets shall be produced for this project.

- Title Sheet
- Index of Drawings
- Typical Sections
- Superelevation Charts
- Paving Details
- Geometry and Coordinates
- Roadway Plans
- Roadway Profiles
- Traffic Control Plans
- Structure Plans
- Storm Drain Profiles and Structure Schedules
- Drainage Details, including ditch type/linings, outfall protection, and non-standard structures
- Erosion and Sediment Control Plans and Details
- Signing and Pavement Marking Plans
- Stormwater Management Plans and Details

- Cross Sections
- Landscape/Reforestation/SWM Planting Plans
- Lighting Plans
- Culvert Extension Plan, Elevation and Details
- Stream Diversion Plans

3.08.01.1 General Requirements

The Design-Build Team shall deliver upon request and at no additional cost hard copies of maps, plans and drawings as well as electronic copies of all computer files. This includes Microstation files used to develop the design and drafting of this project. These files must be logically indexed and labeled to enable Administration personnel to use at any time.

3.08.01.2 Refinements to Contract Documents

The Design-Build Team shall develop refinements to the contract documents within the parameters of the proposed cost that better achieve the project goals. This includes Semi Final and Final Design plans, Final SWM Report, Drainage Calculations and Contract Documents based on refinements and revisions to the Administration-furnished Contract Documents. The Design-Build Team may modify the Microstation V8 files provided by the Administration, or start from new, blank files. In some cases, the Design-Build Team will have to start from new, blank files and redraft everything required for the permit.

3.08.01.3 Contract Plans and Specifications

The Design-Build Team shall provide contract plans and any required specifications, in accordance with "Volume II" and this RFP. The Design-Build Team will develop specifications for construction that identify the details of the proposed work. The intent is that the work will be done in accordance with the Standard Specifications, project specific Special Provisions, the "standard" Special Provisions, and the Special Provisions Inserts which are normally included in an Administration advertised RFP. All of these "standard" Special Provisions Inserts and Special Provisions are included in this RFP even though the work items to which they apply might not be included in this project. The intent is that if the item is included in the construction, then these "standard" Special Provisions and Special Provisions Inserts will apply.

The specifications to be prepared by the Design-Build Team and submitted to the Administration for review and approval will, in addition to all of the specifications mentioned above, include any specifications developed by the Design-Build Team that

supplement or modify what is provided in the RFP.

Throughout the design phase, the Design-Build Team shall prepare and update 50 scale reproducible maps of the design to be used for meetings, briefings, etc. Where needed for added clarification, 20 scale reproducible maps shall be provided for use by the Administration. The scale of the roadway plans should be 50 scale unless more detail is needed.

The Design-Build Team shall provide the Administration with sufficient data to answer property owners' and other requests for information concerning the project's effects, status, etc.

3.08.01.4 Drafting and CADD Standards

The Design-Build Team shall utilize SHA supplied Microstation files, including data collector survey and photogrammetry in their design and drafting. The Design-Build Team shall utilize the Microstation drafting software packages Version V8 or later, and/or GEOPAK. All of the design and drafting will utilize all Administration CADD Standards including but not limited to feature tables, file-naming standards, parameter files, font libraries, cell libraries and color tables.

3.08.01.5 Stormwater Management (SWM) and Surface Drainage Plans

The following items shall be included in the design plan documents:

- Pipe profiles and structure schedules for all storm drain systems.
- Profiles shall be at a scale of 1 in. = 50 ft. horizontal and 1 in. = 5 ft. vertical. The 25-year hydraulic gradient and existing and proposed ground, proposed pipe, existing and proposed utilities, proposed outlet protection, and existing structures shall be shown on all storm drain profiles.
- Details for all non-standard drainage structures.
- SWM Systems including details, profiles, grading and layout plans, planting plans and BMP ID numbers.
- Side, median and outfall ditch elevations, offsets, and configurations.
- A BMP As-Built Certification sheet shall be developed for each SWM facility (see 3.06.16.3). Examples of the checklists and tabulations are included in this package and checklists for other types of facilities may be available from the Administration, Highway Hydraulics Division, upon request. The Design-Build Team may expand the checklist as necessary.

- Hazardous material spill containment plans as necessary.
- Underdrain connections, locations (including linear filter cleanouts), and outlets.
- Cross culvert locations, headwater pool areas, and channel changes required to adjust streams to culverts.
- Spring box and outlet locations and configurations.

3.08.01.6 Erosion and Sediment Control (ESC) Plans

The Design-Build Team shall develop ESC Plans that include the following in addition to the highway plan requirements.

- Plans for both initial and final phases of the construction are required. Plans for interim phases may also be required by MDE to ensure adequate controls throughout project duration. These interim phase plans shall be coordinated with traffic control stages. The plans require one foot contouring for all phases at the same scale as the roadway plans.
- The initial phase plan shall detail the implementation of erosion and sediment control measures necessary to complete the clearing and grubbing and the initial stages of the Traffic Control Plan (TCP).
- The final phase shall detail the control measures required to move to final grade and accommodate interim traffic control phases.
- Plans shall provide a detailed description of the Limit of Disturbance (LOD). A schedule of stations and offsets shall be provided with stations and offsets established at a minimum of 50 foot intervals and at all break points in between.
- Larger scale drawings (1 in. = 200 ft.) shall be included in the plans depicting off-site drainage areas, sensitive environmental resource areas such as wetlands, woodlands, streams, and locations of major diversions and sediment controls.
- This plan will be coordinated with the MDE Non-Tidal Wetland and Waterways Division to ensure compliance with ESC measures in areas subject to waterway construction permits. The Design-Build Team shall be responsible for all revisions due to MDE review and comment.
- The plans shall be sealed and signed by a Maryland Registered Professional Engineer.

3.08.01.7 Traffic Control Plans

The Design-Build Team shall prepare detailed Traffic Control Plans (TCPs) as required for various stages of construction showing traffic patterns, signs, barricades, etc. These plans will be developed at a scale of 1 in. = 20 ft. or 1 in. = 50 ft. and shall layout in detail each phase of construction as coordinated with the erosion and sediment control and landscape plans. Final TCPs shall be submitted for final review, and may include cross-sections, temporary signals and/or signal phasing modification plans and interim drainage. All existing highway lighting systems, sign lighting and traffic signals are to be kept fully operational throughout the construction period. In the event some or all of the existing lighting must be taken out of service, consideration should be given to temporary lighting systems and maximizing usage of new lighting systems. All lane closures shall be as outlined elsewhere in this RFP, and shall be approved by and coordinated with the District 1 Traffic Office of the State Highway Administration.

3.08.01.8 Structure Plans

All structure plans developed by the Design-Build Team shall conform to the following requirements:

Title Block information in accordance with Maryland State Highway, Office of Bridge Development PPM P-79-16(G).

All views in accordance with Maryland State Highway, Office of Bridge Development PPM P-75-7(4).

All lettering in accordance with Maryland State Highway, Office of Bridge Development PPM P-76-9(G).

3.08.01.9 Utility Map

The Design-Build Team shall develop a utility map graphically showing all existing utilities within proposed Right-of-Way. This map shall be at the scale of the roadway plans. Existing utilities are to be clearly indicated and labeled. Connections between valve boxes, manholes, poles, etc., are to be shown and labeled with the type of existing service, e.g. 8 in. Sanitary, 4 in. H.P. Gas, 200 K.V. Transmission, etc. This map is to be kept current with proposed utility relocations shown and made available for review and use by Administration and Utility Company staff. Existing utilities are to be shown and clearly labeled on plans, profile and cross-sections.

3.08.01.10 Roadside Landscape and Reforestation Plans

The Design-Build Team shall prepare landscape and reforestation plans with a scale appropriate for the project, but not less than 1”=50’. Plans shall include schedules of all

materials proposed for use, and shall be submitted to the Administration, Landscape Architecture Division and Landscape Operations Division, for review and approval. Roadside Landscape and Reforestation plans should include the following information:

- Vicinity map of site location for both on-site and off-site reforestation areas
- Density and quantity of plantings area provided for mitigation
- Limit of Disturbance
- Tree preservation fence line
- Plans should include environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel
- A schedule of materials, indication plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG), and proposed spacing
- Defined limits of mowing and limits of mulching where applicable
- Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the tree's trunk; 1 foot of radius per inch of DBH (Diameter at Breast Height), for trees 30 inches DBH or less; and 1.5 feet of radius per inch of DBH for trees greater than 30 inches DBH
- Tree preservation details including but not limited to fencing, fertilizing, root aeration, signage, and root pruning/sequencing of construction indicating any additional requirements for tree preservation not identified in the specifications.

3.08.02 Cross Sections

The Design-Build Team shall prepare cross-sections cut at even 50 foot stations, at driveways, and at critical stations for clarity along the baseline of construction at a scale of 1 in. = 10 ft. horizontal and vertical. Cross sections shall be provided for the mainline and side roads. Cross-sections shall show: existing ground, proposed grade, roadway slope, curb/gutter, existing and proposed right-of-way and easements, traffic barrier, proposed and existing traffic control device and sign structure foundations, grading limits, pavement section and all existing and proposed storm drains, swales, storm water management facilities, noise wall, and all utilities. Cross-sections shall have the P.G.E.(s) and all proposed ditches and swale inverts labeled with offsets and elevations. Cross-sections shall have all existing and proposed (including relocated) utilities and storm drains drawn to scale at the correct offset and elevation, and have type, size, and invert elevation (if known) labeled. Cross-sections shall be placed on sheets measuring 22 in. x 34 in. with grid lines spaced at .2 in. horizontal and .2 in. vertical. Each section shall be identified by

the baseline name, station and a datum elevation. Elevations shall be shown in the Maryland Grid System Datum, NGVD 88.

The cross sections should be annotated according to SHA Highway Design Policy and Procedures Manual including offset and elevation for all significant figures.

Existing and proposed utilities, proposed drainage conveyances including pipes, drainage structures, cross culverts and ditches shall be drawn on to the cross-sections. The cross-sections will be used by the Administration to verify adequate cover at pipes and clearance at utilities.

Interim and final cross sections containing drainage design components and annotations shall be submitted for use in the Administration's review of drainage design.

3.08.03 Reports

The Design-Build Team shall perform engineering computations and/or analysis and maintain all backup data. This data must be available to the Administration at all times; and clear, legible copies shall be furnished to the Administration upon request. Stormwater Management reports, drainage reports, geotechnical report and field inspections reports, computations, and maps shall be submitted to the Administration for review and/or approval and placement in permanent files. These computations shall be for the total project and in accordance with Administration procedures. Design Exceptions shall be documented in report form and submitted to the Administration.

3.08.03.1 Stormwater Management (SWM) Report

Upon completion of the project, the Design-Build Team shall submit two (2) copies of the approved, final SWM Report to the Administration. During the review and approval process, the report can be submitted in phases.

3.08.03.1.1 SWM Report Format

- The report and accompanying mapping shall be compiled according to the SHA HHD SWM Design Report Standard Format (included in this package).
- The report shall be written in a clear, well organized, and concise manner with all pages numbered and dated.
- The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all pages and pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports.
- The final approved report, including all mapping and exhibits, shall be converted to PDF formatted file(s). The electronic file(s) shall be delivered to

the Administration for their records.

3.08.03.1.2 SWM Report Contents

The SWM report shall contain the following:

- A thorough discussion explaining the extent of improvements at each outfall and the proposed quantitative and qualitative control methods of SWM, including reasons why other methods were not selected.
- An explanation of hydrologic/hydraulic analysis methodologies used. Final supporting computations, maps, schematics, cross-sections, details and computer outputs shall be included for each outfall location.
- Outfall stability analysis, including photographs of each outfall and receiving channel.
- Computations for riprap sizing and outlet protection.
- Maps and schematics clearly showing the location of subareas, structures, existing land use, time of concentration paths, soil types and SWM facilities. Maps shall be included in pockets within the report.
- Computer printout sheets in 8½ inch x 11 inch format. These sheets shall be clearly labeled for cross-reference to the supporting data and points of analysis.
- MDE Pond Summary Sheets.
- SHA Water Quality Summary Sheet (WQSS) submitted to Administration, Highway Hydraulics Division, for signature. Maps detailing the impervious areas added, impervious areas treated, pavement removed, redevelopment areas, and areas where existing treatment is lost.
- MDE SWM Waiver Applications that differ from those submitted with the Concept SWM Report. These shall be submitted to the Administration, Highway Hydraulics Division, for signature.
- SHA BMP Identification Forms (included in this package) with SHA BMP numbers indicated. The Design-Build Team is responsible to obtain BMP numbers for all SWM facilities from the Administration, Highway Hydraulics Division.

3.08.03.2 Surface Drainage Report

The Surface Drainage Report shall include all drainage design computations performed according to the Administration's Highway Drainage Manual, drainage area mapping and schematics necessary to complete the design of the stormwater conveyances for the project.

All drainage computations shall be performed using the appropriate design charts within the Administration's Highway Drainage Manual and shall include clear references for all tables and charts used.

Culvert Analysis reports, when necessary for Waterway Construction Permit review and approval, shall be included as an attachment to the Surface Drainage Report and shall follow the format described below. The content shall be dictated by the MDE comment letter, approval or subsequent requirements issued by MDE in their review process.

3.08.03.2.1 Surface Drainage Report Format

- All the pages within the report shall be numbered and dated.
- The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all revised pages. Pages which are added or removed shall be indicated as such. Revisions shall be 3-hole punched for easy placement in the reports.
- The final approved report, including all maps and exhibits, shall be converted to PDF format file(s). The electronic file(s) shall be delivered to the Administration for their records.

3.08.03.2.2 Surface Drainage Report Contents

The report shall include, but not be limited to the following:

- Storm sewer design computations including schematics, inlet drainage area maps, spacing, capacity, spread, hydraulic gradients, and structural design for non-standard drainage structures.
- Culvert analysis including 2, 10, 25 and 100 year frequency storms and design storms.
- Ditch computations and drainage area maps for ditch capacity, freeboard and lining stability.
- Evaluation of outfall stability, and outfall protection design.
- Any deviations from the guidelines and Administration approvals for the deviations.
- Culvert service life verification.

3.08.03.3 Erosion and Sediment Control (ESC) Report

The ESC Report shall contain all computations for the ESC design and can be either a

separate report or can be included in the SWM report. The ESC Report shall conform to SWM Report formatting described above (3.08.03.1.1).

The ESC Report shall contain the following:

- Drainage area maps to control devices for each phase.
- Computations for sizing control devices.
- Plans and procedures for converting sediment control devices into stormwater management facilities.
- Identification of and placement of controls in sensitive areas.

3.08.03.4 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

A) The corresponding Geotechnical Planning Report;

B) The corresponding Interim Design Memorandum;

C) Locations and results of borings, rock coring, geophysical testing and other in-situ testing;

D) A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);

E) Field investigation procedures;

F) A description of groundwater conditions;

G) Results of laboratory tests;

H) Values assigned to all applicable soil parameters for design;

I) All pertinent data and complete discussions of all geotechnical analyses and design;

J) All relevant design calculations and computer program results checked and initialed by a Professional Engineer licensed in the State of Maryland;

K) Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;

L) Groundwater problems encountered, means of dewatering and/or other solutions;

M) Designs for support of excavation;

N) Results of instrumentation and monitoring and post-construction monitoring summaries;

O) Potential settlement problems; and

P) Potential stability problems and analysis results;

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

Q) Foundations

1) Individual pile and pile group design calculations including axial and lateral capacity for the pile type, size, and length to achieve the required capacities (including any effects of liquefaction and downdrag); estimated pile and pile group settlement;

2) Shallow foundations calculations including allowable bearing capacity, estimated differential and total settlements, and rotations; and

3) Calculations of embankment settlement (magnitude and time rate) and downdrag forces on the piles, depths to zero or negligible settlement, and the proposed means to mitigate the downdrag.

R) Retaining Walls

1) Wall design calculations including the results of the global and internal stability analyses; analyses of total, differential, and secondary settlements; and, calculations for analyses of sliding, overturning, and bearing pressure for live and seismic loadings;

S) Embankments

1) The results of the slope stability analyses, including external loading from live and seismic loading, the recommended side-slopes of all embankments;

2) The results of settlement analyses, including predictions of the magnitude and duration of primary, secondary, and post-construction settlements;

3) The results of the liquefaction analyses and the proposed methods of mitigation for any location deemed necessary to protect the integrity of bridges and adjacent walls;

4) The proposed method(s) of protecting and abandoning utilities.

T) Cut Slopes

1) The results of the slope stability analyses, including external loading from live and seismic loading, and the recommended side-slopes of all cuts;

U) Subgrades for Pavements

1) The results of all subgrade improvement testing including Falling Weight Deflectometer (FWD) test results.

V) Instrumentation

1) All items included in TC 3.14.05.01 "Geotechnical Instrumentation".

3.08.03.5 Final Pavement Report

The Design-Builder shall prepare a Final Pavement Report that incorporates all aspects of the pavement engineering performed on the Project for each Design Unit. The Final Pavement Report shall include, but is not limited to the following items:

A) Pavement Investigation Plan Report;

B) Location and results of all testing performed in the complete pavement investigation;

C) Summary of the complete pavement investigation;

D) Interim Pavement Report;

E) A summary of all pavement engineering and design revisions made in the Final Design that are different than the information provided in the Interim Pavement Report;

1) A detailed description of each revision with justification and reasoning;

F) Test results from Top of Subgrade collected during construction that were used to justify the design subgrade strength was achieved;

1) Subgrade test rolling records and field verification notes for all subgrade areas;

2) Subgrade FWD testing and analysis results for all pavement areas;

G) Location of any Top of Subgrade conditions during construction that required additional subgrade improvements beyond those planned for by the Design-Builder;

1) The subgrade improvement technique and quantity/details used by the Design-Builder to improve the subgrade situation;

H) Test results from any in-place base or sub-base pavement layer that were used to justify the required design strength was achieved;

I) Test results from any HMA pavement layer that were used to justify the required design strength was achieved;

J) The location of any pavement or material conditions encountered during the placement of any pavement layer that were unacceptable in terms of pavement quality as defined in the contract documents and as defined by the Design-Builder in their quality plan;

1) The improvements made and quantity/details used by the Design-Builder to address the unacceptable material or pavement condition;

K) Test results from all pavement performance criteria that were used and any corrective actions needed by the Design-Builder to justify the required pavement performance was achieved;

1) Structural capacity;

2) Ride quality;

3) Skid resistance; and

4) Visual Appearance.

3.08.03.6 Tree Impact Minimization and Avoidance Report

A report shall be prepared that shows the tree and forest locations and describes the alternative measures that the Design-Build Team proposes to use to avoid or reduce impacts to these trees and forest, including alignment or typical section modifications or protective measures as stated in Administration's 2001 Standard Specifications, Section 120. This report will be reviewed and approved in conjunction with the grading plans.

3.08.04 Engineers Office

The Design-Build Team shall supply one (1) Engineer's Office Type D, for use by Administration personnel, conforming to the requirements of Section 103 of the Standard Specifications.

One phone in the conference room of the Engineer's Office shall have conference call and speakerphone capabilities.

The Design-Build Team shall provide the Administration with two (2) digital camera, and four (4) cellular phones, and is described in special provisions in this RFP

. The Design-Build Team shall provide the CPM schedule, as is described in the special provision in this RFP.

TC 3.09 ROADWAY PERFORMANCE SPECIFICATION

3.09.01 General

Design and construct roadways in accordance with the requirements of this specification, including performance requirements, standards and references, design and construction criteria, and required submittals.

This section is also intended to allow the flexibility to make Project changes that produce benefit of savings to the Administration and Design-Builder without adversely affecting the essential functions and characteristics of the Project in terms of safety, traffic operations, desired appearance, durability, ease of maintenance, environmental protection, drainage, and other permitted constraints

3.09.02 Guidelines and References

3.09.02.01 Guidelines

Roadway design and construction shall be in accordance with this specification and requirements of the following Guidelines unless otherwise stipulated in this specification. Guidelines and References specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline assigned the highest priority shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to

proceeding with design or construction. Unless noted below, the most recent version as of the date of issuance of this RFP for each Guideline shall apply.

Table 1
Guidelines for Roadway

Priority	Author or Agency	Title
1	SHA	Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways
2	AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
3	AASHTO	Roadside Design Guide, 2002
4	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2006 Edition
5	FHWA	Manual on Uniform Traffic Control Devices, 2003
6	AASHTO	Guide for the Development of Bicycle Facilities, 1999
7	SHA	Highway Design Policy and Procedure Manual
8	ADA	ADA Guidelines Americans with Disabilities Act
9	SHA	Standard Specifications for Construction Materials
10	SHA	Book of Standards Highway and Incidental Structures
11	SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated 2003

3.09.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Roadway. These publications have no established order of precedence.

Table 2
References for Roadway

Author or Agency	Title
SHA	Book of Standards Highway and Incidental Structures

3.09.03 Performance Requirements

Design and construct all roadways to meet the following performance requirements:

A. Meet or exceed all Maryland Department of Transportation State Highway Administration, AASHTO and other roadway design and safety guidelines as referenced above, outlined in these specifications, and in accordance with sound engineering principles.
B. Accommodate traffic volumes and levels of service as outlined in Traffic

Performance Specification.

C. All Roadway components shall be constructed within the defined right of way and easements.

3.09.04 Design and Construction Criteria

The Design-Builder shall design and construct all roadway geometrics including horizontal alignment, vertical alignment, superelevation, cross slopes, lane widths, shoulder widths, medians, and clear zone grading in accordance with the requirements of this section and the guidelines for roadway design.

The Concept Plans show a conceptual design for the Project. These Concept Plans and supporting electronic files are included to illustrate the general scope of the improvements and may contain some elements that require modification to meet the requirements of this Performance Specification. The Design-Builder shall verify all information prior to use to ensure compliance with the requirements of this Performance Specification.

3.09.04.01 Design Criteria

US 113 Mainline Criteria	
Design Speed	60 mph
Posted Speed	55 mph
Functional Classification	Arterial
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO

County and Service Roadway Criteria	
Design Speed	40 mph
Functional Classification	Minor Collector/Local
Posted Speed	35 mph
Terrain	Flat
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO

Driveway Criteria	
Design Speed	N/A
Functional Classification	N/A

Posted Speed	N/A
Terrain	Flat
Maximum Superelevation	N/A
Maximum Grade	7%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

A. The presence of roadway lighting shall not reduce the requirements for vertical sight distance on sag curves.

3.09.05 Typical Section

The Concept Plans include typical sections for US 113 and cross streets in the Project. These specify the general number of lanes, lane and shoulder widths, medians, curb and gutter, sidewalks, offsets from roadway to sidewalk, and other cross section elements. Any proposed modifications to these cross sections shall be consistent with requirements outlined in these Performance Specifications and Project commitments. Modifications to typical sections shall be subject to approval by the Administration and may require approval by additionally affected agencies, including Worcester County.

The following design criteria below shall be used when designing a 54 foot median:

- Lane shift transition rates to be used shall be a minimum of 60:1
- The point of the beginning and ending for the 54 foot median shall be set at the point where the taper begins for the left turn lanes
- Right turn channelization from side streets shall be accomplished by solid pavement markings
- Median openings shall be squared off and consist of 40 feet of paved surface

3.09.06 Cross Street Improvements

The Plans include improvements to local owned roadways crossings with US 113. The general extent and limits of these improvements are shown in the Concept Plans and typical sections. Cross streets shall be constructed to the full cross street typical section within the required limits of work based on the required horizontal and vertical changes. Cross streets shall then be tapered to meet the existing typical section.

3.09.07 Design Vehicle

The design vehicle for turning movements shall accommodate the WB-67 vehicle.

3.09.08 Roadside Barriers

Use of any type of roadside barrier shall be minimized to the extent practicable in favor of a clear zone graded typical section.

3.09.08.01 Traffic Barrier W-Beam

Where a roadside barrier is warranted by AASHTO or other Guidelines, traffic barrier W-beam shall be used. Existing roadside traffic barrier W-beam, if warranted based on the proposed design, shall be replaced.

Weathering steel traffic barrier W-beam shall be used for all areas.

The number and type of end treatments shall be minimized to the extent practical. Permanent Sand Filled Barrels will not be allowed. Traffic barrier end treatments shall match the finish of the adjacent W-beam traffic barrier.

3.09.08.02 Median Traffic Barrier

Where median barrier is warranted by AASHTO or other Guidelines,
traffic barrier W-beam median barrier or 42" F-shape concrete median traffic barrier shall be used. Concrete median traffic barrier shall be installed at locations where the median width is 16' 0" or less.

Traffic barrier w-beam median barrier shall be weathering steel.

Concrete barrier shall include two 3" diameter PVC conduits.

Permanent Sand Filled Barrels will not be allowed for end treatments. Traffic barrier end treatments shall match the finish of the adjacent W- beam traffic barrier.

3.09.08.03 Single Face Concrete Traffic Barrier

Proposed use of single face concrete barrier will be subject to Administration approval and is generally to be avoided. Flaring of the barrier such that it reduces the width of the roadway including shoulder will not be permitted. Concrete barrier shall be 42" F-shape and shall include two 3" diameter PVC conduits.

3.09.08.04 Curb

Vertical curb will not be allowed on any roadway with a posted speed greater than 40 mph. Asphalt curb will not be allowed.

3.09.09 Sidewalks and Bike Lanes

N/A

3.09.10 Noise Walls

N/A

3.09.11 Access to SWM facilities

Maintenance vehicle access shall be provided to SWM and other facilities in accordance with Planting and Landscape Architecture and Drainage Performance Specifications.

3.09.12 Planned Projects

US 113 Phase 2A (WO6345170) is currently under construction. The Design-Builder shall coordinate their efforts with this project

3.09.13 Construction Stakeout

Refer to SP – Section 107 – Construction Stakeout for Design-Build Projects.

3.09.14 Right-Of-Way and Easement Lines

The Design-Builder shall define right-of-way and easement lines of the Project for adjacent property owners, promptly upon request. The Design-Builder shall reset any disturbed or destroyed property corner(s) adjacent to the project upon request from the owner. The Design-Builder shall provide fencing for any properties which has an existing fence disturbed by construction. The Design-Builder shall reset the existing fence or provide black vinyl coated chain link fence with privacy slats. The fence shall be reset or replaced on the same day it is taken down. Once construction is complete, the existing fence which has been removed shall be reset or replaced by the Design-Builder. Any existing fence damaged shall be replaced by the Design-Builder in-kind with the new fence of the same material and aesthetics.

3.09.15 Southbound Lane Drop and Northbound Roadway Crossover

The Design-Build Team shall design the southbound lane drop and northbound roadway crossover at the southern project limit for a design speed of 60 mph. The horizontal alignment shall provide a transition from the two lane southbound section to match the existing single lane. The northbound roadway crossover within the future median shall provide for a 4 foot left shoulder and a 10 foot right shoulder. Roadway runoff in this area shall not drain onto the southbound lane.

The pavement section for the cross-over shall be the same section as used for the US 113 – New Construction.

Signing and pavement markings for the southbound lane drop and northbound roadway crossover shall be in accordance with the latest edition of the MUTCD, Maryland Supplement to the MUTCD and SHA standards as provided by OOTS.

TC 3.10 PAVEMENT PERFORMANCE SPECIFICATION

3.10.01 General

The Design-Builder shall design and construct all pavement sections and perform all pavement engineering in accordance with the criteria established in this Pavement Performance Specification. All pavement sections shall perform under the given loading and environmental conditions for the specified service life periods.

The Design-Builder will have the flexibility to make Project changes that produce benefits or savings to the Administration or for the Design-Builder without impairing the essential functions, characteristics, or quality of the Project, such as safety, traffic operations, ride, long term durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

3.10.02 Guidelines and References

3.10.02.01 Guidelines

Design and construction of all pavements shall be in accordance with this Pavement Performance Specification and the relevant requirements of the following Guidelines and References. Guidelines and References specifically cited in the body of this Pavement Performance Specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. Listed under References are reports and resources that the Design-Builder may use to address the pavement design requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction.

Table 1
Guidelines for Pavement

Priority	Author or Agency	Title
1	SHA	2006 Pavement Design Guide
2	AASHTO	1993 Guide for Design of Pavement Structures
3	SHA	Book of Standards Highway and Incidental Structures
4	ASTM	D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
5	ASTM	D 4694-Standard Test Method for Deflections with a Falling-Weight-Type Impulse Load
6	ASTM	E -274 Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire
7	ASTM	E 501-Specification for Standard Rib Tire for Pavement Skid-Resistance Tests
8	AASHTO	M320 - Performance-Graded Asphalt Binder

Table 1
Guidelines for Pavement

Priority	Author or Agency	Title
9	AASHTO	M323 - Superpave Volumetric Mix Design
10	AASHTO	R25 - Superpave Volumetric Design for Hot-Mix Asphalt
11	AASHTO	AASHTO M288
12	ASTM	E 950 - Test Method for Measuring the Longitudinal Profile of Traveled Surfaces within an Accelerometer Established Inertial Profiling Reference
13	County	Worcester County roadway standards
14	SHA	SHA's 2001 Standard Specifications for Construction and Materials

3.10.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Pavement. These publications have no established order of precedence.

Table 2
References for Roadway

Author or Agency	Title
AASHTO	DARWin Pavement Design Software
SHA	MSMT 563 – Operation of the Inertial Profiler
SHA	Book of Standards Highway and Incidental Structures
FHWA	FHWA-RD-03-031 June 2003-Distress Identification Manual for the Long-Term Pavement Performance Program

3.10.03 Requirements

3.10.03.01 Pavement Engineering

The Design-Builder shall be responsible for all pavement engineering on the Project. The pavement engineering for the Project shall include, but is not limited to, the pavement investigation, pavement type selection, new pavement design, pavement rehabilitation design and material selection.

3.10.03.02 Pavement Investigation

3.10.03.02.01 Preliminary Pavement Investigation

The Administration has completed a preliminary pavement investigation to provide general site characteristics. The Administration obtained pavement borings at

selected locations along the corridor within the Project scope. The boring logs are included in electronic format on ProjectWise. These studies were performed in accordance with applicable standards and with reasonable care. The Administration assumes no responsibility with respect to the sufficiency of the studies for design, or their accuracy in representing actual pavement and subsurface conditions or existing thicknesses over the entire Project limits other than at the specific locations identified or sections tested.

Network level pavement performance and construction history data for all state-maintained roadways are available electronically and included on the ProjectWise. The following data is available for US 113:

A) Pavement performance data – ride quality, friction, rutting, and cracking; and
B) Network Level Construction history data – construction year, construction material type, and material thickness at time of construction Project completion.

3.10.03.02.02 Complete Pavement Investigation

The Design-Builder shall prepare and perform a complete pavement investigation program to obtain the data needed to fulfill the design requirements of the Project. The Design-Builder is responsible for supplementing the preliminary data with pavement data collected, tested and analyzed as part of the a complete pavement investigation program. The pavement investigation shall be done with knowledge about and complimentary to the geotechnical subsurface exploration program. The complete pavement investigation shall be performed per the data requirements in the pavement construction and rehabilitation sections of the SHA Pavement Design Guide. The Design-Builder's complete pavement investigation shall include, but is not limited to, the following items:

A) Review and evaluation of existing construction and performance records;
B) Visual survey performed on all existing roadways following D 6433;
C) Pavement and soil borings;
D) Mainline and shoulder pavement cores of existing roadways;
E) In-situ sampling and test results;
F) Laboratory test results of field samples;
G) Complimentary data and results from the geotechnical subsurface exploration program;
H) Non-destructive structural deflection testing;
I) Data analysis of any and all field data collection; and
J) Pavement patching survey and estimate.

The complete pavement investigation shall be done under the direction and responsibility of the pavement engineer for the Design-Builder.

3.10.03.02.03 Pavement Investigation Plan Report

The Design-Builder shall prepare a Pavement Investigation Plan Report for the pavement needs of each Design Unit. The Pavement Investigation Plan Report shall include the type, details, frequency, and approximate location of testing needed to perform a complete pavement investigation. The review of the Pavement Investigation Plan Report shall be incorporated into the Design-Builder's Design Quality Plan. The review of the report will be completed within the appropriate design stage for each Design Unit.

3.10.03.03 Pavement Type Selection

For the new US 113 Mainline and shoulders and Access Roads, the Design-Builder shall provide a flexible pavement structure according to the criteria set forth in this Pavement Performance Specification. The pavements shall have an initial structural design service life not less than 15 years. The Design-Builder shall maintain a consistent pavement type throughout each roadway element.

3.10.03.04 Pavement and Subgrade Materials

All materials used on the Project shall meet or exceed the requirements established in TC Section 3.10.02.01 of the Pavement Performance Specification. No structural coefficient or pavement layer moduli improvement or structural benefit shall be considered through the incorporation of geosynthetic materials in the pavement structure. Geosynthetic Stabilized Subgrade may be used to improve the subgrade and is encouraged as a good foundation for construction of the pavement section.

3.10.03.04.01 Drainable Granular Pavement Base Materials

Materials containing any Recycled Concrete Aggregate (RCA) and Recycled Asphalt Pavement (RAP) are not acceptable as a drainable granular pavement base material. The following materials are acceptable materials to be used for a drainable granular pavement base material:

A) Capping Borrow;
B) Graded Aggregate Base;

In addition to the above materials, materials meeting the following criteria are acceptable as a drainable granular pavement base material:

1) A crushed aggregate with less than 8% passing the No. 200 sieve, a Plasticity Index of 7 or less, and meeting the aggregate quality requirements for graded aggregate base; and
2) Natural soils with less than 20% passing the No. 200 sieve, a Plasticity Index

of 7 or less, and meeting the aggregate quality requirements for bank run gravel - base.

3.10.03.04.02 Non-Specification Pavement and Subgrade Materials

The Design-Builder may elect to propose a pavement section that utilizes a pavement material not identified in the Contract documents. In this case, the Design-Builder shall submit the following items as part of or prior to their Interim Pavement Report:

A) material design specification,
B) material strength and engineering properties,
C) construction and placement specification,
D) material quality control plan specification, and
E) long-term performance history.

Justification and an explanation of the structural value coefficients shall be provided for a pavement material not identified in the Standard Specifications for Construction and Materials. Construction of the pavement sections using the subject material shall not occur until the design, material and construction specifications, and material quality control plan have been through the Design-Builder's Design Management and Design Quality Assurance/Quality Control Plan.

3.10.03.04.03 Restricted Materials

The following materials shall not be used on the Project:

A) Rubber asphalt in hot mix asphalt materials;
B) Bottom ash; and
C) Slag, with the exception of blast furnace slag cement.

3.10.03.04.04 Recycled Materials

The Design-Builder may use Recycled Concrete Aggregate (RCA) in conformance with Administration policy - "Source Evaluation and Control Procedure for Reclaimed/Recycled Concrete Aggregates."

The Design-Builder may use Recycled Asphalt Pavement (RAP) in conformance with Administration policy –"Evaluation and Compaction Control Procedure for HMA Millings and Crushed Asphalt Material for Embankment/Backfill."

Other recycled materials may be submitted for proposed use following the Non-Specification Pavement and Subgrade Materials requirements above with the following additional documentation:

Certification and test data demonstrating compliance with all MDE and EPA

requirements for use of recycled materials.

3.10.03.05 Pavement Analysis and Design

The Design-Builder shall design pavement sections in accordance with the requirements set forth in the "1993 AASHTO Guide for Design of Pavement Structures" (1993 AASHTO) and the "SHA Pavement Design Guide" and the following sections of the Pavement Performance Specification.

The Design-Builder shall maintain a consistent pavement cross section for the mainline pavement and shoulders throughout the limits of the contract. The pavement cross section shall also be consistent for any given ramp and ramp shoulders. The Design-Builder shall design and provide a positive drainage system to adequately drain the entire pavement structure.

No flexible/rigid combination pavement (composite) shall be constructed for the Project, except for as needed for narrow (less than 4' wide) base-widening or for replacement of curb and gutter that does not involve base-widening. The flexible pavement shall be constructed with hot mix asphalt layers developed using the Superpave mix design criteria. The pavement constructed shall address surface and subsurface drainage giving due consideration to the prevention of water becoming trapped in the granular base/subbase of the pavement.

The pavement design section for the widening of any existing roadway element shall be designed to support the mainline traffic for that roadway element or at a minimum, match the existing mainline pavement structure.

Any construction on roadways not to be maintained by the State, shall be designed and constructed in accordance to the standards and guidelines of the governing local municipality or other entity. The MDSHA Pavement Design Guide provides two standard pavement sections that shall be used for driveways and bike paths.

3.10.03.05.01 Subgrade

The Top of Subgrade shall be identified by the Design-Builder on the pavement details. Any material placed above the Top of Subgrade shall be considered part of the pavement structure. Any material placed below or other Work below Top of Subgrade shall be considered a subgrade improvement. Refer to the Geotechnical Performance Specification for further design and construction requirements related to pavement subgrade.

3.10.03.05.02 Acceptable Subgrade Improvement Strategies

Acceptable subgrade improvement strategies include both mechanical and chemical subgrade improvements and are identified in the Standard Specifications for

Construction and Materials. Subgrade improvement techniques not included in the Standard Specifications for Construction and Materials require the following justification documentation for review by the Administration's in the Design-Builders design review process:

A) Material design specification;
B) Material strength and engineering properties;
C) Construction and placement specification;
D) Material quality control plan specification; and
E) Long term performance history.

Construction of the subgrade improvements using the subject techniques shall not occur until the design, material and construction specifications, and material quality control plan have been reviewed through the Design-Builder's design quality process and in the Interim Pavement Report. The Design-Builder shall adhere to the approved material and construction specifications.

Subgrade improvement techniques proposed by the Design-Builder shall have a proven history of performance in similar applications. Subgrade improvements shall not utilize materials or construction practices that could endanger the safety of the public or be detrimental to the environment in either the short or long term. Any subgrade improvement technique contained in the SHA Standard Specifications for Construction and Materials is considered acceptable without additional supporting documentation.

3.10.03.05.03 Pavement Base and Pavement Structure Drainage

The US 113 mainline pavement sections shall be of a sufficient depth to protect against pavement heaving due to frost. The depth of the US 113 mainline pavements for frost protection purposes shall be a minimum of 10 inches. The frost protection pavement depth includes the hot mix asphalt surface layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers.

The Design-Builder shall design and provide a positive drainage system to adequately drain the entire pavement structure. The pavement drainage system may include longitudinal underdrains, prefabricated edge drains, underdrain outlets, subgrade drains, a free-draining granular layer or combination and variations thereof. All pavement sections shall include, at a minimum, a 4" granular base layer in the pavement section to facilitate pavement drainage. The use of open-graded granular layers shall require the use of properly designed aggregate or geosynthetic filters. Geotextiles used in subsurface drainage and separation applications shall be designed in conformance with AASHTO M288. The pavement drainage system shall be designed in a manner that will minimize the future maintenance of the system.

3.10.03.05.04 Traffic

The following traffic data shall be used to conduct the analysis and develop the pavement design for the Project's new mainline:

	Mainline	
Year	2006	2030
Average Daily Traffic (ADT) - Two-way Traffic	14,750	32,000
Percent Trucks	24%	24%
Truck Factor	0.45	0.45
Lane Distribution	50%	50%

Note: This traffic data shall only be used for pavement design purposes and shall not be used for any other traffic needs in the Project.

3.10.03.05.05 New Pavement Design Criteria - General

The Design-Builder shall use the following requirements as the general pavement design criteria to develop the pavement design for each roadway element:

Pavement Type and Roadway Element	**Flexible Mainline**
Initial Structural Design Life	15 years
Initial Serviceability	4.2
Terminal Serviceability	2.9
Reliability	90%
Overall Standard Deviation	0.49
Overall Drainage Coefficient	N/A
Minimum Resilient Modulus of Subgrade*	4,500 psi
Maximum Resilient Modulus of Subgrade*	10,500 psi

* The Design-Builder has the option of designing with a higher design subgrade modulus than the minimum requirement and less than the maximum requirement, provided field verification is provided by the Design-Builder as per TC Section-

3.10.03.05.01 of the pavement performance specification.

3.10.03.05.06 New Flexible Pavement Design Criteria

The Design-Builder shall design and construct all flexible pavement sections with hot mix asphalt layers developed using the Superpave mix design criteria. The Design-Builder shall design all flexible pavements with the following design requirements:

A) Flexible pavements other than the US 113 mainline and shoulders shall be designed and constructed with a minimum hot mix asphalt thickness of 6 inches. The pavement design standards provided in Section VII of the SHA Pavement Design Guide may be used for the specific roadway facilities that are identified in Section VII;

B) The minimum, maximum and preferred lift thickness for all pavement layers are specified in the "SHA Pavement Design Guide" in Sections VI.B.1.3 and X.C;

C) The layer coefficients utilized in the Design-Builder's pavement sections shall be the "Desired Structural Coefficient" as specified in the "SHA Pavement Design Guide" in Section X.C.

D) No structural coefficient or pavement layer moduli improvement or structural benefit shall be considered through the incorporation of geosynthetic materials in the pavement structure; and

The Design-Builder shall design and construct each flexible pavement layer based on the minimum thicknesses allowed using the layered design analysis approach per Part II, Section 3.1.5 of the "1993 AASHTO Guide for Design of Pavement Structures." For purposes of determining the minimum layer thickness, the following maximum layer moduli shall be used:

1) Select, Capping, or Modified Select Borrow, Mr = 10,500 psi;
2) Cement Modified Subgrade, Mr = 10,500 psi;
3) Graded aggregate base, Mr = 15,000 psi;
4) Soil Cement Base Course, Mr = 20,000 psi;
5) For any bound pavement layer, Mr = 40,000 psi,

3.10.03.05.07 New Rigid Pavement Design Criteria

Rigid pavement shall not be used on this project.

3.10.03.05.08 Pavement Rehabilitation Design Criteria of Existing Roadways

The Design-Builder shall provide pavement improvements for all existing roadway elements. All non-state roadways shall be designed in accordance with the local agency standards or per the SHA Pavement Design Guide if no standards exist.

The Design-Builder shall perform a complete pavement investigation for all existing roadways within the limits of the Project that are not to be reconstructed. The Design-Builder shall provide the rehabilitation strategy and design for all existing pavement sections of roadway identified for resurfacing within the Project. The traffic data provided in TC Section-3.10.03.05.04 shall be used in the pavement rehabilitation design of existing roadways.

3.10.03.05.09 Temporary Pavement Sections for Maintenance of Traffic

The Design-Builder shall provide a roadway pavement section capable of safely and structurally supporting mainline traffic. All temporary roadways shall be free of all medium or high severity distress during their operation. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any distress reaching medium or high severity level shall be repaired with 24-hours.

The Design-Builder shall evaluate the condition of any roadway or shoulder to be used to support maintenance of traffic during construction. This evaluation shall be done within the complete pavement investigation required of the Design-Builder. At a minimum, pavement cores of the existing roadway shall be obtained by the Design-Builder and the structural capacity validated through an appropriate analysis by the Design-Builder's pavement engineer. This shall be done in all cases to use any existing roadway or shoulder for maintenance of traffic purposes that is expecting to have different traffic patterns than those that existed prior to the notice to proceed for the Project. The Design-Builder's pavement engineer shall determine if the roadway has adequate structural capacity to support maintenance of traffic and what, if any, construction is required to provide a pavement structure capable of supporting mainline traffic volumes. The results of the pavement investigation along with the maintenance of traffic pavement design and structural improvements shall be provided to the Administration as part of the Design-Builder's design review process prior to moving any traffic on a roadway or shoulder that was not supporting mainline traffic prior to the notice to proceed for the Project. Existing roadways used for maintenance of traffic, and new pavement constructed for maintenance of traffic that will ultimately be used as permanent shoulders or roadways, shall be restored to a suitable condition and meet the ultimate design requirements at the completion of the work. The Design-Builder shall be responsible for maintaining roadways used for maintenance of traffic.

Design requirements for new temporary flexible pavement for Maintenance of Traffic pavements are identified in the SHA Pavement Design Guide. The same minimum and maximum subgrade strength identified in the table in TC Section-3.10.03.05.05

shall apply for temporary roadways.

3.10.03.06 Interim Pavement Report

The Design-Builder shall develop and submit an Interim Pavement Report for each Design Unit of the Project at the Readiness for Construction Review or Interim Review Stage. The Interim Pavement Report shall contain the Design-Builder's plans for addressing the pavement design sections for the following:

A) New roadways for mainline, shoulders and ramps;
B) Pavement rehabilitation treatments;
C) Widening and reconstruction for existing roadways and other paved areas;
D) Roadway and pavement base/subbase drainage; and
E) Other pavement related matters on the Project.

The Design-Builder shall provide a pavement section for each roadway element in a Design Unit in the Interim Pavement Report for review and comment. A Pavement Engineer for the Design-Builder, who is a registered professional engineer, shall supervise all work and also seal the Interim Pavement Report.

The Design-Builder shall obtain all information necessary to properly complete the Interim Pavement Report, and the construction of the Project. The Interim Pavement Report shall include the design inputs and calculations used to develop the pavement sections.

The results of all soil borings and pavement cores, both the Administration's and the Design-Builder's, shall be shown on the roadway plan sheets. Boring log information shall be shown on the roadway profile sheets. Laboratory and in-situ test data may be shown on separate plan sheets. The recommendations contained in the Interim Pavement Report shall be incorporated into the plans and specifications developed for the Project.

The Interim Pavement Report shall contain pavement design items deemed important by the Design-Builder. The Interim Pavement Report shall contain, but is not limited to the following items:

F) Testing results from the Complete Pavement Investigation;
G) Summary of records review of as-builts, existing construction and performance records;
H) Pavement condition index (PCI) and distress summaries on all existing roadways following D 6433;
I) Location and result of pavement and soil borings;
J) Location and result of mainline and shoulder pavement cores of existing roadways;
K) In-situ test results;
L) Laboratory test results of field samples;

M) Location and result of non-destructive structural deflection testing;
N) Findings and summary of data analysis of any and all field data collection; and
O) Estimate of pavement patching needs.
P) Summary of critical design values and elements from the Complete Pavement Investigation;
Q) Records review analysis of each existing and new pavement section;
R) Analysis and pavement design of all roadways;

1) All design input requirements for AASHTO and SHA Pavement Design criteria;
2) Traffic data, analysis and calculation of the equivalent single axle load (ESAL) for each roadway element;
3) Structural capacity values (required, effective and original) for each roadway element;
4) Structural pavement layer calculations used to develop pavement sections needed for the required structural capacity;
5) Design subgrade resilient modulus (Mr);

S) Subgrade improvement- treatments and stabilization strategies;
T) FWD testing program guidelines and testing qualifications if effective design subgrade strength values are greater than the minimum values required;
U) Temporary pavement details and design/construction approaches to meeting performance requirements during maintenance of traffic operations;
V) Specific material selections for each pavement layer within the pavement section for each roadway element;
W) Rehabilitation techniques used for existing roadways***;***

1) Selection criteria used in determining of pre-overlay treatments (patching and grinding needs) and the estimated quantity;
2) Reasoning for selection of rehabilitation technique with respect to the pavement performance criteria;
3) Structural improvement strategy for existing roadway;
4) Functional improvement strategy for existing roadway;
5) Existing roadway conditions;
6) Existing Design subgrade resilient modulus (Mr);

X) Specifications for all materials to be used in the pavement section for each roadway element;
Y) Pavement drainage design and construction strategies;
Z) Use of unique or innovative construction techniques, i.e. automated dowel bar insertion, intelligent compaction, etc; and
AA) Pavement details.

3.10.03.07 Pavement Construction

Construction of all pavement materials shall be in accordance with the Standard Specifications for Construction and Materials unless modified in this Pavement Performance Specification or in the specifications developed by the Design-Builder.

3.10.03.07.01 Removal of Pavement markings

When required by the Design-Builder's MOT plan, existing pavement markings shall be removed by grinding, or overlaying the entire pavement surface, from shoulder edge to shoulder edge. The depth of grinding/thickness of overlay shall be the depth to remove the entire thickness of the existing surface layer of the pavement. Removal of existing pavement markings by water blasting, sand blasting, covering with black tape, or spot grinding the pavement marking itself shall not be used.

3.10.03.07.02 Repair of Damaged Pavement

The Design-Builder shall perform pavement repairs of all distressed areas related to the operations of the Project. Distressed areas shall be defined as any medium and high severity distress in existing pavement and any low, medium or high severity level for new construction or reconstruction pavement section. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any damage to the pavement in the Project or adjacent pavements caused by operations of the Design-Builder shall be repaired to the satisfaction of the Administration at the Design-Builder's expense. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the SHA Pavement Design Guide.

In addition, the Design-Builder shall perform patching and other necessary repairs to maintain traffic during all construction operations at no additional expense to the Administration.

3.10.03.08 Performance Criteria

The parameters that will be used to evaluate performance of all constructed pavements for this Project are as follows:

A) Structural capacity;
B) Skid resistance; and
C) Visual Appearance.

These parameters will be evaluated by the Design-Builder in coordination with the Administration, during construction and at Final Administration Acceptance. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities

to minimize disruption to the traffic at no additional cost to Administration.

3.10.03.08.01 Structural Capacity

The structural capacity (thickness and strength) of 100% of all pavement sections shall be evaluated during the design and construction phase through the Design-Builder's Quality Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. The thickness, strength, quality, and proper placement of materials shall be evaluated to ensure compliance with the Design-Builder's Design and Construction Quality Plans. Final Acceptance will require meeting or exceeding the design criteria as well as meeting proper construction requirements. The Design-Builder shall provide documented field evidence and/or data that confirms the design thickness for each pavement layer was achieved after final construction. If the structural capacity is determined to be deficient by the Design-Builder or the Administration, the Design-Builder shall take corrective action at no expense to the Administration.

3.10.03.08.02 Skid Resistance

The Design-Builder shall construct a pavement surface that shall meet or exceed an average friction number of 45 for each travel lane to provide adequate skid resistance for each roadway element. The friction number of the roadway shall be collected and determined in accordance with "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire" (E 274) and "Specification for Standard Rib Tire for Pavement Skid-Resistance Tests" (E 501). The Design-Builder shall be responsible for the friction number data collection. The Design-Builder may elect to request the Administration to collect friction data. If the Design-Builder disputes the friction number collected by the Administration, the Design-Builder must collect the data through other means in accordance with this specification for justification of friction number dispute.

A friction number data test point shall be collected every three tenths of a lane-mile for each travel lane, at a minimum testing frequency. The average of all test points collected for each roadway element shall meet or exceed a friction number of 45 with no single data point falling below 30. Roadway elements with pavements exhibiting values less than an average friction number of 45 or a single data point less than 30 shall require corrective action from the Design-Builder to provide average friction number values that exceeds 45 and is projected to provide that value for at least 5 years into the future. Data collection 5 years into the future shall not be required. The Design-Builder shall provide justification and evidence that the corrective action will provide the friction number of 45 for 5 years into the future. A flexible pavement constructed with a surface layer meeting the requirements of this specification with an approved high polish value aggregate source shall be considered as satisfying the skid resistance performance criteria.

3.10.03.08.03 Visual Appearance

The Design-Builder shall provide a pavement for each roadway element that is visually appealing and free of distress. The pavement surface shall have a consistent color and texture. The Design-Builder shall minimize the number of construction joints. The construction joints that do exist shall be visibly straight and performing as intended. The Design-Builder shall be required to provide a pavement surface that is free of any severity distress. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. A visual survey shall be done on a representative sample of the pavement per D 6433. The Design-Builder shall take corrective action to ensure the visual appearance is in accordance with this specification.

3.10.04 Submittals

All submittals shall be subject to review and approval as per TC Section 3.06.20.1.

TC 3.11 STRUCTURAL DESIGN PERFORMANCE SPECIFICATION

3.11.01 General

Design and construct all structures in accordance with requirements of this specification, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required submittals. The minimum design life for all permanent structures shall be 75 years.

The requirements in this specification apply to the design and construction of temporary and permanent structures, including but not limited to: pipe culverts; box culverts; wing walls and drainage structures.

Massey Branch is located in MD watershed 02-13-01 coastal area and drains to Marshall Creek and then into Newport Bay. Massey Branch is classified as Use I stream according to the Code of Maryland Regulations (COMAR) and in stream construction may not occur during the period of March 1 through June 15, inclusive of any year.

Goody Hill Branch is located in MD watershed 02-13-01 coastal area and drains into Bassett Creek, which in turn drains into Newport Bay (Note: The portion of the stream at the US 113 crossing is also known as Bassett Creek). Goody Hill Branch is classified as Use I stream according to the Code of Maryland Regulations (COMAR) and in stream construction may not occur during the period of March 1 through June 15, inclusive of any year.

Porter Creek is located in MD watershed 02-13-01 coastal area and drains into into Newport Bay. Porter Creek is classified as Use I stream according to the Code of Maryland Regulations (COMAR) and in stream construction may not occur during the period of March 1 through June 15, inclusive of any year.

3.11.02 Guidelines and References

3.11.02.01 Guidelines

Structural and structure hydraulic analysis, design and construction shall be in accordance with this performance specification and the relevant requirements of the following Guidelines listed in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this performance specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It shall be the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed Guideline, including interim revisions, as of the initial publication date of this RFP unless modified by addendum or change order.

TABLE 1

GUIDELINES FOR STRUCTURES

Priority	Author or Agency	Title
1	SHA	Office of Bridge Development, Policy and Procedure Manual
2	SHA	Office of Bridge Development, Structural Standards Manual, Volumes I and II
3	SHA	Special Provisions and Special Provision Inserts to the Standard Specifications
4	SHA	Standard Specifications for Construction and Materials
5	SHA	Office of Bridge Development Manual on Hydrologic and Hydraulic Design
6	SHA	ABSCOUR Program
7	AASHTO	Standard Specifications for Highway Bridges, 17th Edition
8	ACI	Building Code Requirements for Structural Concrete, ACI 318
9	AASHTO/AWS	D1.5M/D1.5: Bridge Welding Code
10	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
11	AASHTO	Roadside Design Guide with errata
12	AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
13	FHWA	FHWA Memorandum, Bridge Rails, Dated August 1986 and updated May 1997
14	AASHTO	Manual on Subsurface Investigations
15	AASHTO	Manual for Condition Evaluation of Bridges
16	SHA	State Highway Administration, Office of Bridge Development Guide for Completing Structure Inventory and Appraisal Input Forms, June 2003.
18	MDE	Code of Maryland Regulations Title 26.08.02 Water Quality
19	MDE	Code of Maryland Regulations Title 26.17.4 Water Management
20	SEI/ASCE	Standard 7-02, Minimum Design Loads for Buildings and Other Structures
21	ACOE	HEC-RAS Software, Version 3.1.3
22	MDE	Maryland's Waterway Construction Guidelines
23	FEMA	Conditional Letter of Map Revision (CLOMR)

3.11.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the structures. These references have no established order of precedence and are not intended to be all-inclusive.

TABLE 2

REFERENCES FOR STRUCTURES

Author or Agency	Title
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
FHWA	Publication No. FHWA-SA-98-074, Driven 1.0 User's Manual
FHWA	Publication No. FHWA-SA-91-048, Laterally Loaded Pile Program
FHWA	Publication No. FHWA-SA-96-038, Geotechnical Engineering Circular No. 2: Earth Retaining Structures
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff 1986
ASTM	Standards in Building Codes
SHA	Standard Specifications for Subsurface Explorations
OSHA	Occupational Safety & Health Administration (OSHA) Standards – 29CFR, Including Parts 1910 and 1926
FEMA	Code of Federal Regulations Title 44, Part 9 and 10

3.11.03 Design Requirements

The design shall use Strength Design Method (Load Factor Design) with service load checks for serviceability. Serviceability checks shall include fatigue, crack control, and deflection limits as applicable. Geotechnical Designs of Foundations shall be made using the Service Load Design Method. Structural Designs of Foundations shall be made using the Service Load Design Method. Design calculations shall be performed in Customary U.S. units. Only Customary U.S. units shall appear on the plans.

3.11.03.01 Structure Hydrology and Hydraulics

3.11.03.01.01 Structure Classification and Design Storm

The State Functional Classification for proposed US 113 is Intermediate Arterial. This classification will remain the same after the highway dualization. This means that the highway should be designed to prevent inundation by a 50-year flood. However, since this is a Federal Aid Project, Federal Highway Administration guidelines shall be used. The design storm will be upgraded to the 100-year storm to comply with FHWA's Functional Classification System, which classifies the highway as a Principal Arterial.

3.11.03.01.02 Existing and Ultimate Conditions Hydrology

The MDE-approved peak discharges for US 113 at Massey Branch are:

Peak Discharges for Massey Branch at US 113		
Frequency (yrs.)	Existing TR-20 (cfs)	Ultimate TR-20 (cfs)
2	127	127
10	280	280
100	625	625

The MDE-approved peak discharges for US 113 at Goody Hill Branch are:

Peak Discharges for Goody Hill Branch at US 113		
Frequency (yrs.)	Existing TR-20 (cfs)	Ultimate TR-20 (cfs)
2	79	79
10	176	176
100	394	394

The MDE-approved peak discharges for US 113 at Porter Creek are:

Peak Discharges for Porter Creek at US 113		
Frequency (yrs.)	Existing TR-20 (cfs)	Ultimate TR-20 (cfs)
2	50	50
10	114	114
100	247	247

3.11.03.01.03 Hydraulic Analysis Issues

3.11.03.01.03.01 Massey Branch Structure:

The Design-Builder is responsible for the following:

A. Hydrology and Hydraulics Analysis Procedures

Phase 2B includes the replacement of the existing US 113 culvert crossing over Massey Branch (Small Structure No. 23071XO) to support the planned US 113 dualization. For this crossing, SHA performed a detailed Hydrology and Hydraulics (H/H) and floodplain characteristic study for the existing condition and for the recommended proposed condition which includes a design recommendation for replacing the existing 2-48 inch reinforced concrete pipe culverts with 3 arch pipes that are longer and extend downstream to accommodate the highway dualization.

The Design-Build Team (DBT) is to decide if the SHA-proposed design option is acceptable for implementation, and if not, develop and secure all approvals for the DBT proposed design (as described below), and complete the final design.

The SHA H/H studies include the following items:

1. The Hydrologic Analysis Report for the existing and ultimate land use conditions. The results of the study have been approved by MDE.
2. A geomorphic assessment of the reach at the crossing location.
3. The Hydraulic Analysis Report for the existing condition, as well as the proposed condition option of extending the existing structure. The results of the study have been approved by MDE.

The above-listed studies and the Office of Bridge Development (OBD) Manual for Hydrologic and Hydraulic Design, has been provided in electronic format on ProjectWise with the Design-Build (DB) contract package.

B. Communication

The DBT is encouraged to work in close cooperation with the OBD to establish and maintain good communication to result in productive work. At a minimum the DBT shall submit the following items for correspondence, communication to SHA:

1. Project schedule complete with design, MDE approval and permitting timeframes.
2. Identification of submission and completion milestones.
3. Plans / protocol for mitigative action for project changes, schedule upsets.
4. Monthly progress reports.

C. Proposed Design Culvert Options

The SHA-proposed hydraulics model for the option of replacing the existing structure was based upon the best current information available along with visual inspections of the existing structure by the OBD. The SHA structure hydraulics were analyzed utilizing peak flow discharges developed in the above-referenced hydrologic study and to address the project geomorphic assessment in the above-referenced report. For any hydraulic analyses or new design, the DBT shall also utilize the project study hydrology and address items identified in the geomorphologic assessment report. The following options for culvert improvements should be considered by the DBT with one selected for execution:

a) Utilize the proposed culvert design extension option as studied by SHA.
b) Disregard the previously approved SHA design, change the proposed structure design and prepare a new proposed design condition Hydraulic Study.

For option “a”, a revised proposed condition Hydraulic Study would not be required.

For option “b” a detailed proposed condition Hydraulic Study would be required

to be prepared by the DBT.

For either of the above options, "a" or "b", a Hydrology and Hydraulics Data Plan Sheet shall be completed, in conformance with the OBD Manual for Hydrologic and Hydraulic Design, and to summarize the results for hydrologic, hydraulic, geomorphic, and scour analysis.

D. Requirements for DBT Development of a New Proposed Design

The DBT's Hydraulic Study and Hydraulic Analysis Report prepared for a revised proposed option shall include hydraulic design computations performed according to the OBD Manual for Hydrologic and Hydraulic Design. Detailed discussions and guidance relating to hydraulic design procedures are contained in Chapters 9, 10, and 13 of the OBD Manual for Hydrologic and Hydraulic Design. The DBT designer is referred to Chapter 3, Reference (a), to review the checklist of items to be considered in the development and hydraulic analysis of alternative designs.

The Hydraulic Analysis Report for the new design shall contain the completed text, exhibits, summary tables, computer output data, and other technical information, as provided in the SHA-developed report discussed above, that has been revised in conformance with the review comments of the SHA. Computer CD's containing full input and output data from computer programs and word processor files for the final report that include all text, pictures, maps and exhibits, shall also be included with the new proposed Hydraulic Analysis Report. The format and content of report shall be prepared in conformance with the instructions in the OBD Manual for Hydrologic and Hydraulic Design and any other instructions from the SHA's Project Team. The DBT shall utilize the SHA-developed existing condition hydraulics and compare their new proposed design conditions to determine the impacts the proposed project would have on the hydraulic characteristics such as water surface elevations, flow velocities, Froude numbers and shear stress in the channel.

All DBT study reports shall be self-contained documents to the extent practicable. When necessary, reference may be made to outside sources of information used by the DBT in their preparation of data or exhibits for the reports. All references shall be clearly stated, listed and described as related to the Hydraulic Analysis Report. All the pages within the report shall be numbered, dated and shall be placed in an 8 ½-inch by 11-inch, three-hole binder.

Upon completion of the Hydraulic Analysis Report for the new design, the DBT shall submit the report to SHA's Structure Hydrology and Hydraulics Unit for review and concurrence prior to submittal to MDE. The DBT shall submit the Hydraulic Analysis Report for the new design to MDE for review and approval and copy SHA. Upon approval from MDE, the DBT shall provide two copies of the final, approved report, files on CD, and the notification of the MDE approval to the OBD Structure Hydrology and Hydraulics Unit.

E. Scour Requirements

With exception to permitting requirements (discussed below), a scour analysis shall not be required if the previous SHA-prepared and MDE-approved design option (aforementioned option "a") is utilized. Any other design option, new design proposed by the DBT, shall include a detailed scour analysis dependent on culvert structure type and in conformance with Chapter 11 of the OBD Manual for Hydrologic and Hydraulic Design, unless waived by SHA.

Inlet and outlet scour protection, may be required for any design option (SHA original design or any new design by the DBT) if it is necessary as a permit condition, environmental commitment, or to meet regulations as set forth in MDE regulation COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains" concerning inlet and outlet velocities and froude numbers.

F. Current guidance to perform the required studies

1. Office of Bridge Development Manual for Hydrologic and Hydraulic Design, (September, 2006, attached)
2. Hydrologic Analysis Report, Massey Branch at US 113 Crossing Small Structure No. 23071XO, Worcester County, Maryland, FMIS No. WO635B21, performed for the SHA by SAAD Consultants, PC (December 2003, attached)
3. Hydraulic Analysis Report, Massey Branch at US 113 Crossing Small Structure No. 23071XO, Worcester County, Maryland, FMIS No. WO636B21, performed by the SHA (March 2006, attached)
4. Visual Field and Preliminary Geomorphic Assessment of US 113 over Massey Branch, prepared by SHA (August 24, 2004, attached)
5. US Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) Software, Version 3.1.3 (May 2005) *, Davis California
6. MDE Regulations COMAR 26.17.04, "Construction on Nontidal Wetlands and Floodplains.

G. HEC-RAS Software Application Version

The SHA hydraulic analysis was developed using HEC-RAS Version 3.1.2 (April 2004). If the DBT chooses to use another, more recent version of HEC-RAS, such as Version 3.1.3 (May 2005) or Version 4.0 (November 2006), the DBT is responsible for relative water surface elevations and depths developed in the SHA design. Based on the level of resultant data changes associated with using a different software version, the DBT analysis may require reestablishment of the SHA-developed existing condition HEC-RAS as well as the proposed design HEC-RAS.

3.11.03.01.03.02 Goody Hill Branch Structure:

The Design-Builder is responsible for the following:

A. Hydrology and Hydraulics Analysis Procedures

Phase 2B includes the replacement or extension of the existing US 113 culvert crossing over Goody Hill Branch (Small Structure No. 23074XO) to support the

planned US 113 dualization. (Note: the portion of the stream at the US 113 crossing is also known as Basset Creek). For this crossing, SHA performed a detailed Hydrology and Hydraulics (H/H) and floodplain characteristic study for the existing condition and for the recommended proposed condition which includes a design recommendation for extending the existing box culvert upstream to accommodate the highway dualization.

The Design-Build Team (DBT) is to decide if the SHA-proposed design option is acceptable for implementation, and if not, develop and secure all approvals for the DBT proposed design (as described below), and complete the final design.

The SHA H/H studies include the following items:

1. The Hydrologic Analysis Report for the existing and ultimate land use conditions. The results of the study have been approved by MDE.
2. A geomorphic assessment of the reach at the crossing location.
3. The Hydraulic Analysis Report for the existing condition, as well as the proposed condition option of extending the existing structure. The results of the study have been approved by MDE.

The above-listed studies and the Office of Bridge Development (OBD) Manual for Hydrologic and Hydraulic Design, has been provided in electronic format on ProjectWise with the Design-Build (DB) contract package.

B. Communication

The DBT is encouraged to work in close cooperation with the OBD to establish and maintain good communication to result in productive work. At a minimum the DBT shall submit the following items for correspondence, communication to SHA:

1. Project schedule complete with design, MDE approval and permitting timeframes
2. Identification of submission and completion milestones
3. Plans / protocol for mitigative action for project changes, schedule upsets
4. Monthly progress reports

C. Proposed Design Culvert Options

The SHA-proposed hydraulics model for the option of extending the existing structure was based upon the best current information available, visual inspections of the existing structure by the OBD, and the observation that the structure is in sound structural condition. The SHA structure hydraulics were analyzed utilizing peak flow discharges developed in the above-referenced hydrologic study and to address the project geomorphic assessment in the above-referenced report. Upon award of the contract, the DBT shall confirm the structure condition assumption by performing a detailed inspection of the existing box culvert structure. For any hydraulic analyses or new design, the DBT shall also utilize the project study

hydrology and address items identified in the geomorphologic assessment report. The following options for culvert improvements should be considered by the DBT with one selected for execution:

a) Perform an inspection of the existing structure to verify that the structure is in "sound" condition, and can be extended as proposed. If the structure can be extended, utilize the culvert extension option as studied by SHA.
b) If the culvert can not be extended as designed by SHA, prepare a new proposed design condition Hydraulic Study.
c) Disregard the previously approved SHA design regardless of the condition of the existing structure, change the proposed structure design and prepare a new proposed design condition Hydraulic Study.

For option "a", a revised proposed condition Hydraulic Study would not be required.

For options "b" and "c", a detailed proposed condition Hydraulic Study would be required to be prepared by the DBT.

For any of the above options, "a", "b" or "c", a Hydrology and Hydraulics Data Plan Sheet shall be completed, in conformance with the OBD Manual for Hydrologic and Hydraulic Design, and to summarize the results for hydrologic, hydraulic, geomorphic, and scour analysis.

D. Requirements for DBT Development of a New Proposed Design

The DBT's Hydraulic Study and Hydraulic Analysis Report prepared for a revised proposed option shall include hydraulic design computations performed according to the OBD Manual for Hydrologic and Hydraulic Design. Detailed discussions and guidance relating to hydraulic design procedures are contained in Chapters 9, 10, and 13 of the OBD Manual for Hydrologic and Hydraulic Design. The DBT designer is referred to Chapter 3, Reference (a), to review the checklist of items to be considered in the development and hydraulic analysis of alternative designs.

The Hydraulic Analysis Report for the new design shall contain the completed text, exhibits, summary tables, computer output data, and other technical information, as provided in the SHA-developed report discussed above, that has been revised in conformance with the review comments of the SHA. Computer CD's containing full input and output data from computer programs and word processor files for the final report that include all text, pictures, maps and exhibits, shall also be included with the new proposed Hydraulic Analysis Report. The format and content of report shall be prepared in conformance with the instructions in the OBD Manual for Hydrologic and Hydraulic Design and any other instructions from the SHA's Project Team. The DBT shall utilize the SHA-developed existing condition hydraulics and compare their new proposed design conditions to determine the impacts the proposed project would have on the hydraulic characteristics such as water surface elevations, flow velocities, Froude numbers and shear stress in the channel.

All DBT study reports shall be self-contained documents to the extent practicable. When necessary, reference may be made to outside sources of information used by the DBT in their preparation of data or exhibits for the reports. All references shall be clearly stated, listed and described as related to the Hydraulic Analysis Report. All the pages within the report shall be numbered, dated and shall be placed in an 8 ½-inch by 11-inch, three-hole binder.

Upon completion of the Hydraulic Analysis Report for the new design, the DBT shall submit the report to SHA's Structure Hydrology and Hydraulics Unit for review and concurrence prior to submittal to MDE. The DBT shall submit the Hydraulic Analysis Report for the new design to MDE for review and approval and copy SHA. Upon approval from MDE, the DBT shall provide two copies of the final, approved report, files on CD, and the notification of the MDE approval to the OBD Structure Hydrology and Hydraulics Unit.

E. Scour Requirements

With exception to permitting requirements (discussed below), a scour analysis shall not be required if the previous SHA-prepared and MDE-approved design option (aforementioned option "a" above) is utilized. Any other design option, new design proposed by the DBT, shall include a detailed scour analysis dependent on culvert structure type and in conformance with Chapter 11 of the OBD Manual for Hydrologic and Hydraulic Design, unless waived by SHA.

Inlet and outlet scour protection, may be required for any design option (SHA original design or any new design by the DBT) if it is necessary as a permit condition, environmental commitment, or to meet regulations as set forth in MDE regulation COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains" concerning inlet and outlet velocities and froude numbers.

F. Current guidance to perform the required studies

1. Office of Bridge Development Manual for Hydrologic and Hydraulic Design, (September, 2006, attached)
2. Hydrologic Analysis Report, Goody Hill Branch at US 113 Crossing Small Structure No. 23074XO, Worcester County, Maryland, FMIS No. WO634B21, performed for the SHA by SAAD Consultants, PC (December 2003, attached)
3. Hydraulic Analysis Report, Goody Hill Branch at US 113 Crossing Small Structure No. 23074XO, Worcester County, Maryland, FMIS No. WO634B21, performed by the SHA (May 2005, attached)
4. Visual Field and Preliminary Geomorphic Assessment of US 113 over Goody Hill Branch, prepared by SHA (September 21, 2004, attached)
5. US Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) Software, Version 3.1.3 (May 2005) *, Davis California
6. MDE Regulations COMAR 26.17.04, "Construction on Nontidal Wetlands and Floodplains.

G. HEC-RAS Software Application Version

The SHA hydraulic analysis was developed using HEC-RAS Version 3.1.2 (April 2004). If the DBT chooses to use another, more recent version of HEC-RAS, such as Version 3.1.3 (May 2005) or Version 4.0 (November 2006), the DBT is responsible for relative water surface elevations and depths developed in the SHA design. Based on the level of resultant data changes associated with using a different software version, the DBT analysis may require reestablishment of the SHA-developed existing condition HEC-RAS as well as the proposed design HEC-RAS.

3.11.03.01.03.03 Porter Creek Structure:

The Design-Builder is responsible for the following:

H. Hydrology and Hydraulics Analysis Procedures

Phase 2B includes the replacement or extension of the existing US 113 culvert conveying Porter Creek (Small Structure No. 23073X0) to support the planned US 113 dualization. For this crossing, SHA performed a detailed Hydrology and Hydraulics (H/H) and floodplain characteristic study for the existing condition and for the recommended proposed condition which includes a design recommendation for extending the existing dual-cell 54-inch RCP culverts downstream to accommodate the highway dualization.

The DBT is to decide if the SHA-proposed design option is acceptable for implementation, and if not, develop and secure all approvals for the DBT proposed design (as described below), and complete the final design.

The SHA H/H studies include the following items:

1. The Hydrologic and Hydraulic Analysis Report for the existing and ultimate land use conditions, the existing and proposed conditions hydraulic performance of the crossing and a brief assessment of the geomorphology at the crossing. The results of the study have been approved by MDE.

The above-listed studies and the OBD Manual for Hydrologic and Hydraulic Design, has been provided in electronic format on ProjectWise with the DB contract package.

I. Communication

The DBT is encouraged to work in close cooperation with the OBD to establish and maintain good communication to result in productive work. At a minimum the DBT shall submit the following items for correspondence/communication to SHA:

1. Project schedule complete with design, MDE approval and permitting timeframes
2. Identification of submission and completion milestones
3. Plans / protocol for mitigative action for project changes, schedule upsets
4. Monthly progress reports

J. Proposed Design Culvert Options

The SHA-proposed hydraulics model for the option of extending the existing structure was based upon the best current information available, visual inspections of the existing structure by the OBD, and the observation that the structure is in sound structural condition. The SHA structure hydraulics were analyzed utilizing peak flow discharges developed in the above-referenced study and to address the project geomorphic assessment in the above-referenced report. Upon award of the contract, the DBT shall confirm the structure condition assumption by performing a detailed inspection of the existing dual-cell 54-inch RCP culvert structure. For any hydraulic analyses or new design, the DBT shall also utilize the project study hydrologic/hydraulic analysis. The following options for culvert improvements should be considered by the DBT with one selected for execution:

a. Perform an inspection of the existing structure to verify that the structure is in "sound" condition, and can be extended as proposed. If the structure can be extended, utilize the culvert extension option as studied by SHA.
b. If the culvert can not be extended as designed by SHA, prepare a new proposed design condition Hydraulic Study.
c. Disregard the previously approved SHA design regardless of the condition of the existing structure, change the proposed structure design and prepare a new proposed design condition Hydraulic Study.

For option "a", a revised proposed condition Hydraulic Study would not be required.

For options "b" and "c", a detailed proposed condition Hydraulic Study would be required to be prepared by the DBT.

For any of the above options, "a", "b" or "c", a Hydrology and Hydraulics Data Plan Sheet shall be completed, in conformance with the OBD Manual for Hydrologic and Hydraulic Design, and to summarize the results for hydrologic, hydraulic, geomorphic, and scour analysis.

K. Requirements for DBT Development of a New Proposed Design

The DBT's Hydraulic Study and Hydraulic Analysis Report prepared for a revised proposed option shall include hydraulic design computations performed according to the OBD Manual for Hydrologic and Hydraulic Design. Detailed discussions and guidance relating to hydraulic design procedures are contained in Chapters 9, 10, and 13 of the OBD Manual for Hydrologic and Hydraulic Design. The DBT designer is referred to Chapter 3, Reference (a), to review the checklist of items to be considered in the development and hydraulic analysis of alternative designs.

The Hydraulic Analysis Report for the new design shall contain the completed text, exhibits, summary tables, computer output data, and other technical information, as provided in the SHA-developed report discussed above, that has been revised in conformance with the review comments of the SHA. Computer CD's containing full input and output data from computer programs and word processor files for the final report that include all text, pictures, maps and exhibits, shall also be included with the new proposed Hydraulic Analysis Report. The

format and content of report shall be prepared in conformance with the instructions in the OBD Manual for Hydrologic and Hydraulic Design and any other instructions from the SHA's Project Team. The DBT shall utilize the SHA-developed existing condition hydraulics and compare their new proposed design conditions to determine the impacts the proposed project would have on the hydraulic characteristics such as water surface elevations, flow velocities, Froude numbers and shear stress in the channel.

All DBT study reports shall be self-contained documents to the extent practicable. When necessary, reference may be made to outside sources of information used by the DBT in their preparation of data or exhibits for the reports. All references shall be clearly stated, listed and described as related to the Hydraulic Analysis Report. All the pages within the report shall be numbered, dated and shall be placed in an 8 ½-inch by 11-inch, three-hole binder.

Upon completion of the Hydraulic Analysis Report for the new design, the DBT shall submit the report to SHA's Structure Hydrology and Hydraulics Unit for review and concurrence prior to submittal to MDE. The DBT shall submit the Hydraulic Analysis Report for the new design to MDE for review and approval and copy SHA. Upon approval from MDE, the DBT shall provide two copies of the final, approved report, files on CD, and the notification of the MDE approval to the OBD Structure Hydrology and Hydraulics Unit.

L. Scour Requirements

With exception to permitting requirements (discussed below), a scour analysis shall not be required if the previous SHA-prepared and MDE-approved design option (aforementioned option "a" above) is utilized. Any other design option, new design proposed by the DBT, shall include a detailed scour analysis dependent on culvert structure type and in conformance with Chapter 11 of the OBD Manual for Hydrologic and Hydraulic Design, unless waived by SHA.

Inlet and outlet scour protection, may be required for any design option (SHA original design or any new design by the DBT) if it is necessary as a permit condition, environmental commitment, or to meet regulations as set forth in MDE regulation COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains" concerning inlet and outlet velocities and froude numbers.

M. Current guidance to perform the required studies

1. Office of Bridge Development Manual for Hydrologic and Hydraulic Design, (September, 2006, attached)
2. Hydrologic and Hydraulic Analysis Report, U.S. Route 113 Culverts at Porter Creek and Wetland 20, Worcester County, Maryland, FMIS No. WO634B21, performed for the SHA by Parsons, Brinckerhoff, Quade & Douglas, Inc. (Revised April 2004, attached)
3. US Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) Software, Version 3.1.3 (May 2005) *, Davis California
4. MDE Regulations COMAR 26.17.04, "Construction on Nontidal Wetlands

and Floodplains.

N. HEC-RAS Software Application Version

The SHA hydraulic analysis was developed using HEC-RAS Version 3.1.2 (April 2004). If the DBT chooses to use another, more recent version of HEC-RAS, such as Version 3.1.3 (May 2005) or Version 4.0 (November 2006), the DBT is responsible for relative water surface elevations and depths developed in the SHA design. Based on the level of resultant data changes associated with using a different software version, the DBT analysis may require reestablishment of the SHA-developed existing condition HEC-RAS as well as the proposed design HEC-RAS.

3.11.03.01.04 Hydraulic Requirements and Issues

3.11.03.01.04.01 Massey Branch Structure

Design-Builder is also responsible for the following:

A. Construction of the three arch-pipe culvert. The new main arch pipe and 2 side arch pipes shall be constructed with upstream inverts and slopes that meet the SHA-proposed design. The SHA-proposed center arch culvert slope and inverts are established to maintain the existing condition flow characteristics relative to fish passage consideration.

B. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for the protection, preservation and mitigation (if applicable) of the existing wetlands.

C. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for stream geomorphology.

D. Riprap blanket at the culvert entrance and outlet meeting SHA-design requirements. The riprap blanket shall be buried to avoid flow blockage and to create favorable flow conditions for fish passage.

E. Locating the proposed culvert wing walls in conformance with SHA design, to provide smooth flow transitions, and assuring that the downstream and upstream channel banks are protected from erosion.

F. Reconstructing the scour hole downstream of the culvert as proposed in the SHA design.

G. Remove, if required, the existing meander upstream of the culvert addressing the recommendations in the SHA design.

H. Ensuring that no other revisions have been made to the culvert or road design that would affect the hydraulic model results. Any revisions to the hydraulics shall be analyzed with respect to the SHA-design and in accordance with Section 3.11.03.01.03 and submitted for MDE re-approval. The DBT shall submit

changes to the hydraulic analysis and related MDE or FEMA reports to the SHA for review prior to submissions to MDE and FEMA.

I. The development of the Hydrology and Hydraulics Data Sheet.

J. Securing, if necessary, a FEMA Conditional Letter of Map Revision (CLOMR) described in Section 3.11.03.01.06.

K. As-built survey following the completion of construction.

L. The Design-Builder is responsible for preservation and maintenance of stream flow at Massey Branch during and after construction. All provisions shall be designed and implemented per Maryland's Waterway Construction Guidelines. The Design-Builder shall assure that dewatering diversions are adequately sized to handle the two-year storm event. If this is deemed infeasible by the DBT, then alternate provision to assure protection of water quality and prevent damage to property both upstream and downstream shall be made. These provisions shall be approved by both SHA and MDE prior to implementation.

3.11.03.01.04.02 Goody Hill Structure

Design-Builder is also responsible for the following:

A. Construction of the box culvert. The box culvert extension shall be constructed with the same dimensions as the existing box culvert (14 foot wide by 6 foot high). The upstream inverts and slope shall meet the SHA-proposed design and the downstream inside of the culvert extension shall meet and be flush with the inside of the existing culvert providing a smooth hydraulic transition. The SHA-proposed box culvert extension slope and upstream invert are established to maintain the existing condition flow characteristics relative to fish passage consideration.

B. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for the protection, preservation and mitigation (if applicable) of the existing wetlands.

C. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for stream geomorphology.

D. Riprap blanket at the culvert entrance and outlet meeting SHA-design requirements.

E. Locating the proposed box culvert wing walls in conformance with SHA design, to provide smooth flow transitions, and assuring that the downstream and upstream channel banks are protected from erosion.

F. Ensuring that no other revisions have been made to the culvert or road design that would affect the hydraulic model results. Any revisions to the hydraulics shall be analyzed with respect to the SHA-design and in accordance with Section 3.11.03.01.03 (above) and submitted for MDE re-approval. The DBT shall submit changes to the hydraulic analysis and related MDE or FEMA reports to the SHA for review prior to submissions to MDE and FEMA.

G. Relocating, if necessary, the USGS gauging station, 01484719, "Bassett Creek Near Ironshire", located at the project site.

H. The development of the Hydrology and Hydraulics Data Sheet.

I. Securing, if necessary, a FEMA Conditional Letter of Map Revision (CLOMR) described in Section 3.11.03.01.06.

J. As-built survey following the completion of construction.

K. The Design-Builder is responsible for preservation and maintenance of Stream Flow at Goody Hill Branch during and after construction. All provisions shall be designed and implemented per Maryland's Waterway Construction Guidelines. The Design-Builder shall assure that dewatering diversions are adequately sized to handle the two-year storm event. If this is deemed infeasible by the DBT, then alternate provision to assure protection of water quality and prevent damage to property both upstream and downstream shall be made. These provisions shall be approved by both SHA and MDE prior to implementation.

3.11.03.01.04.03 Porter Creek Structure

Design-Builder is also responsible for the following:

a. Extension of the dual-cell 54-inch RCP culvert, downstream. The 80-foot long culvert extension shall be constructed with the same dimensions as the existing RCP culvert (54-inch). The upstream inverts of the extension shall meet existing downstream inverts and the extension shall maintain the existing slope (4 %) in order to meet the SHA-proposed design such that the inside of the culvert extension shall meet and be flush with the inside of the existing culvert providing a smooth hydraulic transition. The SHA-proposed RCP culvert extension slope and upstream invert are established to maintain the existing condition flow characteristics.

b. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for the protection, preservation and mitigation (if applicable) of the existing wetlands.

c. The culvert (whether SHA-designed or new design by the DBT) shall meet all SHA-design and regulatory requirements for stream geomorphology.

~~d.~~ Riprap blanket at the culvert entrance and outlet meeting SHA-design requirements.

e. Locating the proposed culvert headwall in conformance with SHA design, to provide smooth flow transitions, and assuring that the downstream and upstream channel banks are protected from erosion.

f. Ensuring that no other revisions have been made to the culvert or road design that would affect the hydraulic model results. Any revisions to the hydraulics shall be analyzed with respect to the SHA-design and in accordance with Section 3.11.03.01.03 (above) and submitted for MDE re-approval. The DBT shall submit

changes to the hydraulic analysis and related MDE reports to the SHA for review prior to submissions to MDE.

g. The development of the Hydrology and Hydraulics Data Sheet.

h. As-built survey following the completion of construction.

i. The Design-Builder is responsible for preservation and maintenance of Stream Flow at Porter Creek during and after construction. All provisions shall be designed and implemented per Maryland's Waterway Construction Guidelines. The Design-Builder shall assure that dewatering diversions are adequately sized to handle the two-year storm event. If this is deemed infeasible by the DBT, then alternate provision to assure protection of water quality and prevent damage to property both upstream and downstream shall be made. These provisions shall be approved by both SHA and MDE prior to implementation.

3.11.03.01.05 MDE Hydraulics

Major drainage structures shall be located and designed in accordance with the Office of Bridge Development Manual on Hydrologic and Hydraulic Design and MDE regulation COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains". Major drainage structures shall generally be considered to be all bridges and any pipe or culvert greater than 84" in diameter or with an equivalent hydraulic opening. The SHA proposed culvert for this project located at Massey Branch (consists of three (3) structural plate pipes arches: center pipe of 10-foot 11-inch; Left pipe of 64-inch by 43-inch; Right pipe of 64-inch by 43-inch. The proposed culvert at Goody Hill Branch for this project is a 14 foot wide by 6 foot high box culvert. The proposed culvert at Porter Creek for this project is an 80- foot extension of dual-cell 54-inch RCP culvert. The exact structures covered by this section shall be determined jointly by the DBT and the SHA.

3.11.03.01.06 FEMA Hydraulics and CLOMR Requirements

3.11.03.01.06.01 Massey Branch

A. FEMA Floodplain Designation

Massey Branch, downstream of the proposed crossing at US 113, is designated as being in "Zone B" of the FEMA Special Flood Hazard Area (SFHA) floodplain, as shown on the Flood Insurance Rate Map (FIRM) for Worcester County, Maryland, Community-Panel Number 240083 0095 C, dated June 16, 1992. The downstream reach to US 113 is comprised by a detailed hydraulic study. Massey Branch, upstream of the proposed crossing at US 113, is designated as being in "Zone A" of the FEMA Special Flood Hazard Area (SFHA) floodplain, not having BFEs.

B. FEMA Floodplain Map Change Requirements

Whether implementing the SHA-proposed or new design by the DBT, the

proposed culvert construction for US 113 over Massey Branch crossing will have an impact on the FEMA-regulated 1-percent annual chance floodplain limits and water surface. The SHA-proposed design shows a decrease in the BFE water surface upstream of the culvert ranging from 0.01 feet to 3.64 feet lower than existing. The SHA-proposed design shows a slight increase in the BFE water surface downstream of the culvert with a maximum rise of 0.25 feet. Any new proposed design prepared by the DBT shall target similar floodplain elevation changes with consideration of regulatory approval and permitting requirements.

The proposed US 113 improvements at the Massey Branch crossing may require a FEMA NFIP permit to address the project's impact on the FEMA SFHA, such as a FEMA Floodplain Conditional Letter of Map Revision (CLOMR). The DBT, if necessary, shall prepare the FEMA permit, or CLOMR, in conformance with all applicable regulations and codes, including Federal Emergency Management Agency, Code of Federal Regulations Title 44 (Emergency Management Assistance), Parts 9, 10 and Part 72—Procedures and Fees for Processing Map Changes. The DBT shall coordinate with SHA throughout the duration of submitting and securing and meeting all subsequent requirements of the required FEMA permit. The DBT shall provide SHA with copies of the permit submission, approval and all related documents.

3.11.03.01.06.02 Goody Hill Branch

A. FEMA Floodplain Designation

Goody Hill Branch, downstream of the proposed crossing at US 113, is designated as being in Flood Zone A12 (El. 7 NAVD88) of the FEMA Special Flood Hazard Area (SFHA) floodplain, as shown on the FEMA Flood Insurance Rate Map (FIRM) for Worcester County, Maryland, Community-Panel Number 240083 0095 C, dated June 16, 1992. The Goody Hill Branch reach upstream of the US Route 13 crossing is not located in a FEMA-regulated floodplain.

B. FEMA Floodplain Map Change Requirements

Whether implementing the SHA-proposed or new design by the DBT, the proposed culvert construction for US 113 over Goody Hill Branch crossing will have an impact on the FEMA-regulated 1-percent annual chance floodplain limits and water surface. The SHA-proposed design water surface change is less than a 1.0 feet rise (maximum of 0.11 feet). Any new proposed design prepared by the DBT shall target similar floodplain elevation changes with consideration of regulatory approval and permitting requirements.

The proposed US 113 improvements at the Goody Hill Branch crossing may require a FEMA NFIP permit to address the project's impact on the FEMA SFHA, such as a FEMA Floodplain Conditional Letter of Map Revision (CLOMR). The DBT, if necessary, shall prepare the FEMA permit, or CLOMR, in conformance with all applicable regulations and codes, including Federal Emergency Management Agency, Code of Federal Regulations Title 44 (Emergency Management Assistance), Parts 9, 10 and Part 72—Procedures and

Fees for Processing Map Changes. The DBT shall coordinate with SHA throughout the duration of submitting and securing and meeting all subsequent requirements of the required FEMA permit. The DBT shall provide SHA with copies of the permit submission, approval and all related documents.

3.11.03.01.06.03 Porter Creek

A. FEMA Floodplain Designation

Porter Creek, downstream of the proposed crossing at US 113, is designated as being in "Zone B" of the FEMA Special Flood Hazard Area (SFHA) floodplain, as shown on the FEMA Flood Insurance Rate Map (FIRM) for Worcester County, Maryland, Community-Panel Number 240083 0095 C, dated June 16, 1992. The Porter Creek reach upstream of the US Route 13 crossing is not located in a FEMA-regulated floodplain.

B. FEMA Floodplain Map Change Requirements

Whether implementing the SHA-proposed or new design by the DBT, the proposed culvert construction for US 113 over Massey Branch crossing will not have an impact on the FEMA-regulated 1-percent annual chance floodplain limits and water surface. Any new proposed design prepared by the DBT shall re-evaluate floodplain elevation changes and downstream impacts with consideration of regulatory approval and permitting requirements.

The proposed US 113 improvements at the Porter Creek crossing does not require a FEMA NFIP permit to address the project's impact on the FEMA SFHA, such as a FEMA Floodplain Conditional Letter of Map Revision (CLOMR).

3.11.03.02 Loads and Forces

All loads and forces applied to structures shall be in accordance with AASHTO Standard Specifications for Highway Bridges, 17th Edition (AASHTO) except as modified below.

3.11.03.02.01 Dead Loads

Design loads shall be in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum D-89-40(4).

3.11.03.02.02 Live Loads

Design loads shall be in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum D-89-40(4).

3.11.03.02.03 Construction Loads

Where the Design-Builder during construction anticipates passing truck traffic in excess of the design load over structures designed and constructed under this Project, the structure shall be designed for the higher truck load. The Inventory and Operating Rating Factors shall be greater than 1.0 for the higher truck load. The Design-Builder shall receive written concurrence from the Administration before developing a design using a

live load in excess of that specified in 3.11.03.02.02.

3.11.03.03 Load Rating

Initial inventory and operating load rating for the controlling vehicle shall be provided on the plans in the general notes. The Inventory and Operating Rating factors for all vehicles shall be greater than 1.0. Consider the following vehicles using Load Factor Rating:

A. HS-25;

B. H-20;

C. Maryland T-3; and

D. 150-kip Permit Load Vehicle. This vehicle shall consist of 8 axles with loads of 8 kips, 26 kips, 26 kips, and five axles each with 18 kips. These axles shall be spaced at 11'-0", 4'-0", 30'-0" and 4 equal spaces of 4'-0" respectively. Only the Operating Rating Factor is required to be greater than 1.0 for this vehicle.

3.11.03.04 Materials

3.11.03.04.01 Foundations

A. Piling

1) Steel H piles shall conform to conform to A 36, Grade 36 or A 709, Grade 50 Steel.

2) Timber piles shall conform to Section 907.01 of the Administrations Standard Specifications for Construction and Materials.

3) Steel pipe piles shall conform to A252, Grade 3 steel (Fy = 45,000 psi.).

4) Concrete for steel pipe piles shall conform to Mix No. 3 with a slump range of 4-6 inches in accordance with Section 902.10 of the Administrations Standard Specifications for Construction and Materials.

5) Reinforcement for steel pipe piles shall conform to Section 908.01 of the Administrations Standard Specifications for Construction and Materials.

B. Drilled shaft materials shall conform to Section 412 of the Administrations Standard Specifications for Construction and Materials.

3.11.03.04.02 Structural Steel

A. Steel sheet piling shall conform to A328.

B. All bolts shall conform to M164.

3.11.03.04.03 Concrete

A. Concrete for box culvert top slab shall be normal weight Mix No. 6 (4500 psi) concrete when minimum depth of fill at the headwall is less than 18 inches.

B. Concrete for box culvert top slab shall be normal weight Mix No. 3 (3500 psi) concrete when minimum depth of fill at the headwall is greater than 18 inches or greater.

C. Concrete for footings and substructure units shall be normal weight Mix No. 3 (3500 psi) concrete.

D. Subfoundation concrete shall be normal weight Mix No. 4 (3500 psi) concrete.

E. Concrete for retaining walls shall be normal weight Nix No. 3 (3500 psi) concrete.

F. The use of lightweight concrete for structures is prohibited on this Project.

3.11.03.04.04 Reinforcement Steel

A. All reinforcement steel bars shall conform to 908.01.

B. All Welded Wire Fabric (WWF) reinforcing shall conform to 908.05.

C. All Epoxy coated reinforcement steel bars and WWF shall conform to Section 917.02 of the Administration's Standard Specification for Construction and Materials and shall be used at the following locations:

1. Box culvert headwalls; and
2. Top mat of the top slab, including truss bars and any reinforcement extending into the top of the top slab, for box culverts with less than 1'-6" of cover.
3. Parapet Portion of Retaining Walls.
4. Portions of Retaining Walls located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.

D. Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

LOCATION	CLEAR COVER
Top of Box Culvert Slabs Built to Grade	2-1/2 in.
Box Culvert Slab Not Built to Grade	2 in.
Toewall – Top, Bottom and Sides	3 in.
Culvert Bottom Slab – Bottom	3 in.
Footings – Bottom and Sides	3 in.
All Other Locations – Main Reinforcement	2 in.
All Other Locations – Stirrups	2 in.
Precast Concrete Elements	1-1/2 in.

E. Welding of reinforcement steel is prohibited.

F. Box culvert shall be designed to allow the reinforcing steel in the top mat to be laid out parallel to the headwalls or perpendicular with the culvert sidewalls when using a headwall edge beam.

G. Mechanical rebar couplers may be used.

3.11.03.04.05 Pipes

A. Reinforced concrete pipes, corrugated steel pipe, and corrugated metal pipes shall conform to section 905.01 of the Administrations Standard Specifications for Construction and Materials.

B. The corrugated steel and corrugated metal pipes shall have a minimum gage of 8.

3.11.03.05 Aesthetics

No special aesthetic treatments are required for the culvert headwalls and wing walls in this Contract.

3.11.03.06 Structural Plate Arch Culvert

The structure (listed below) covered under this Section is the replacement of the existing 48”ϕ concrete pipes with a structural plate arch culvert. Concept Plans for the structure are included with the RFP and contain site restrictions and other project commitments. Any notes containing the word “shall” on The Concept Plans shall be considered Directive and must be incorporated by the Design-Builder. The structural plate arch culvert is based on an alignment developed during preliminary studies and may vary according to the final documents developed by the Design-Build Team. If the Design-Build Team proposes to eliminate or introduce new structures, the proposed changes shall be submitted in writing to the Administration’s Office of Bridge Development for review and development of any site-specific requirements beyond those provided by the Design-Build Team. All design elements of this project shall be the responsibility of the Design-Build Team.

Structure S1: Structure No. 23071X0, US 113 over Massey Branch. Existing Structure No. 23071X0, dual 48”ϕ concrete pipes located approximately between Stations 1646+50 and 1647+50, shall be replaced as part of the dualizing of US 113. The existing structure shall be replaced by a new structure located east of the existing structure. For geometric design criteria, refer to TC 3.11.03.06.01. Only structural plate arch culvert flanked on each side by corrugated metal pipes shall be considered for the replacement structure unless the requirements of TC 3.11.03.06 and 3.11.03.01 are satisfied. If headwalls and wing walls are incorporated into this structure only cast-in-place concrete culvert headwalls and wing walls shall be considered. The proposed structural plate arch culvert shall be constructed on a pile (driven) foundation or a shallow foundation. For additional foundation requirements, refer to TC 3.11.03.06.02.

3.11.03.06.01 Geometry

Structural plate arch culvert requirements (typical sections and horizontal dimensions) are shown on the Concept Plans. The Design-Builder shall adhere to the minimum horizontal dimensions shown on the Concept Plans and the minimum vertical clearances specified herein for the structural plate arch culvert. The Typical Section dimensions represent the desired structure configuration; structures on horizontal roadway curves or other roadway alignment features may require a wider structure. The Design-Builder shall be responsible for determination of the final structure size, clearances, geometry and details that meet or exceed the requirements of the performance specification and the Concept Plans.

3.11.03.06.02 Foundations

A. The structural plate arch and corrugated metal pipes shall be founded on deep foundations, or shall be founded on improved subgrade as determined by the Design-Build Team and approved by the Administration.

B. Refer to 3.11.03.04.01 for specific types of deep foundations.

C. Anticipated scour depth information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.

D. Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal and rotational movement of foundation elements. The limiting values in AASHTO 4.4.7.2.5 shall not be exceeded.

E. The proposed pile spacing for design shall conform to the following:

1. Pile spacing shall not exceed 8 ft.
2. The Design-Build Team shall use battered piles to resist all horizontal loads.
3. Pile patterns shall be designed so that no piles are in tension.

F. As-built pile foundation data should be documented in the final As-Built Plans in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum P-93-35(4).

3.11.03.06.03 Support of Excavation

Temporary support of excavation may be required in order to maintain the roadway embankment during the construction of the box culvert extension.

3.11.03.07 Box Culvert Extension

The structure (listed below) covered under this Section is the existing single cell box culvert that shall be extended and repaired. Concept Plans for the structure are included with the RFP and contain site restrictions and other project commitments. Any notes containing the word "shall" on The Concept Plans shall be considered Directive and must be incorporated by the Design-Builder. The proposed box culvert extension is based on an alignment developed during preliminary studies and may vary according to the final documents developed by the Design-Build Team. If the Design-Build Team proposes to eliminate or introduce new structures or modify the length or size of the proposed box culvert extension, the proposed changes shall be submitted in writing to the Administration's Office of Bridge Development for review and development of any site-specific requirements beyond those provided by the Design-Build Team. All design elements of this project shall be the responsibility of the Design-Build Team.

Structure S2: Structure No. 23074X0, US 113 over Bassett Creek/Goody Hill Branch. Existing Structure No. 23074X0, a single cell 14' x 6' box culvert located approximately between Stations 1737+50 and 1738+50, shall be extended to the west (upstream) approximately 62 feet as part of the dualizing of US 113. For geometric design criteria, refer to TC 3.11.03.07.01. Only a precast or cast-in-place concrete culvert barrel shall be considered for the proposed culvert extension. Only cast-in-place concrete culvert headwalls

and wing walls shall be considered for the proposed culvert extension. The proposed box culvert extension shall be constructed on a pile (driven) foundation. For additional foundation requirements, refer to TC 3.11.03.07.02 In addition to the proposed box culvert extension, the spalls and cracks in the existing east (downstream) box culvert headwall and wing walls shall be repaired.

3.11.03.07.01 Geometry

Box culvert geometric requirements (typical sections and horizontal dimensions) are shown on the Concept Plans. The Design-Builder shall adhere to the minimum horizontal dimensions shown on the Concept Plans and the minimum vertical clearances specified herein for the box culvert extension. The Typical Section dimensions represent the desired structure configuration; structures on horizontal roadway curves or other roadway alignment features may require a wider structure. The Design-Builder may propose alternate wing wall orientations and length; however, the changes shall comply with the hydraulic requirements in 3.11.03.01 and other commitments contained within the IFB. The Design-Builder shall obtain approval from the Administration in writing prior to changing any of these dimensions. The Design-Builder shall be responsible for determination of the final structure size, clearances, geometry and details that meet or exceed the requirements of the performance specification and the Concept Plans.

The top slab of the box culvert shall be built to grade when the minimum depth of fill at the headwall is less than 9 inches. If the depth of fill at the headwall exceeds 9 inches, a HMA overlay on fill shall be placed over the culvert.

3.11.03.07.02 Foundations

A. Box culvert extension shall be founded on a deep foundation.

B. Refer to 3.11.03.04.01 for specific types of deep foundations.

C. Anticipated scour depth information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.

D. Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal and rotational movement of foundation elements. The limiting values in AASHTO 4.4.7.2.5 shall not be exceeded.

E. The proposed pile spacing for design shall conform to the following:

   1. Spacing in the front row of wing wall piles and culvert piles shall not exceed 8 ft.

   2. Spacing for all other rows of wing wall piles shall not exceed twice the spacing of the front row.

   3. The Design-Build Team shall use battered piles to resist all horizontal loads.

   4. Pile patterns shall be designed so that no piles are in tension.

F. As-built pile foundation data should be documented in the final As-Built Plans in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum P-93-35(4).

3.11.03.07.03 Support of Excavation

Temporary support of excavation may be required in order to maintain the roadway embankment during the construction of the box culvert extension.

3.11.03.08 Reinforced Concrete Pipe Culvert Extension

The structure (listed below) covered under this Section is the existing dual 54"ϕ concrete pipes shall be extended and repaired. Concept Plans for the structure are included with the RFP and contain site restrictions and other project commitments. Any notes containing the word "shall" on The Concept Plans shall be considered Directive and must be incorporated by the Design-Builder. The proposed dual pipe extension is based on an alignment developed during preliminary studies and may vary according to the final documents developed by the Design-Build Team. If the Design-Build Team proposes to eliminate or introduce new structures or modify the length or size of the proposed dual pipe extension, the proposed changes shall be submitted in writing to the Administration's Office of Bridge Development for review and development of any site-specific requirements beyond those provided by the Design-Build Team. All design elements of this project shall be the responsibility of the Design-Build Team.

Structure S3: Structure No. 23073X0, US 113 over Porter Creek. Existing Structure No. 23073X0, dual 54"ϕ concrete pipe located approximately between Stations 1684+50 and 1685+50, shall be extended to the east (downstream) approximately 80 feet as part of the dualizing of US 113. For geometric design criteria, refer to TC 3.11.03.08.01. Only precast reinforced concrete pipes shall be considered for the proposed dual pipe extension. Only cast-in-place concrete headwalls and wing walls shall be considered for the proposed dual pipe extension. For foundation requirements, refer to TC 3.11.03.08.02. In addition to the proposed dual pipe extension, the spalls and cracks in the existing west (upstream) headwall and wing walls shall be repaired.

3.11.03.08.01 Geometry

Dual pipe geometric requirements (typical sections and horizontal dimensions) are shown on the Concept Plans. The Design-Builder shall adhere to the minimum horizontal dimensions shown on the Concept Plans and the minimum vertical clearances specified herein for the dual pipe extension. The Typical Section dimensions represent the desired structure configuration; structures on horizontal roadway curves or other roadway alignment features may require a wider structure. The Design-Builder may propose alternate wing wall orientations and length; however, the changes shall comply with the hydraulic requirements in 3.11.03.01 and other commitments contained within the IFB. The Design-Builder shall obtain approval from the Administration in writing prior to changing any of these dimensions. The Design-Builder shall be responsible for determination of the final structure size, clearances, geometry and details that meet or exceed the requirements of the performance specification and the Concept Plans.

3.11.03.08.02 Foundations

F. The dual pipes shall be founded on deep foundations, or shall be founded on improved subgrade as determined by the Design-Build Team and approved by the Administration.

G. Refer to 3.11.03.04.01 for specific types of deep foundations.

H. Anticipated scour depth information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.

I. Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal and rotational movement of foundation elements. The limiting values in AASHTO 4.4.7.2.5 shall not be exceeded.

J. The proposed pile spacing for design shall conform to the following:

4. Pile spacing shall not exceed 8 ft.

5. The Design-Build Team shall use battered piles to resist all horizontal loads.

6. Pile patterns shall be designed so that no piles are in tension.

F. As-built pile foundation data should be documented in the final As-Built Plans in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum P-93-35(4).

3.11.03.06.03 Support of Excavation

Temporary support of excavation may be required in order to maintain the roadway embankment during the construction of the box culvert extension.

3.11.03.09 Retaining Walls

3.11.03.09.01 Description.

Retaining walls for the project will be required at the box culvert extension at Goody Hill Branch and the dual pipe extension at Porter Creek as shown on the Concept Plans. The retaining walls shall serve as the wing walls the structures. The retaining walls are based on an alignment developed during preliminary studies and may vary according to the final documents developed by the Design-Builder. If the Design-Builder proposes to eliminate or introduce new retaining walls to the project, the proposed changes shall be submitted in writing to the Office of Bridge Development for review. The Office of Bridge Development may then develop any site-specific requirements beyond those provided by the Design-Builder, to be used in the design of the structures. All design elements of this project shall be the responsibility of the Design-Builder.

3.11.03.09.02 Geometric Design Criteria

A. Retaining walls on curved horizontal alignments may be constructed on chords provided the angle of deflection between segments does not exceed 5 degrees.

B. The horizontal offset of the wall from the baseline shall not change abruptly. All changes in offset shall be accomplished using curves or chorded construction as described above.

C. The top of retaining walls shall not be stepped to accomplish a change in elevation. The top shall be level or shall vary using a smooth linear transition.

D. The completed retaining wall shall be located entirely within the Administration's Right-of-Way. Construction easements shall only be used to facilitate construction efforts.

E. The ground line behind the retaining wall shall be placed a minimum of 9" below the top of the wall, unless a barrier is required on top of the wall.

3.11.03.09.03 Structural Details and Standard Details

Standard Details, as developed in the Administration's Structural Standards Manual shall be utilized whenever possible. Any proposed deviation from the established standards shall be approved in writing by the Office of Bridge Development.

The following structural details shall be used where appropriate:

A. For retaining walls supporting roadways and adjacent to the shoulder, an F-Shape Barrier shall be placed on top of the proposed retaining wall. The height of the proposed barrier shall be either 34" or 42" in accordance with the roadway design requirements.

B. For retaining walls adjacent to and supporting sidewalks, a 2'-3" barrier with a two strand railing in conformance with Standard BR-SS(5.01)-76-35 shall be utilized.

C. For retaining walls supporting private property or other facilities that are accessible to pedestrians, fencing shall be provided on top of the wall. The minimum height of the fence shall be 3'-0" and detailed in accordance with Standard No. BR-SS(3.11)-96-317 and BR-SS(3.12)-96-318.

D. All retaining walls shall contain the appropriate details for drainage. The drainage system for cast-in-place cantilever walls shall be in accordance with Standard No. RW(0.01)-80-100.

3.11.03.09.04 Design Alternates for Retaining Walls

A. The Design-Build Team shall design and detail proposed concrete cantilever retaining walls in accordance with Structural Standards No. RW(6.02)-83-133 through RW(6.14)-89-201 and AASHTO.

3.11.03.09.05 Structural Analysis

For determination of forces and deflections, all analysis methods and computer models shall use gross sectional properties.

3.11.03.09.06 Structure Design Loading

A. Dead Loads (DL). Unit weights of materials shall conform to AASHTO.

B. Highway Loads (LL). Retaining walls including wing walls shall be designed to accommodate the horizontal surcharge caused by live load per AASHTO criteria.

C. Seismic Analysis. Structures will be within seismic zone 1. No detailed seismic analysis need be performed.

D. Wind Loads. Wind loads for retaining walls shall be in accordance with AASHTO Standard Specifications for Bridges, 17th Edition.

3.11.03.09.07 Foundation Specific Requirements

A. Spread Footings. The bottom of a spread footing or proprietary retaining wall shall be placed so that the top of the footing is a minimum of 1 ft below the proposed ground line and the bottom of the footing is a minimum of 3 ft below the proposed ground line. If the footing is to be placed on rock as determined by the Engineer, it shall be keyed into the sound rock at a minimum depth as determined by the scour analysis and shall be at least 1 ft. The Plans developed by the Design-Builder shall specify the maximum allowable bearing pressure for each substructure element.

   Setting spread footings in embankment or fill material is prohibited. Any spread foundation shall be set into existing in-situ soil or sound rock.

   The Design-Builder shall have the exposed subgrade of any spread foundation inspected by their geotechnical engineer with a written recommendations of their findings forwarded to the Administration.

B. Driven Piles. Refer to Section 3.11.03.04.01 for permissible pile types to be used. The bottom of footing for retaining walls may be placed in fill provided they sit on pile-supported foundations with the pile tips set into in-situ soil or rock. Pile tips shall be applied to driven piles where warranted.

   The proposed pile spacing for design shall conform to the following:

   1. Spacing in the front row of piles shall not exceed 8 ft.
   2. Spacing for all other rows shall not exceed twice the spacing of the front row.
   3. The Design-Builder shall use battered piles to resist all horizontal loads.
   4. Pile patterns shall be designed so that no piles are in tension.

   As-built pile foundation data should be documented in the final As-Built plans in conformance with the Administration's Office of Bridge Development Policy and Procedure Memorandum P-93-35(4).

C. Drilled Shafts. Any drilled shaft foundation that encounters rock shall have its final tip elevation a minimum of 5 ft into sound rock. Tension is not permitted on drilled shafts.

D. Minimum Subsurface Condition Requirements for Foundation Types. The following chart represents the minimum subsurface requirements for the various structure and foundation types allowed on this Contract. This information does not supersede any other foundation design criteria.

Structure /Foundation Type	Spread Footing	Deep Foundation (Piles)
Subsurface Conditions	N > 30 for 10 feet of sampling*	N > 50 blows per 1 inch for tests over 10 feet of sampling* or

		REC >50

N = Blow counts representing penetration resistance as defined in AASHTO T-206
* - In accordance with SHA's Standard Specifications for Subsurface Exploration

3.11.03.09.08 Structure Specific Foundation Requirements

The box culvert wing walls shall be founded on a deep foundation.

3.11.03.09.09 Aesthetic Guidelines for Retaining Walls

No special aesthetic treatments are required for the retaining walls at the box culvert.

3.11.04 Submittal

All bridges and any and all retaining walls, noise walls, culverts classified as small structures, and any other structure specifically designed for this project shall follow an independent review process. This process will be coordinated with the review and approval of the other articles (roadway, drainage, etc.) as appropriate or as required in the specifications.

The structure submission schedule shall be presented in the Design-Build's original project schedule and updated as the project progresses. Submissions for the subject structures shall be made one at a time with a minimum of 14 calendar days between submissions. This schedule shall be presented in the Design-Build's original submission schedule. As noted the Design-Build Team must notify the SHA 14 calendar days in advance of all submissions.

3.11.04.01 Type, Size & Location Submission

The first submission required for the structures in this Contract shall be the Type, Size and Location (T.S.&L.) Plans. The materials developed for this submission shall represent approximately 30% complete construction documents. Prior to this submission, the roadway alignment and profile need to have been finalized and approved by the SHA Highway Design Division. Any other pertinent information such as grading plans or drainage features that impact the proposed structures must also be reviewed and approved by the appropriate SHA Design Division prior to submitting the structure plans for review. All plans shall be developed in conformance with TC-3.11.05 Structure Plan Development.

The Design-Build Team shall submit a minimum of six (6) sets of the T.S.&L. Plans to the ADMINISTRATION for review. Official review comments shall be conveyed back to the Design-Build Team via correspondence and plans with comments noted. The Design-Build Team shall provide a point-by-point response to all official comments received and receive concurrence from SHA prior to proceeding forward with design and/or plan development activities. Telephone, email and discussion meeting comments and questions may also be presented to the Design-Build Team. No official response is necessary for these inquiries however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. The T.S.&L. submissions will be reviewed and comments provided within 40 calendar days of receipt of the submission. Any incomplete submission shall not be reviewed and returned to the Design-Build Team.

3.11.04.02 Foundation Report

The Foundation Report and Plan submission shall be made in accordance with the Maryland Department of Transportation Policy and Procedure Memorandum D-79-17(4), the Structure

Descriptions, and other requirements outlined in TC-3.11.03.06 and TC-3.11.03.07. The submission of the foundation report can be made concurrently with the T.S.&L. submission; however, it shall be noted that the foundation design may be impacted by comments received on the T.S.&L. Plans. If the T.S.&L. submission is provided separately, the Foundation Reports shall not be submitted until comments on the T.S.&L. have been provided back to Design-Build Team and the Design-Build Team's responses are accepted by the ADMINISTRATION. The All plans shall be developed in conformance with TC-3.11.06 Structure Plan Development.

The Design-Build Team shall submit a minimum of six (6) sets of the Foundation Report to the ADMINISTRATION for review. Official review comments shall be conveyed back to the Design-Build Team via correspondence and plans with comments noted. Comments will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission if the Foundation Report is submitted independently. If the Foundation Report is submitted concurrently with the T.S.&L. submission, comments will be provided within 40 calendar days of the receipt of the submission. The Design-Build Team shall provide a point-by-point response to all official comments received and receive concurrence from SHA prior to proceeding forward with design and/or plan development activities. Telephone, email and discussion meeting comments and questions may also be presented to the Design-Build Team. No official response is necessary for these inquiries however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. If combined with the T.S.&L. submission, the Foundation Report and Plan submission will be reviewed concurrently. If a separate Foundation Report and Plan submission is made, it shall be reviewed and comments provided within 21 calendar days of receipt of the submission. Any incomplete submission shall not be reviewed and returned to the Design-Build Team.

3.11.04.03 Structural Detail Submissions

Following approval of the T.S.&L. Plans and Foundation Report, the Design-Build Team may submit detailed plans for various structural elements. All plans shall be developed in conformance with TC-3.11.05 Structure Plan Development. The Design-Build Team shall submit a structure submission schedule that outlines the anticipated structural detail submissions.

The Design-Build Team shall submit a minimum of six (6) sets of the Structural Detail Plans to the ADMINISTRATION for review. The Structural Detail submissions shall be reviewed and comments provided back to the Design-Build Team within 21 calendar days of receipt of the submission. The Design-Build Team shall provide a point-by-point response to all official comments received. Upon incorporating the comments into Structural Detail Plans, the Design-Build Team shall provide four (4) sets of revised Plans to the ADMINISTRATION as a record set of the proposed construction plans. Any incomplete submission shall not be reviewed and returned to the Design-Build Team.

3.11.04.04 Revisions to Structure Plans

Any revisions to the structural drawings must be submitted in writing to the ADMINISTRATION and approved prior to proceeding with any change to the approved structural drawings. All changes must be documented as Red Line Revisions in accordance with Maryland Department of Transportation Policy and Procedures Memorandum P-75-

6(4). The Design-Build Team is responsible for preparation of all Red Line Revisions.

3.11.04.05 Shop Drawing Review Process

All shop drawings relating to the structures shall be reviewed in accordance with Maryland Department of Transportation Policy and Procedures Memorandum OP-82-34 (G). The Design-Build Team shall undertake the primary review and shall be stamped by the Design-Build Team as accepted prior to submitting the shop drawings to the ADMINISTRATION. A secondary review shall be undertaken by the ADMINISTRATION. Once reviewed and approved by the ADMINISTRATION, the structural shop drawings shall be stamped as approved and returned to the Design-Build Team with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by the ADMINISTRATION.

3.11.04.06 Final Plans and Computations

The Design-Build Team shall submit a complete set of structure plans once all structural details have been approved. A full set of plans (details, standards etc.) shall be developed for each of the structures. The complete set shall consist of one set of mylar originals, four (4) full size paper print sets and four (4) half size paper print sets. The General Plan & Elevation sheet for each of the structures sealed by the Design-Build structural key staff member thus denoting it as the final construction documents.

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the original project (mylar) plans in green. Old details, dimensions and notes shall not be erased, but X'd out in green. The date that the revision was made shall be indicated in the title block of each revised plan sheet. The As-Built Plans should reflect any field revision made during construction. The Design-Build Team shall submit reproducible As-Built plans at the completion of the project that are signed and sealed by the Engineer.

The Design-Build Team shall submit a complete set of structure computations once all structural details have been accepted for each structure including all designed elements. All computations shall be on 8 ½” x 11” paper with initials of the designer and checker indicated on each page. The computations shall be submitted in a three ring binder and subdivided into relevant design sections. A coversheet shall be included in each binder and shall be signed and sealed by the Design-Build Team structural key staff member responsible for performing or oversight of the pertinent design work.

3.11.05 Structure Plan Development

The Design-Build Team shall prepare structure plans as part of the Contract using the latest CADD Standards and Plan Development Checklists available from the SHA Office of Bridge Development (OBD).

The Plan Development Checklists are developed for various types of structures (Steel Girder Bridges, Retaining Walls, etc.) and indicate the minimum amount of information that is required on the Structure Contract Plans. If a checklist is not provided for the type of structure that is proposed by the Design-Build Team, the existing checklists shall be used as a general guide for similar information.

The Design-Build Team shall also conform to the following requirements in the development of

Structure Contract Plans:

A. The development of views on all Structure Contract Drawings shall be in accordance with Maryland Department of Transportation Policy and Procedures Memorandum P-75-7(4).

B. The designation of structural elements shall be in accordance with Maryland Department of Transportation Policy and Procedures Memorandum P-93-36(4).

TC 3.12 TRAFFIC PERFORMANCE SPECIFICATION

3.12.01 General

The Design-Builder shall be responsible for the design and construction of the Project signing, pavement markings, roadway and sign lighting, and traffic signals if needed. The Design-Builder is responsible for coordinating all Traffic Control Devices including signing and lighting with all other disciplines involved with the Project.

Signing consists of guide, supplemental, route marker, regulatory, and warning signs for both US 113 and cross-streets approaching US 113. The Design-Builder shall be responsible for the design and construction of sign structures (overhead, cantilever, and ground mounted), including foundations. Sign lighting for all overhead and cantilever structures shall be provided.

The Design-Build Team shall prepare plans for application of the Final Pavement Markings, including Plowable Raised Pavement Markers (RPM), in accordance with the latest edition of the MUTCD, Maryland MUTCD, and SHA standards as provided by OOTS. The Design Builder shall be responsible for the design and construction of the Pavement Markings within the project limits along US 113 and cross-streets and access roads. Final pavement marking lane lines including parallel, accel/decel lanes for ramps and intersection auxiliary lanes, shall be waterborne paint and will be installed by SHA District1 paint crew. All other pavement marking will be installed by the Design Build Team.

The Design Builder shall be responsible for the design and construction of the shoulder rumble strips through out the project limits as approved by District 1 Traffic.

Intersection lighting shall be provided within the project limits as specified in the RFP and as required to meet IES and AASHTO criteria and the Administration's policies and procedures. The Design-Builder shall be responsible for the design and construction of all light poles, including foundations, conduit systems, circuitry, power supplies, lighting cabinets, and coordination with the power company to obtain power service for the lighting devices.

The Design-Builder shall be responsible for all traffic analyses if the Design-Builder proposes modifications to the concept plans included in this RFP.

3.12.02 Guidelines and References

3.12.02.01 Guidelines

Traffic analysis, design, and construction shall be in accordance with this performance specification and the relevant requirements of the following Guidelines, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current adopted version of each listed Guideline as of the publication date of this RFP.

All traffic analysis shall be in accordance with the relevant requirements of the Guidelines listed by priority in Table 1.

TABLE 1
GUIDELINES FOR TRAFFIC ANALYSIS

Priority	Author or Agency	Title
1	TRB	Highway Capacity Manual
2	ITE	Traffic Engineering Handbook
3	ITE	Manual of Transportation Engineering Studies
4	SHA	Office of Traffic and Safety Capacity/Queuing Analysis Procedures for Intersections
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)

All traffic design and construction for signing, pavement markings, and traffic signals shall be in accordance with the relevant requirements of the Guidelines listed by priority in Table 2.

TABLE 2
GUIDELINES FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

Priority	Author or Agency	Title
1	SHA	List of Qualified Permanent Pavement Markings
2	SHA	List of Qualified Loop Sealants
3	SHA	List of Qualified Detectable Warning Surfaces
4	SHA	Standard Specifications for Construction and Materials
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
7	IES	RP-8-00, American National Standards for Roadway Lighting
8	AASHTO	Roadside Design Guide
9	SHA	Standard Office of Traffic and Safety Shelf Typicals

TABLE 2
GUIDELINES FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

Priority	Author or Agency	Title
10	SHA	Book of Standards for Highway and Incidental Structures
11	SHA	Maryland State Highway Standard Sign Book
12	FHWA	Standard Highway Signs Book
13	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
14	SHA	Administration, Section VIII, of the "Specifications for Consulting Engineer's Services, Volume II
15	NFPA	National Electric Code
16	IEEE	National Electric Safety Code
17	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
18	SHA	Maryland State Highway Line Striping Material Selection Policy
19	SHA	Roundabout Traffic Design Manual
20	AASHTO	Highway Safety Design and Operations Guide
21	SHA	Accessible Pedestrian Signals-Design Guidelines
22	SHA	Accessibility Guidelines for Pedestrian Facilities along State Highways
23	ADA	Americans with Disabilities Act Accessibility Guidelines
24	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

* Note: For traffic signal structures the Design-Builder shall utilize the 3rd Edition. For sign structures (overhead, cantilever, and ground mounted) the Design-Builder shall utilize the 4th edition.

All traffic design and construction for roadway and sign lighting shall be in accordance with the relevant requirements of the Guidelines listed in Table 3.

TABLE 3
GUIDELINES FOR ROADWAY LIGHTING

Priority	Author or Agency	Title
1	SHA	Standard Specifications for Construction and Materials
2	NFPA	National Electric Code
3	IEEE	National Electric Safety Code
4	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
5	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
6	IES	RP-8-00, American National Standard for Roadway Lighting
7	IES	DG-5-94, Recommended Lighting for Walkways and Class 1 Bikeways
8	IES	RP-19-01, Roadway Sign Lighting
9	AASHTO	Roadway Lighting Design Guide
10	AASHTO	Roadside Design Guide
11	SHA	Book of Standards for Highway and Incidental Structures
12	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition
13	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
14	AASHTO	Highway Safety Design and Operations Guide
15	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State

TABLE 3
GUIDELINES FOR ROADWAY LIGHTING

Priority	Author or Agency	Title
		Highways
16	ADA	Americans with Disabilities Act Accessibility Guidelines
17	AASHTO	Guide for the Planning, Design and Operation of Pedestrian Facilities
18	AASHTO	Guide for the Development of Bicycle Facilities
19	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

3.12.02.02 References

Use the references listed in Table 4 as supplementary materials for traffic analysis. These publications have no established order of precedence.

TABLE 4
REFERENCES FOR TRAFFIC ANALYSIS

Author or Agency	Title
SHA	2030 LOS Wiring Diagram – Design Forecast Volumes

Use the references listed in Table 5 as supplementary materials for the design of signing, pavement markings, and traffic signals. These publications have no established order of precedence.

TABLE 5
REFERENCES FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

Author or Agency	Title
KDOT	Kansas Roundabout Guide – A Supplement to FHWA's Roundabouts: An Information Guide
FHWA	FHWA Roundabouts: An Informational Guide 2000 FHWA-RD-00-067
TRB	Transportation Research Board's Accessible Pedestrian Signals Synthesis and Guide to Best Practices

3.12.03 Coordination with Other Contracts

The Design-Builder shall coordinate the design and construction of all traffic control devices for the Project with those required for other SHA, Worcester County, and local jurisdiction Projects.

3.12.04 Traffic Operational Analysis – Procedures and Application

3.12.04.01 Approved Analysis Techniques and Software

3.12.04.01.01 Highway Capacity Manual and Software – Latest Version

The Highway Capacity Manual and Software (latest version) shall be used to analyze all freeway mainlines, ramp junctions (merge and diverge locations), and weaving sections. The Design-Builder shall provide a summary of results on a line diagram of the proposed roadway configurations, including both the level of service and the volume-to-capacity (V/C) ratio as appropriate. The Design-Builder shall also provide all calculation files on a CD to support the summary of results.

3.12.04.01.02 Synchro and SimTraffic – Latest Version

For corridors with multiple intersections, the Design-Builder shall use Synchro and SimTraffic to analyze corridor operations. The Design-Builder's timing plans shall consider corridor-wide cycle lengths and appropriate offsets. The Design-Builder shall provide all calculation files on a CD to support the summary of results.

3.12.04.01.03 CORSIM – Latest Version

For freeway and arterial operations, the Design-Builder may elect to use CORSIM to analyze operations. This shall be in addition to the Highway Capacity Manual and Software, and Synchro/SimTraffic requirements listed above. Results will be considered by the Administration in conjunction with the above when assessing design alternatives proposed by the Design-Builder.

3.12.04.01.04 aaSidra – Latest Version

For all roundabouts proposed by the Design-Builder, operational analyses shall be completed with aaSIDRA, with the Environmental Factor set to 1.2, as recommended by the software manufacturer when analyzing roundabouts in the U.S. The volumes should also be checked against the capacity thresholds outlined in NCHRP 3-65, Applying Roundabouts in the United States. The results shall demonstrate that the roundabout operation will be no worse than the corresponding intersection operations proposed in the RFP.

3.12.04.01.05 Critical Lane Technique

For all signalized intersections, the Design-Builder shall calculate the level of service for each MOT phase of operation using the Administration's Critical Lane Volume methodology, as outlined in the Office of Traffic and Safety's

Capacity/Queuing Analysis Procedures for Intersections memorandum, latest version. Design-Builder shall also conduct Critical Lane Analyses for any design modifications to the concept plans provided in this RFP.

3.12.04.01.06 Queuing Analysis Technique

To determine the appropriate length of left and right turn bays, the Design-Builder shall calculate the queue length for both the through lane/s and the turn lane/s for the proposed design and each MOT phase of operation using the Administration's Queuing Analysis methodology, as outlined in the Administration's Procedures for Intersections memorandum, latest version.

3.12.04.01.07 Operational Assessment of Design Alternative/s

It shall be the Design-Builder's responsibility to perform traffic analyses for each MOT phase using the tools and techniques listed above, as appropriate.

If a change is proposed to the concept plans included in the RFP, the Design-Builder shall use the 2030 Build Volumes to develop and test the final design plans. All modifications to the concept plans shall provide traffic operations equal to or exceeding the operational analysis completed by the Administration for the original design. The Design-Builder shall also provide a corridor analysis using CORSIM and Synchro to review corridor-wide operations for the proposed change. Where interpretation of the traffic analyses is required (i.e. if a change results in some improvements and some decreases in operations), it will be the Administration's determination whether the change is acceptable.

3.12.04.01.08 Signal Warrant Analysis

Signal warrant analyses for the concept plans included in the RFP have been completed by the Administration. At this time no traffic signals are required. The Design-Builder shall be responsible for all traffic analyses if the Design-Builder proposes modifications to the concept plans included in this RFP.

3.12.05 Signing

3.12.05.01 Design and Construction Requirements

3.12.05.01.01 Definitive Design Signing Roll Plan

The Design-Builder shall prepare a Definitive Design Signing Roll Plan and present the plan at a review meeting with the Administration. The roll plan shall include proposed sign locations (overhead, cantilever, ground mounted, etc.) and messages for all guide, supplemental, regulatory, and warning signs. All proposed signing shall be sized to match the previous US 113 projects for

consistency. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The Design-Builder shall not relocate existing overhead or cantilever sign structures. The roll plan shall display signing for US 113, as well as for the cross-street streets, frontage roads, and any other roadways that contain signing that is affected by the Project. The Design-Builder shall also provide for the modification or removal of any signage outside the limits of the Project that is no longer appropriate or pertinent. The signage shall be removed or modified regardless of whether it falls within or outside the limits of construction along the mainline and cross-street approach roadways. The Design-Builder shall provide signing for roadways where existing access has been modified. The signing modifications due to the access modifications shall be shown on the definitive plan. The plan shall also denote which agency is responsible for ownership and maintenance of each sign and structure (i.e. SHA or local jurisdiction). The definitive plan features shall include, but are not limited to, the existing and proposed roadway alignments, right-of-way, utilities, baseline of construction (including stationing), and existing topography at the tie-in points of the roadway limits of work. The proposed pavement markings shall also be shown on the definitive plan.

3.12.05.01.02 Plan Sheet Requirements

Once the roll plan is reviewed by the Administration, the Design-Builder shall prepare signing plans at a scale of 1”=50’ or equal to the roadway plans. Plans shall show the proposed message, MD MUTCD or MUTCD sign designation (if applicable), size and location of all guide, supplemental, route marker assemblies, regulatory, and warning signing. These plans shall also show the location, messages and sizes of all existing signs. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The plans shall include the location and type of delineation devices (including pavement markings). The owner of each sign/structure shall be clearly noted on the plan sheets. All proposed guide, supplemental and non-standard signs shall be detailed on a SN-3 (Sign Fabrication) detail sheet. The plan set shall include SHA’s latest SN-1 sheet (General Notes and Proposals). The Design-Builder shall be responsible for contacting SHA to obtain the latest SN-1 sheet. The SN-4 (Ground Mount Sign Support Details) sheet shall be used for all ground mounted guide sign supports. All ground mounted sign supports (steel and wood) shall be detailed on this sheet. The tables on this sheet shall include the Sign Number, Plan Sheet number where the sign is located, the sign size, the post size to be used, if the supports are breakaway or non-breakaway, the support lengths, the lateral clearance code and offset, and the support spacing from left edge of sign. If necessary, the SN-8 (Overhead Structures) and the SN-9 (Cantilever Structures) sheets shall also be included in the plan set. The SN-11 (Signing and Marking Quantities) sheet may be included which summarizes the quantities and materials in table format being used for this Project. If the SN-11 sheet is submitted, every sign location shall have a separate line.

3.12.05.01.03 Design of Sign Locations

The Design-Builder shall design, fabricate and install all the overhead and ground mounted signs shown on the definitive plan, within 25-feet of the location shown on the definitive plan or as approved otherwise by the Administration. 800 foot spacing shall be maintained between overhead signs and traffic signals. For signing along US 113 and cross-streets, all guide signs, supplemental guide signs, and any overhead or cantilever structures shall be installed such that 800 foot spacing is maintained unless approved by the Administration. It is the Administration's intent to have the signs spaced at 800 foot intervals so that future signing can be accommodated and the 800 foot spacing is maintained. Overhead and cantilever sign structures installed upstream of bridges crossing over the traveled roadway shall be constructed with at least 300 feet between the sign structure and the bridge unless precluded by the MD MUTCD or Administration standards. Overhead and cantilever sign structures installed downstream of bridges crossing over the traveled roadway shall be constructed at least 800 feet from the bridge. The Design-Builder shall coordinate the proposed sign locations with all proposed landscaping, utility, hydraulic, lighting, and all other roadside features to assure proper clearances, lighting levels, and adequate sight distance.

3.12.05.01.04 Sign Design and Construction Requirements

The Design-Builder shall design, fabricate, and install all guide, supplemental, route marker assemblies, regulatory and warning required for this Project, including approaches outside Project limits. The Design-Builder shall modify all existing signs requiring message modification, including approaches outside Project limits.

The messages, fonts, font sizes, arrows, shields, colors, borders, and type of supports for the overhead and ground mounted signs shall be designed and constructed according to the MD MUTCD sign sizes shall match the signing for the previous stages of US 113 dualization. The Clearview font shall be utilized for all positive contrast guide signs. Positive contrast guide signs are signs that utilize white text/copy on a dark colored background (i.e. green, blue, black, brown, etc.)

All Regulatory/Warning Signs and route marker assemblies installed along US 113 shall be expressway size. All Regulatory/Warning Signs and route marker assemblies installed along all other local roadways shall be standard size. The sizes of the signs shall adhere to the latest edition of the Maryland State Highway Standard Sign Book and the FHWA Standard Highway Signs Book.

Guide signs indicating left or exit only movements entering or exiting freeways or

expressways shall have the action message (i.e. NEXT LEFT, LEFT LANE, EXIT ONLY, etc.) in black legend on fluorescent yellow background. Fluorescent yellow background sheeting shall be used for all yellow traffic signs. When a sign contains more than one background color, the signs shall have two separate borders corresponding to each background color where the background colors meet. If the background colors utilize the same border color, then only one border is necessary where the background colors meet.

All proprietary logos will be provided by the Administration. The Design-Builder shall identify the logos required during the definitive design process. Those logos will be provided and installed by the Administration onto signs and/or supports furnished and installed by the Design-Builder. The Design-Builder shall submit a letter to the Administration requesting the logos and the required size between the definitive design review and the plan submittal.

All signs greater than 4' x 8' shall be manufactured using extruded aluminum sign material. All new signs for this Project shall be constructed with non-reflective (black copy and background) or retroflective (all other colors) sheeting background and copy. The retroflective sheeting for sign copy shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials. All retroflective sheeting for sign backgrounds except for fluorescent yellow and fluorescent yellow-green shall comply with Section 950.03.08 of the Administration's Standard Specification for Construction and Materials. All fluorescent yellow and fluorescent yellow-green sign backgrounds shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials.

3.12.05.01.05 Sign Support Design and Construction

All overhead and cantilever sign structures installed under this Project shall be located at a minimum of 50 feet from any roadway lighting.

For each overhead or cantilever structure location, the Design-Builder shall draw the sign panel(s) and the sign structure on the corresponding completed cross-section. The proper vertical and horizontal clearances, sign sizes and sign structure offsets, number of lanes, and lane widths shall be labeled on the cross-sections. The Design-Builder shall check the cross-sections and profiles at all overhead sign locations and make adjustments as necessary to provide adequate sight distances and ground clearances to the bottom of the luminaire supports. Using the sign structure cross-section, the Design-Builder shall correctly fill out the Administration's sign structure input sheet for each overhead/cantilever sign structure. The sign structure input sheet and associated cross section shall be submitted during the definitive design for Administration review and written comment. Comments on the input sheets will be provided within fourteen calendar days and returned to the Design-Builder for revisions, if needed. Once

comments to input sheets have been satisfactorily resolved, the Design-Builder shall develop the standard SN-8 and SN-9 sheets for the sign structures. Administration will provide current SN-8 and SN-9 sheets upon request.

For signs using Breakaway wood supports, Non-Breakaway wood supports, or Non-Breakaway steel supports, the Design-Builder shall utilize the support selection charts provided in the Administration's Traffic Control Device Design manual. For sign structures (Overhead, Cantilever, and Breakaway Steel Ground Mounted) the Design-Builder shall utilize the 4th edition of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. The wind speed to be used in design shall be 100 mph. The structure design life shall be a 10 year recurrence interval for ground mounted signs using breakaway steel supports. For signs using breakaway steel supports, the Design-Builder shall utilize the design assistance CD provided by the manufacturer of the breakaway system and follow the ground mounted steel post breakaway system selection process provided by the Administration. All posts except for W6X9 wide flange steel I-beams shall have at least 7 foot clear distance between adjacent posts. All wide flange steel I-beam sign supports shall utilize ASTM A709 Grade 36 steel. All square steel posts shall utilize ASTM A500 Grade B structural tubing.

Sheet aluminum signs shall be mounted on wood supports or square tubular steel posts. Signs over 32 square feet shall be installed on steel posts, unless otherwise noted by the Administration for a particular sign. Additionally, if the signs are installed at a location where steel posts are required, then extruded aluminum sign material shall be used. All exit gore signs shall be placed on steel supports.

No signs or sign structures will be allowed on bridge overpass structures. No signs shall be banded to utility poles. No signs shall be banded to street lighting poles, and overhead or cantilever sign structure uprights without OOTS approval.

Traffic barriers shall be provided for protecting all non-breakaway supports within the clear zone and for new structures within as well as outside the limits of work. Signs shall be placed outside the clear zone wherever possible.

The Design-Builder will be responsible for locating and marking all underground and overhead utilities prior to any signing work beginning.

3.12.05.01.06 Modification to Existing Overhead Signs

The Administration will provide the Design-Builder with blank 'Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures' sheets. Any modifications to the existing overhead sign structures, including replacement of sign panels, shall be presented to the Administration for review and written comment. Review and written comments, if necessary, will be

provided within 21 calendar days. Upon satisfactory resolution to comments, the Design-Builder shall draft the plans and/or notes using CADD for review with the Administration.

3.12.05.01.07 Sign Lighting

The Design-Builder shall provide sign lighting maintenance systems for all new and existing overhead and cantilever sign structures within the Project limits in accordance with the lighting section of this RFP. All sign lighting shall be on dedicated circuits. The sign lighting design shall be shown on the roadway lighting plans. All overhead sign structures shall be illuminated.

3.12.05.02 Submittals

The Design-Builder shall submit the following items prior to the Definitive Design Signing Review:

A) Definitive Design Signing Roll Plan;

B) For all proposed sign structures, the Administration's sign structure input sheet for each overhead/cantilever sign structure along with the associated cross-sections; and

C) For all existing sign structures, the Administration's 'Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures' sheets.

3.12.06 Pavement Markings

3.12.06.01 Design and Construction Requirements

All proposed pavement markings shall be shown on definitive plans for signing and reviewed by the Administration prior to advancing the design.

All proposed pavement marking shall be shown on the same plan sheets as the signs. All single longitudinal lines shall be 5 inches wide, and all double width lines shall be 10 inches wide. The plans are to show color, size, location, and material type for markings within the limits of work. The final design marking plans shall be indicated on the signing plan with the same scale as the signing plan. The lanes shall be dimensioned based on the typical sections for the Project. Dimensions shall be included for each change in the roadway typical. The plan shall also clearly define locations where pavement markings change color, width, or material.

The Design-Build Team shall be responsible for the design of all pavement markings. The Design-Build Team shall be responsible for the construction of all pavement markings excluding the final pavement marking lane lines including parallel, accel/decel

lanes for ramps and intersection auxiliary lanes, which shall be waterborne paint and will be installed by SHA District1 paint crew.

For all final pavement marking lane lines including parallel, acceleration/deceleration lanes for ramps, and intersection auxiliary lanes, the following Pavement Marking Material Table shall be adhered to:

Pavement Marking Abbreviations

RPMs – Plowable Raised Pavement Markers

Durable Markings – Includes thermoplastics, patterned profiled thermoplastics (wet tape), or epoxy. All durable markings shall demonstrate wet retro reflective properties when tested in accordance with ASTM #E 2177-01 (Test Method for Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Standard Condition of Wetness).

Paint – Whenever paint is listed as an application, the 50/50 blend of large and standard glass beads is required.

PAVEMENT MARKING MATERIAL TABLE				
CATEGORY	ROADWAY TYPE	LINE STRIPING MATERIAL		
		Center Lines	Lane Lines	Edge Lines
	Portland Cement Concrete (PCC) (Including Bridge Decks)			
3	Highway (other than Interstate/Freeway) AADT < 50,000	Durable with RPM's	Durable with RPM's	Durable
	HOT MIX ASPHALT (HMA)			
3	Multi-lane or Divided Highway (other than Interstate/Freeway) AADT < 50,000	Durable with RPM's	Durable with RPM's	Durable
4	2-Lane 2-Way Roadway AADT ≥ 30,000	Durable	------	Durable
5	2-Lane 2-Way Roadway AADT < 30,000	Paint	------	Paint

All transverse pavement markings (i.e. yield symbols (shark's teeth), crosswalks, stop lines), as well as all arrows, symbols, and letters shall be heat applied permanent preformed thermoplastic.

Crosswalks shall be provided across roads at all signalized intersections as specified in section 3.12.07 Traffic Signals.

All permanent pavement markings installed on the Project shall be listed on the Administration's List of Qualified Permanent Pavement Markings, unless submitted and approved through the Administration's Maryland Product Evaluation List (MPEL) program.

3.12.07 Traffic Signals

There are no signals anticipated in this project

3.12.08 Lighting

3.12.08.01 Design and Construction Requirements

For existing lighting, the maximum outage time for luminaires shall be 24 hours unless otherwise approved by the Administration. All proposed and existing luminaires within the Project limits shall be working upon completion of the Project.

All underground lighting conduits shall be schedule 80 rigid PVC conduit. All exposed conduits shall be galvanized rigid steel conduit.

All roadway lighting installed under this Project shall be located a minimum of 50 feet from any overhead or cantilever structure.

All proposed lighting equipment shall be located such that it can be readily maintained by personnel of the maintaining agency. Lighting placed on traffic signal equipment shall be serviced from a metered service pedestal. Each luminaire mounted on a signal structure shall be equipped with a photocell. Power supply for roadway lighting shall be installed in separate conduits and on independently metered circuits for respective jurisdictional owners.

The Design-Builder shall provide voltage drop calculations for all circuits. The voltage drop for each branch circuit shall not exceed three percent for new circuits and five percent for existing circuits, assuming a cable temperature of 40 degrees Celsius. A minimum of two branch circuits shall be used for each continuous succession of lighting structures. All lighting circuits shall have balanced lighting loads.

Two conductor duct cables shall be used for all lighting circuits. Only the conductors that serve the lighting structures shall enter the foundation of the lighting structures. All other conductors shall remain un-spliced and bypass the foundation. The Design-Builder shall furnish and install single conductor cables in conduit under all roadway surfaces. Single conductor cables shall be used any place cables are to be installed in conduit. The Design-Builder shall provide electrical manholes and connector kits to splice the conductors. No in-ground splices of electrical cables shall be permitted for any reason. No electrical handholes/handboxes/manholes shall be placed in drainage ditches. The Design-Builder shall abandon existing conductors between poles that are to be removed.

Any existing lighting structure that is impacted by construction of this Project shall be disconnected, reconnected, and made fully operational by the Design-Builder as part of

this Project unless it is being removed. All abandoned cables shall be made safe.

All light poles that are not protected by traffic barrier and are in the clear zone as defined in the AASHTO Roadside Design Guide shall be installed on a breakaway transformer base complying with the Maryland Book of Standards. Light poles shall not be installed in front of traffic barrier.

The lighting system shall utilize cabinets, conduits, and handboxes/manholes/junction boxes separate from the traffic signal equipment.

The Design-Builder shall place luminaries approximately one foot over the pavement marking edge line. To avoid foundation conflicts, the luminaire location may be adjusted approximately 3 feet over the pavement marking edge line, subject to review by the Administration.

3.12.08.01.01 Definitive Design Lighting Roll Plan

A lighting roll plan shall be presented at the definitive review and concurrently with the signing and signal plans for review and written comment by the Administration. The lighting roll plans shall include proposed locations for all lights and photometric calculations supporting the light locations.

The Design-Builder shall provide spacing computations showing illuminance and veiling luminance calculations, as appropriate. The calculations shall include uniformity ratios (average to min and max to min) and point-by-point computations. The Design-Builder shall apply a light loss factor of 0.64 when computing photometrics. The computations shall use the lamp lumen requirements in Section 950.12.02 of the Administration's Standard Specifications for Construction and Materials. For lamp types not listed in Section 950.12.02, the Design-Builder shall use the values provided by the manufacturer.

The Design-Builder shall design, fabricate, and install all roadway lighting shown on the definitive design plan within 5 feet of the location shown on the definitive design plan or as otherwise approved by the Administration.

3.12.08.01.02 Plan Sheet Requirements

The Design-Builder shall prepare and present lighting plans with a scale appropriate for the Project, generally 1"=50'. Plans shall include existing and proposed geometry, existing and proposed utilities, right-of-way, landscape features, applicable drainage features, applicable structural facilities, and other information required for coordination of utilities. Plans shall show location of new lighting, type and mounting height of poles, type and wattage of luminaires, length of luminaire arms, removal and relocation of existing lighting, conduit,

circuit routings, cable types and installation method, manholes/junction boxes, splice locations with appropriate connector kits, ground rod locations, signs to be lit, electrical service locations, and other details pertinent to the construction. The plans shall include standard Administration identifiers for light poles and manholes as well as standard designations for cable sizes. The plans shall include a panel schedule; including pole mounted lighting cabinets and metered service pedestals, showing the circuit breaker loads and equipment connected to each circuit breaker. The plan shall include a schedule of light poles and a sign lighting schedule.

3.12.08.01.03 Existing Lighting

All impacted existing roadway lighting shall be replaced by the Design-Builder. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency.

The Design-Builder shall design and construct the lighting system consistent with operational and engineering requirements of the utility company and owning/maintaining agencies. For locations where luminaires are attached to a utility pole, the Design-Builder (as a part of the utility relocation effort) shall contact the owner of the lighting to coordinate relocation of the light fixture. The Design-Builder is responsible for coordinating agreements between the owner and the utility company.

The Design-Builder shall remove existing light poles that are no longer required due to construction of the Project. The equipment shall be the property of the Design-Builder upon removal. The Design-Builder shall notify the owner of the lighting being removed at least two weeks in advance of scheduled equipment removal.

3.12.08.01.04 Intersection Lighting

All intersections (both signalized and unsignalized) along US 113 within the project limits shall have intersection lighting. All intersection lighting shall be prepared using the Administration's guidelines for partial intersection/entrance lighting. See ANSI - IESNA RP-8-00, Annex D for the design of intersection lighting.

3.12.08.01.05 Sign Lighting

Any lighting system with a lamp life less than 60,000 hours shall be installed on a maintenance track system or other system that provides lamp replacement from the shoulder of the road without closing lanes. Signs shall be only lit from beneath the signs. Acceptable lighting shall consist of mercury vapor or other approved conventional lighting system with a CRI>70 and lamp life>15,000

hours and a manufacturer guarantee of replacement parts availability for 10 years past the manufacture date. Alternatively, long-life lighting systems may be utilized if approved by the Administration. A long-life system shall be a lighting system with a functional life time (<50% failure of any component including lamp and depreciation not worse than 70% at 60,000 hours) of at least 100,000 hours. All sign lighting shall be on dedicated circuits. For each sign structure a minimum of two circuits shall be used. The sign lighting design shall be shown on the roadway lighting plans. The design of luminaires for sign illumination using conventional lighting system shall be in accordance with OOTS standard lighting charts. The design of luminaires for sign illumination using long-life lighting systems shall be in accordance with the long-life lighting charts provided by the Administration. All other sign lighting systems shall be designed to provide an average of 20 to 40 foot candles with 6:1 max to min uniformity. Photometric calculations shall be on a 1 foot grid over the entire surface of the sign. All existing lighting within Project limits shall be maintained throughout construction.

3.12.08.01.06 Temporary Lighting

All existing roadways which have roadway lighting shall remain illuminated at IES minimum levels for the duration of the Project unless approved otherwise by the Administration.

The Design-Builder shall maintain all existing lighting within the Limits of Work shown on the Concept Plans throughout construction. Where temporary lighting is needed to maintain the existing lighting levels in the Project area, the Design-Builder shall install and maintain temporary lighting (cobra heads attached to wood poles). Temporary overhead electrical service is acceptable for non-breakaway poles. The Design-Builder shall remove temporary lighting when no longer needed. The Design-Builder shall be responsible for the power costs of any and all temporary lighting that may be required and it is the Design-Builder's responsibility to schedule all utility connections.

3.12.08.01.07 Electrical Service for Lighting

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any lighting work beginning. The Design-Builder shall be solely responsible for all Work, materials, and costs (including coordination with the power company) associated with obtaining power and maintaining power throughout construction for all lighting facilities and other electrical work required for this Project. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the appropriate power companies. All materials shall be submitted to the power company through the Administration. The Design-Builder shall contact all utility companies to fulfill requirements to determine the location of all

existing and proposed utilities, obtain power company requirements for service and obtain power company approval for service location(s). For each location requested, it is the Design-Builder's responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so to not adversely affect the Project schedule.

Lighting systems owned by different jurisdictions shall have separate power sources derived from the utility company. Exceptions shall require written approval and agreement of all jurisdictions involved and will require separate circuits for each jurisdiction's electrical elements fed from the electrical service equipment.

3.12.08.01.08 Light Pollution

For all proposed roadway lighting, the maximum allowable vertical and horizontal illuminance at residential property lines shall not exceed 0.01 foot-candles (fc). House side shielding shall be provided where necessary to achieve the 0.01 fc horizontal or vertical illuminance requirement. House side shielding shall also be provided with all roadway lighting within 75 feet of a residential structure. All photometric analyses for light trespass at residential property lines shall utilize a light loss factor of 1.00.

3.12.08.02 Submittals

The Design-Builder shall submit the Definitive Design Lighting Roll Plan prior to or at the same time of submitting the Definitive Design Signing Roll Plan.

3.12.09 Advisory Speeds

The Design-Builder shall be responsible for providing a report to the Administration that documents all advisory speeds. The report shall include an investigation of the horizontal geometrics based on AASHTO roadway design guidelines. The investigation shall define the critical stopping sight distance for each curve. These above values shall be field verified to determine if the actual conditions provide the critical distances required. Pavement conditions of the roadway shall also be noted. Photographs for each curve shall be taken and included in the report. The Design-Builder shall evaluate curves with an electronic accelerometer (CurveRite Model 1100 or approved equivalent). All electronic accelerometer measurements shall follow the manufacturer's instructions. The field testing shall not exceed the posted regulatory mainline speed limit and shall be stopped if g-force measurements exceed 0.40 g-ft/sec^2. The recommended average g-force for determining advisory speeds is 0.28 g-ft/sec^2 and the advisory speeds should be posted in 5 MPH increments.

3.12.10 Regulatory Signing

The Design-Builder shall be responsible for providing an engineering study to the

Administration that documents all regulatory signing (i.e., speed limits, truck restrictions, etc.) installed under this Project.

3.12.11 Traffic Control Device Verification

The Design-Builder shall schedule meetings with the Administration to verify traffic control device work as follows:

A) At the completion of all cabling and wiring and prior to electrical utility service connection; and

B) Prior to traffic control device activation.

TC 3.13 ROADSIDE LANDSCAPE AND REFORESTATION DESIGN PERFORMANCE SPECIFICATIONS

3.13.01 Preservation of Trees and Woodlands

The Administration has imposed restrictions on construction activities that increase the removal of existing trees. The Administration will also require that the project design minimize the amount of trees removed and avoid or minimize impacts to existing tree stands and specimen trees through sound tree protection measures in accordance with the requirements of the Administrations 2001 Standard Specifications Section 120-Tree Preservation.

a. All trees removed or trimmed within this project shall be in accordance with the Roadside Tree Law and Section 120-Tree Preservation of the Administration's Standard Specifications. All tree removal and tree protection efforts shall be shown on the construction plans. All forest removed within this project shall be conducted in accordance with the Reforestation Law. Forest impacts are estimated to total **10.34 acres**, based on the RFP Forest Impact Plans.

b. On-site reforestation as shown on the conceptual landscape plans and described in this document shall be made part of this contract. Any proposed revisions to the Reforestation Site review approval shall be coordinated with SHA/LOD/LAD and DNR. Any DNR requirements or conditions associated with the modification of the Reforestation Site Review Approval shall be the responsibility of the Design-Build Team as stated elsewhere. If the Design Builder impacts forests in excess of the anticipated 10.34 acres, the Design Builder shall be responsible for locating additional off-site reforestation areas, and any necessary revisions to the State Reforestation Law Approval.

c. The order of preference for the location of reforestation is as follows:

1. Cleared land within project limits that is not otherwise allocated for reforestation due to other current or future SHA projects.

2. Offsite area in adjacent SHA lands, within the same watershed, and in coordination with and with the approval of the SHA.

d. The Design-Build Team must employ the services of an ISA Certified Arborist and a MD Licensed Tree Expert, who shall perform the following activities:

1. Conduct an on-site inspection to determine the presence and location of any and/or specimen or significant trees within the limits of disturbance plus 30 feet beyond the limits of disturbance. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of 30" or greater or at least 75% of the DBH of the MD State Champion of the species, whichever DBH measurement is smaller.

2. Prepare a Tree Impact Avoidance and Minimization Report as described under Deliverables and consistent with the Administrations 2001 Standard Specifications Section 120-Tree Preservation.

3.13.02 Guidelines and References

3.13.02.01 Guidelines

Design and construct the Landscape & Aesthetics in accordance with the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed Guideline as of the initial Publication Date of this RFP.

Table 1
Guidelines for Landscape

Priority	Author or Agency	Title
1	SHA	Standard Specifications for Construction and Materials
2	SHA	Integrated Vegetation Management Manual for Maryland Highways
3	MDE	2000 Maryland Stormwater Design Manual, Appendix A, Landscaping Guidance for Stormwater BMPs
4	ANSI A300 (Part 1)	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices
5	ANSI A300 (Part 2)	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices – Part 2 – Fertilization

Table 1
Guidelines for Landscape

Priority	Author or Agency	Title
6	ANSI A300 (Part 3)	Tree Care Operations – Tree, Shrub and Other Woody Plant - Standard Practices – Part 3 – Tree Support Systems
7	ANSI Z60.1	American Standard for Nursery Stock
8	NRCS	Pond Code 378, Visual Resource Design. Page 9
9	AASHTO	Roadside Design Guide Chapters 4, 5, 6 and 10
10	AASHTO	T88 and T194
11	SHA	Highway Hydraulic Division Stormwater Management Facility Safety Policy for Design
12	COMAR	Nutrient Management Law
13	SHA	Storm Water Management Safety Policy
14	SHA	Visual & Environmental Quality and Safety Criteria Review Guidelines

3.13.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Landscape & Aesthetics. These publications have no established order of precedence.

Table 2
References for Landscape

Author or Agency	Title
ANSI Z133.1	Safety Requirements for Pruning, Trimming, Repairing, Maintaining, and removing Trees, and for Cutting brush
Hortus Third	A Concise Dictionary of Plants Cultivated in the United States and Canada (L. H. Bailey Hortorium 1976)
AASHTO	A Guide for Transportation Landscape and Environmental Design
DNR	Department of Natural Resources Article 5-103 – Maryland Reforestation Law; and Maryland Forest Conservation Act

3.13.03 General

The Design-Builder shall design and construct Landscape plantings associated with the Project in accordance with this specification.

This Project requires particular attention to the aesthetic and landscape architectural design elements of the highway corridor. The Project corridor traverses through a variety of existing land use types that include: residential, commercial, and open landscape.

3.13.04 Planting Zones and Landscape Requirements

3.13.04.01 Planting Zone Types

The Design-Builder shall prepare a Planting Plan for the Landscape and Reforestation Plantings, based on the RFP Landscape & Reforestation Concept Plans. The Landscape and Reforestation Concept Plans designate Planting Zone Types, location, and approximate square footage. The landscape planting concept shall be developed to incorporate the use of native plants and to revegetate disturbed areas within the Project to the fullest extent possible. Large masses or groupings of trees and shrubs shall be created whenever possible to create naturalistic plantings that have continuity from one planting zone to the next. Plantings shall be designed to provide multi-season aesthetic interest to the fullest extent possible. The Design-Builder shall be responsible for coordinating the Planting Plan for Landscape and Reforestation with all other elements of work to be performed under the Project, including but not limited to final grading, stormwater management best management practices (BMP) locations, highway clear zones and sight distances, storm drain and stormwater management BMP outfalls and cross culvert outfalls, utilities, signing, and lighting. Depending on the roadway section, trees shall be offset from the edge of travel lanes conforming to the AASHTO Roadside Design Guide and the Integrated Vegetation Management Design Manual for Maryland Highways. If the Design-Builder determines a conflict from one or more of these elements, the Design-Builder shall be responsible for modifying the concept plans, while still retaining the intent of the design. Areas used for stormwater management BMPs shall not be used for Reforestation plantings or Landscape plantings other than what is required as part of the stormwater management plans. Stormwater management BMP landscape plans shall be coordinated with other landscape and reforestation plans to ensure a unified planting theme is created for the Project corridor. The Design-Builder shall furnish all specified seed and seed mixes according to the MDOT/SHA Standard Specifications for Construction and Materials 2001, Section 920.04.

The approved plant species, minimum acceptable sizes, and minimum spacing are listed below. Requests for substitution of other species shall be submitted in writing to the Administration.

3.13.04.01.01 Forest Edge (Landscape Concept Plan Symbol "FE")

The Design-Builder shall prepare Landscape Plans for the areas identified as Forest Edge Plantings. This planting zone occurs in areas where the roadway construction requires that a portion of the existing forest be removed, exposing plant material that was once "inside" the forest. A new "edge" shall be replanted using shrubs, understory, and overstory tree species. The Design-Builder shall employ this planting association at the edges of clearing of existing forest, as indicated on the Conceptual Landscape Plans. The plant association shall be designed as a band between the forest edge and the safety/clear zone limits, in accordance with the Administration's Slope Management Standards in the Integrated Vegetation Management Manual for Maryland Highways and the AASHTO Roadside Design Guide. The plantings shall, at a minimum, consist of randomly mixed tree and shrub groupings.

Density of plantings shall be 1 shade tree for each 1,500 square feet, 1 evergreen tree for each 3,000 square feet, 1 flowering tree for each 2000 square feet, and 1 shrub for each 400 square feet. A minimum of 3 tree species and a minimum of 3 shrub species shall be selected for use. Forest Edge plant selections shall be appropriate for the field environmental conditions of the project corridor. Forest edge plantings shall not be planted in long groups of the same species. Forest edge plantings shall be located in small random groupings of odd numbers of plants to achieve a naturalized appearance. The trees and shrubs located along the leading edge of the roadway side of the plantings shall be of larger sizes to better delineate the edge, and should be designed such that they will provide both natural edge structure and multi-season interest, and will compliment the remainder of the Forest Edge Plantings. Understory species shall be multi-stem form unless specified otherwise. Overstory trees, and Evergreen trees shall not be planted within 30' of the C/L of overhead utilities. Only a random mix of Understory trees and Shrubs shall be planted within 30' of the C/L of overhead utilities. The approved plant species, minimum acceptable sizes, and minimum spacings are listed below:

PLANT MATERIAL: Forest Edge Planting Areas "FE" (69,696.0 SF/1.60 Acres)

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Overstory Trees (Major Deciduous Trees):			
Acer rubrum	Red Maple	35' OC	2" Cal. B&B
Liquidambar styraciflua	Sweetgum	35' OC	2" Cal. B&B
Liriodendron tulipifera	Yellow Poplar	35' OC	1.5" Cal. B&B
Nyssa sylvatica	Black Gum	35' OC	1.5" Cal. CG

Quercus rubra	Northern Red Oak	35' OC	2" Cal. B&B
Quercus velutina	Black Oak	35' OC	2" Cal. B&B

Evergreen Tree Species:

Ilex opaca	American Holly	15' OC	5'Height B&B
(SHA Approved varieties, Provide 10% male plants of OED approved compatible varieties)			
Pinus rigida	Pitch Pine	15' OC	3' Height CG
Pinus strobus	Eastern White Pine	15' OC	5'Height B&B
Pinus taeda	Loblolly Pine	15' OC	3' Height CG
Pinus virginiana	Virginia Pine	15' OC	3' Height CG

Understory Trees (Flowering/Small Deciduous Trees):

Amelanchier arborea	Downy Serviceberry	15' OC	5' Height CG
Amelanchier laevis	Allegheny Serviceberry	15' OC	5' Height CG
Amelanchier canadensis	Shadblow Serviceberry	15' OC	5' Height CG
Cercis canadensis	Eastern Redbud	15' OC	5' Height CG
(Single Stem, Tree Form)			
Chionanthus virginicus	White Fringetree	15' OC	5'Height B&B
Hamamelis virginiana	Common Witchhazel	15' OC	5' Height CG
Magnolia virginiana	Sweetbay Magnolia	15' OC	5' Height CG
Ostrya virginiana	Ironwood	15' OC	5' Height CG
(Single Stem, Tree Form)			

Understory Shrub Species:

Aronia arbutifolia	Red Chokeberry	5' OC	3' Height CG
Calicarpa americana	Beautyberry	5' OC	3' Height CG
Clethra alnifolia	Summersweet	5' OC	3; Height CG
Ilex verticillata	'Winter Gold' Winterberry	5' OC	3' Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Ilex verticillata	'Winter Red' Winterberry	5' OC	3' Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Myrica pensylvanica	Northern Bayberry	5' OC	3'Height CG
Rhus aromatica	Fragrant Sumac	5' OC	3' Height CG
Rhus glabra	Smooth Sumac	5' OC	3' Height CG
Viburnum acerifolium	Mapleleaf Viburnum	5' OC	3' Height CG
Viburnum dentatum	Southern Arrowwood	5' OC	3' Height CG
Viburnum x pragense	Prague Viburnum	5' OC	3'Height B&B
Viburnum prunifolium	Blackhaw Viburnum	5' OC	3'Height B&B

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

ROADSIDE PLANTINGS (Landscape Concept Plan Symbol "RP")

DESIGN INTENT:

The intent is to provide shade trees and/or shrubs in areas within the project right of way that are

suitable for roadside plantings. It is the responsibility of the Design-Build Team to determine which locations trees can be placed based on hydrologic site features, existing and proposed utility locations, and adjacent land uses.

The Design-Build Team shall employ this planting association along the roadside, as indicated on the conceptual landscape plans. The Design-Build Team shall submit a site analysis plan indicating the planting opportunities for this category. Design-Build team to maximize planting whenever possible. The plantings shall, at a minimum, consist of a single row of shade trees, planted in long groups of the same genus, or shrubs or ornamental grasses planted in mass groupings of 15 plants minimum of the same genus. These groupings of one shrub genus may be combined with groupings of another genus (shrubs or ornamental grasses) in order to extend seasonal interest or enhance texture differences between plants. Areas of separation between groups of plants shall also serve as the starting point for changing to a different plant genus. Density of plantings shall be as indicated below and as approved by SHA according to the approved site analysis plan . Plant selections shall be appropriate for the field environmental conditions of the planting site; coordination shall include but not be limited to above ground, below grade utilities, business locations, and roadway signage. Maintain appropriate sight lines at all times. Understory species shall be multi-stem form unless specified otherwise. The approved plant species, minimum acceptable sizes, and maximum spacings are listed below. Requests for substitution of other species, submitted in writing, may be approved by the state Highway Administration Office of Environmental Design:

PLANT MATERIAL: Roadside Plantings – Areas "RP" (128,066.4 SF/2.94 Acres)

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Overstory Tree Species (Major Deciduous Trees)			
Acer rubrum 'Red Sunset'	Red Sunset Maple	30' OC	2.5" Cal. B&B
Platanus x acerifolia 'Bloodgood'	Bloodgood London Planetree	35' OC	2.5" Cal. B&B
Quercus phellos	Willow Oak	35' OC	2.5" Cal. B&B
Quercus rubra	Northern Red Oak	35' OC	2.5" Cal. B&B
Tilia Americana	American Linden	35' OC	2.5" Cal. B&B
Ulmus parvifolia	Chinese Lace-bark Elm	30' OC	2.5" Cal. B&B
Deciduous Trees Species Acceptable for Planting Beneath Overhead Utilities			
Acer campestre	Hedge Maple	20' OC	2" Cal. B&B Straight Single Trunk

Acer ginnala	Amur Maple	20' OC	8'Height B&B
Amelanchier laevis	Allegheny Serviceberry	20' OC	2" Cal. B&B
Maackia amurensis	Amur Maackia	20' OC	2" Cal. B&B
Prunus Sargentii	Sargent Cherry	20' OC	2" Cal. B&B

Understory Tree Species (Flowering Deciduous Trees)

Amelanchier laevis	Allegheny Serviceberry	20' OC	2" Cal. B&B
Prunus Sargentii	Sargent Cherry	20' OC	2" Cal. B&B
Single Trunk, Tree Form			
Prunus x incam 'Okame'	Okame Cherry	20' OC	2" Cal. B&B
Single Trunk, Tree Form			

Understory Shrub Species

Aronia arbutifolia	Red Chokeberry	4' OC	3' Height CG
Ilex verticillata	Winterberry	4' OC	3' Height CG
Juniperus spp.	Juniper	3' OC	15"Spread CG
(OED approved sp.)			
Myrica cerifera	Wax Myrtle	4' OC	3' Height CG
Sambucus canadensis	American Elder	4' OC	2' Height CG
Spiraea japonica	Little Princess Spirea	3' OC	2' Spread CG
'Little Princess'			
Viburnum carlesii	Koreanspice Viburnum	4' OC	3' Height CG
Viburnum dilitatum	Linden Viburnum	4' OC	3' Height CG

Ornamental Grasses

Calamagrostis'Karl Foerster'	Feather Reed Grass	3' OC	3 Gallon CG
Panicum virgatum	Red Switchgrass	3' OC	3 Gallon CG
'Shenandoah'			
Pennisetum alopecuroides	Fountain Grass	3' OC	3 Gallon CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On Center Spacing.

REFORESTATION PLANTINGS (Landscape Concept Plan Symbol "R")

In the design and execution of reforestation plantings, the Design-Build Team shall comply with the requirements of the Reforestation Law. In designing and executing the reforestation plantings, the Design-Build Team shall employ a method of "random spacing" and a density of

200 stems per acre. A full 70% of the species shall be "Overstory" species, and 30% shall be "understory" species, chosen from the list of approved species, below. A minimum of 5 major Deciduous Tree species shall be selected for the Overstory, and a minimum of 3 flowering Tree, Evergreen Tree, or Shrub species shall be selected for the understory. *In no case shall 3 of the same plant genus constitute the minimum selection.* In addition to the reforestation-sized planting stock, each reforestation area shall contain, interspersed randomly among the reforestation stock, trees chosen from the Major Deciduous Tree List, which are a minimum of 2.5 inches in caliper, at a planting density of 20 trees per acre. Reforestation plant selections shall be native, and appropriate for the field environmental conditions of the planting site. Plants specified shall be native to the Coastal Plain region of Maryland's eastern shore.

Overstory tree species, and Evergreen tree species shall not be planted within 30' of the C/L of overhead utilities. Only a random mix of Understory tree species and Shrubs species shall be planted within 30' of the C/L of overhead utilities. The approved plant species, minimum acceptable sizes, and minimum spacing are listed below. The State Highway Administration Office of Environmental Design may approve requests submitted in writing for substitution of other species.

If the Design-Build Team proposes forest impacts that are greater than 10.34 acres, the Design-Build Team is responsible for providing the remaining mitigation. The Design-Build Team is required to submit a Forest Impact Drawing to the State Highway Administration's Landscape Architecture Division for review and approval.

PLANT MATERIAL: Reforestation Plantings – Areas "R" (183,823.2 SF/4.22 Acres)

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Overstory Tree Species (Major Deciduous Trees)			
Acer rubrum	Red Maple	15' OC	1" Cal. CG
Betula lenta	Sweet Birch	15' OC	1" Cal. CG
Celtis occidentalis	Common Hackberry	15' OC	1" Cal. CG
Diospyrus virginiana	Common Persimmon	15' OC	1" Cal. CG
Liquidambar styraciflua	Sweetgum	15' OC	1" Cal. CG
Liriodendron tulipifera	Tulip Poplar	15' OC	1" Cal. CG
Nyssa sylvatica	Black Gum	15' OC	1" Cal. CG
Quercus palustris	Pin Oak	15' OC	1" Cal. CG
Quercus rubra	Northern Red Oak	15' OC	1" Cal. CG
Quercus velutina	Black Oak	15' OC	1" Cal. CG
Understory Tree Species (Flowering Deciduous Trees)			
Amelanchier arborea	Downy Serviceberry	15' OC	5' Height CG
Amelanchier laevis	Allegheny Serviceberry	15' OC	5' Height CG
Amelanchier canadensis	Shadblow Serviceberry	15' OC	5' Height CG
Cercis canadensis	Eastern Redbud	15' OC	5' Height CG

Crataegus crusgalli var. 'inermis'	Thornless CockspurHawthorn	15' OC	5' Height CG
Magnolia virginiana	Sweetbay Magnolia	15' OC	5' Height CG
Ostrya virginiana	Ironwood	15' OC	5' Height CG
Evergreen Tree Species			
Ilex opaca	American Holly	15' OC	4'Height B&B
(SHA Approved varieties, Provide 10% male plants of OED approved compatible varieties)			
Pinus rigida	Pitch Pine	15' OC	3' Height CG
Pinus strobus	Eastern White Pine	15' OC	3'Height B&B
Pinus taeda	Loblolly Pine	15' OC	3' Height CG
Pinus virginiana	Virginia Pine	15' OC	3' Height CG
Understory Species (Shrubs)			
Aronia arbutifolia	Red Chokeberry	5' OC	3' Height CG
Calicarpa americana	Beautyberry	5' OC	3' Height CG
Clethra alnifolia	Summersweet	5' OC	3; Height CG
Ilex verticillata	'Winter Gold' Winterberry	5' OC	3' Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Ilex verticillata	'Winter Red' Winterberry	5' OC	3' Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Myrica pensylvanica	Northern Bayberry	5' OC	3'Height CG
Rhus aromatica	Fragrant Sumac	5' OC	3' Height CG
Rhus glabra	Smooth Sumac	5' OC	3' Height CG
Viburnum acerifolium	Mapleleaf Viburnum	5' OC	3' Height CG
Viburnum dentatum	Southern Arrowwood	5' OC	3' Height CG
Viburnum x pragense	Prague Viburnum	5' OC	3'Height B&B
Viburnum prunifolium	Blackhaw Viburnum	5' OC	3'Height B&B

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

SWM POND PLANTINGS (Landscape Concept Plan Symbol "SWM")

In the design and execution of stormwater management pond plantings, the Design-Build Team shall comply with the requirements of the SHA's Visual & Environmental Quality and Safety Criteria Review Guidelines. Minimum planting densities and size requirements shall conform to *Table 2-Minimum Planting Requirements* of the Guidelines. Plants specified shall be native to the Coastal Plain region of Maryland's Eastern Shore. Listed below are recommended species for *Canopy Trees*, *Understory or Flowering Trees*, and *Woody Shrubs* for the ponds. Plant species selections for the Wetland Hydrologic Zones of the ponds shall be determined by the Design Builder based on the final designs of each stormwater management facility.

PLANT MATERIAL: SWM Pond Plantings – Areas "SWM" (45,738 SF/1.05 Acres)

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Canopy Tree Species			
Acer negundo	Box Elder Maple	15' OC	2" Cal. CG
Acer rubrum	Red Maple	15' OC	3" Cal. B&B
Betula nigra	River Birch	15' OC	6'Height B&B
Multi-stem, clump form			
Celtis occidentalis	Common Hackberry	15' OC	1" Cal. CG
Liquidambar styraciflua	Sweetgum	15' OC	2" Cal. B&B
Nyssa sylvatica	Black Gum	15' OC	2" Cal. B&B *Platanus*
occidentalis	American Sycamore	15' OC	3" Cal. B&B
Quercus phellos	Willow Oak	15' OC	3" Cal. B&B
Salix nigra	Black Willow	15' OC	1" Cal. CG
Taxodium distichum	Bald Cypress	15' OC	4' Height CG
Understory or Flowering Tree Species			
Amelanchier canadensis	Shadblow Serviceberry	15' OC	6'Height B&B
Multi-stem, clump form			
Magnolia virginiana	Sweetbay Magnolia	15' OC	2" Cal. B&B
Ostrya virginiana	Ironwood	15' OC	2" Cal. B&B
Woody Shrub Species			
Alnus serrulata	Smooth Alder	5' OC	2' Height CG
Aronia arbutifolia	Red Chokeberry	3' OC	2' Height CG
Aronia meloncarpa	Black Chokeberry	3' OC	2' Height CG
Baccharis halmifolia	High-Tide Bush	5' OC	2' Height CG
Cephalanthus occidentalis	Buttonbush	5' OC	3' Height CG
Clethra alnifolia	Summersweet	5' OC	3; Height CG
Hypericum densiflorum	Dense St. John's Wort	3' OC	2' Spread CG
Ilex verticillata	'Winter Red' Winterberry	5' OC	3' Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Itea virginica	Virginia Sweetspire	5' OC	2' Height CG
Rhododendron viscosum	Swamp Azalea	5' OC	2' Height CG
Sambucus canadensis	Common Elderberry	5' OC	3' Height CG
Viburnum dentatum	Southern Arrowwood	5' OC	3' Height CG
Viburnum prunifolium	Blackhaw Viburnum	5' OC	3'Height B&B

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

TC 3.14 GEOTECHNICAL PERFORMANCE SPECIFICATION

3.14.01 General

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification.

3.14.02 Guidelines and References

3.14.02.01 Guidelines

Design and construction of all geotechnical elements shall be in accordance with this Geotechnical Performance Specification and the relevant requirements of the following Guidelines and references unless otherwise stipulated in this specification. Guidelines and references specifically cited in the body of this Geotechnical Performance Specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. Listed under references are reports and resources that the Design-Builder may use to address the geotechnical requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction. All Geotechnical Reports and Submissions will be reviewed based upon FHWA Geotechnical Checklist and Guidelines (FHWA-ED-88-053).

Use the most current version of each listed guideline as of the initial publication date of this RFP unless revised by addendum or contract modification.

TABLE 1
GUIDELINES FOR GEOTECHNICAL

Priority	Author or Agency	Title
1	SHA	Office of Bridge Development, Policy and Procedure Manual
2	AASHTO	Standard Specification for Highway Bridges, 17th Edition
3	SHA	Standard Specifications for Construction and Materials
4	AASHTO	Manual on Subsurface Investigations
5	AASHTO	Guide Specifications for Structural Design of Sound Barriers
6	AASHTO	Standard Specifications for Structural Supports for Highway

TABLE 1
GUIDELINES FOR GEOTECHNICAL

Priority	Author or Agency	Title
		Signs, Luminaries and Traffic Signals, 4th Edition
7	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Parts I and II
8	ASTM	Annual Books of Standards
9	MDE	2000 Maryland Stormwater Design Manual Volumes I and II
10	FHWA	Mechanically Stabilized Earth Walls and Reinforced Soil slopes, Design and Construction Guidelines
11	SHA	Book of Standards for Highway and Incidental Structures

3.14.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and exploration of the geotechnical subsurface. These publications have no established order of precedence.

TABLE 2
REFERENCES FOR GEOTECHNICAL

Author or Agency	Title
FHWA	Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Slopes
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Drilled Shafts: Construction Procedures and Design Methods, Volumes 1 and 2
FHWA	Geosynthetic Design and Construction Guidelines
FHWA	Geotechnical Engineering Circular No. 1: Dynamic Compaction
FHWA	Geotechnical Engineering Circular No. 2: Earth Retaining Systems
FHWA	Geotechnical Engineering Circular No. 4: Ground Anchors and Anchored Systems

FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	Geotechnical Engineering Circular No. 6: Shallow Foundations
FHWA	Geotechnical Engineering Circular No. 7: Soil Nail Walls
FHWA	Durability of Geosynthetics for Highway Applications
FHWA	Ground Improvement Technical Summaries
FHWA	Micropile Design and Construction Guidelines
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff 1986
SHA	Standard Specifications for Subsurface Investigations
FHWA	Subsurface Investigations (Geotechnical Site Characterization)
	Subsurface Investigations - Geotechnical Site Characterization Reference Manual for NHI 132031
FHWA	Geotechnical Instrumentation

3.14.03 Requirements

3.14.03.01 Geotechnical Subsurface Exploration

3.14.03.01.01 Preliminary Subsurface Data

The Administration has completed a preliminary subsurface investigation to provide site characterization. The preliminary site characterization consists of Standard Penetration Test (SPT) borings, auger borings, in-situ testing and/or laboratory testing. These borings were obtained with reasonable care and recorded in good faith. This information was prepared and is intended for the Administration's design and estimate purposes. Its presentation on the plans or elsewhere is for the purpose of providing intended users with access to the same information available to the Administration. The subsurface information presented is not intended as a substitute for a subsurface investigation by the Design-Builder. The Design-Builder shall conduct additional studies in accordance with the minimum scope specified herein.

The Design-Builder shall note that the Geotechnical Data Reports, which contain the geotechnical data obtained by the Administration for this Work, is included with this RFP. Data reports generated from the preliminary studies conducted for the Administration are provided to the Design-Builder for evaluation of the subsurface conditions along the alignment and for the various design elements.

The Design-Builder shall also note the shallow level of groundwater as observed in the borings at locations where US 113 and Access Roads are in areas of cut.

3.14.03.01.02 Design-Builder's Subsurface Exploration

The Design-Builder shall form its own interpretation of the existing geotechnical data and satisfy itself as to the nature of the subsurface conditions, the form and nature of the site and nature of the Work that may affect its detailed design, construction methods, and tools. The Design-Builder shall undertake its own assessment of the suitability of the preliminary geotechnical data.

The data from the preliminary geotechnical subsurface investigation shall not serve as the sole basis for the Design-Builder's final design. The studies were performed by the Administration at a limited number of locations along the site and additional information is required for detailed design and construction.

The Design-Builder shall prepare and implement a subsurface exploration and testing program with all field and laboratory testing necessary (Table 3 & 4) to establish the geotechnical conditions and to perform all geotechnical and foundation design and analyses. The program, herein designated as the Design-Builder's subsurface exploration program, shall be developed and implemented to supplement the data provided by the Administration and to obtain the data as required to meet the requirements of AASHTO and the Design-Builder's design approach and construction methods. The locations, number, depths and types of boreholes, laboratory and field-testing and sampling shall conform to the standards of practice of the Administration, AASHTO and the FHWA. The details of the Design-Builder's field and laboratory testing programs for design shall be submitted to the Administration as part of the Geotechnical Planning Reports for review and comment (See "Geotechnical Planning Reports", below) at least 30 days prior to the actual field exploration activities. The rationale for development of the exploration programs, data interpretation, and parameter selection, together with descriptions of the methods of analyses, shall be clearly presented.

In addition to the techniques described in the AASHTO Manual on Subsurface Investigations, the Design-Builder's Geotechnical Engineer may include the Ko blade, Prebored Pressuremeter (ASTM D-4719), Electronic and Piezocone Testing (ASTM D-5578), Mechanical Cone Penetrometer (ASTM D-3441), and Dilatometer Test Probes (ASTM D-6635) in the subsurface investigations to aid in the development of in-situ soil parameters for the design of this Project. Ko testing shall be in accordance with the manufacturers recommended procedures. The raw data obtained from in-situ testing shall be correlated by a professional geotechnical engineer based upon the soil conditions. Parameters obtained from in-situ testing, without correlation with soil index and validation by a qualified engineer will not be allowed for design purposes.

The Administration will review and provide written comments on the Design-Builder's subsurface exploration plan prior to its implementation. The Design-Builders shall perform its subsurface exploration program to establish all geotechnical parameters and subsurface conditions, including groundwater conditions, required for design and construction. In areas of erratic subsurface conditions and where stratification indicates possible deep stability or settlement problems, borings shall extend into rock or into a hard or dense soil stratum.

The Design-Builder shall provide the results of the studies to the Administration as described in "Interim Design Memoranda", below.

TABLE 3
MINIMUM REQUIREMENTS FOR BORING DEPTH

Areas of Investigation	Boring Depth
Bridge Foundations	For spread footings and deep foundations See AASHTO 17th Edition, Section 4.3.2.
Retaining Walls / Wing Walls	AASHTO 17th Edition, Section 5.3.2.
Roadway, Subgrade and Pavement Design	Extend borings a minimum of 10 feet below the proposed pavement subgrade level.
Cuts	Borings shall extend a minimum of 1.5 times the depth of the cut below the anticipated depth of the cut at the ditch line.
Embankments	See AASHTO Manual on Subsurface Investigations, Section 7.4.4.2. Borings shall extend a minimum of 1.5 times the height of the embankment.
Culverts	Use criteria presented above for Retaining walls/wing walls
Stormwater Management	See the 2000 Maryland Stormwater Design Manual Volumes I and II
Noise Walls and High Mast Lighting	See bridge foundation requirements above.

TABLE 4
MINIMUM REQUIREMENTS FOR SPT BORING LAYOUT*

Geotechnical Features	Boring Layout
Bridge Foundations	See AASHTO 17th Edition, Section 4.3.3.
Retaining Walls	A minimum of two borings shall be performed for each retaining wall. For retaining walls more than 100 feet in length, the spacing between borings shall be no greater than 100 feet. Additional borings to define conditions at the toe of the wall and in the zone behind the wall to

TABLE 4 MINIMUM REQUIREMENTS FOR SPT BORING LAYOUT*	
Geotechnical Features	Boring Layout
	estimate lateral loads and anchorage capacities shall be included at a spacing of no greater than 150 feet.
Wing Walls	A minimum of one (1) boring shall be performed for each wing wall. For retaining walls in excess of 75 feet in length, see Retaining Walls, above.
Roadways, Subgrade and Pavement Design	The spacing between borings along the roadway alignment shall not exceed 500 feet.
Roadway Embankments and Cuts	See AASHTO Manual on Subsurface Investigations, Section 7.4.3.2. For the most critical section, at least three borings (at toe of the slope, crest of the slope and top of the slope) shall be conducted to establish the soil profile for slope stability analysis.
Culverts	AASHTO Manual of Subsurface Investigations, Section 7.4.3.3.
Stormwater Management	See the 2000 Maryland Stormwater Design Manual Volumes I and II
Noise Walls	See retaining wall boring layout above.
Highmast Poles	See Standard #6 above.

* Foundation borings must be within 25-feet of the substructure unit to be applicable.

Among the requirements for the subsurface investigation and laboratory testing to be performed for the Project are the following:

A) Supervision and Inspection – All geophysical investigations shall be planned and performed under the direct supervision of a geophysicist with a minimum of 10 years experience. All boring and in-situ testing inspection shall be performed by field inspectors that have passed the NHI Subsurface Investigation Qualification Course (#132079), and; (a) be a degreed engineer or geologist; or, (b) have a minimum of two (2) years of field experience in the inspection and reporting of field sampling and testing of similar size and content. All field investigations and laboratory testing shall be performed under the direct supervision of a Maryland-registered professional engineer with a minimum of five (5) years experience in the performance and supervision of geotechnical engineering Projects.

B) Location and Ground Surface Elevation - The Design-Builder shall determine the coordinate location, Station and Offset from the US 113 Mainline and ground surface elevation, for each boring and other test probes and show the information on the individual boring logs.

C) Soil classification shall be performed in accordance with the AASHTO Classification system.

D) Final boring and rock core logs shall be prepared and presented using gINT software as supplied by Geotechnical Computer Applications Inc. The Administration will provide the electronic template for the latest version of gINT; and,

E) The soils and rock samples obtained by the Design-Builder for the supplemental subsurface investigation are the property of the owner. The Design-Builder shall deliver all samples to the designated location upon completion.

F) Location of groundwater table and determination of seepage conditions.

G) All drilling equipment shall be calibrated and the Design-Builder shall provide the efficiency of all hammers to be used for this project.

H) The Design-Builder shall use all information obtained from the testing program to prepare a subsurface profile in order to determine the adequacy of the site investigation program.

See the Environmental Performance Specification for specifics regarding stream crossing, wetland, and buffer zones. See the Maintenance of Traffic Performance Specification for the specifics regarding maintenance of traffic requirements that will be required during any subsurface exploration activities.

3.14.03.01.03 Laboratory Testing

After collecting soil and rock samples, laboratory tests will be performed to quantify material properties and verify design assumptions. All engineering properties shall be based upon the type of structure being constructed. The type and number of tests required are primarily a function of the variability of the site, the purpose of the study, and the amount of risk and potential consequences of failure. Sufficient laboratory testing shall be performed so that the Design-Builder's Geotechnical Engineer and that the Administration's Geotechnical Engineer are satisfied that the test results are representative of in-situ conditions. All standard soil and rock sample laboratory testing shall be performed in accordance with the appropriate AASHTO Test Designation. All laboratory testing shall be performed by laboratories with AMRL certification for each specific test performed. Laboratory testing conducted on undisturbed samples shall be performed no more than 7 days after sample retrieval.

3.14.03.01.04 Geotechnical Planning Reports

The Design-Builder shall prepare Geotechnical Planning Reports for individual Project elements or groups of Project elements based upon the design/construction priority and/or sequence of construction. The Geotechnical Planning Reports shall include a detailed method statement describing the general philosophy and methods of investigation, preliminary design and analysis and selection of the anticipated means of construction for the included Project elements. The method

statement shall indicate how material and design details are chosen to match selected construction methods and construction details and the soil, rock, and groundwater environment for the site.

For each Geotechnical Planning Report, the Design-Builder shall include the following technical information, as a minimum:

A) Description of geology and various ground types to be encountered along the alignment;

B) A description of the geotechnical information that was collected and analyzed in developing the Design-Builder's Geotechnical Planning Report;

C) Assessment of the engineering properties of all soil types, including the expected average and range of soil strengths and deformation properties and the preliminary design parameters for all soil and rock types;

D) A narrative describing the interpretation of the pertinent geotechnical data used as a basis for preliminary selection, design, and installation of the proposed foundation elements;

E) A description of the planned supplemental subsurface investigation (See "Design-Builders Subsurface Exploration").

F) The Geotechnical Planning Reports shall define the investigation, engineering and design approach that will be followed in order to develop the most technically, and environmentally acceptable and durable foundations, cut and fill slopes, retaining structures, pavements, stormwater management, and geotechnical designs for the elements included in the Geotechnical Planning Report.

The Geotechnical Planning Reports shall be prepared, signed and sealed by a Professional Engineer licensed in the State of Maryland. This Geotechnical Planning Report shall be submitted to the Administration 30 days prior to mobilization. Prior to mobilization, the Design-Builder and the Administration shall meet to discuss the contents of the Geotechnical Planning Reports and present the Administration's review written comments.

3.14.03.02 Geotechnical Design

3.14.03.02.01 Selection of Design Properties

The following process shall be followed in selecting material properties for design:

- select samples for performance testing,
- conduct laboratory testing,
- review the quality of the laboratory data,
- select material properties for design.

Subsurface soil or rock properties shall be determined using one or more of the following methods:

- in-situ testing during the field exploration program, including consideration of any geophysical testing conducted,
- laboratory testing,
- and back analysis of design parameters based on site performance data.

The selection of soil shear strength for design shall consider, at a minimum, the following:

- the rate of construction loading relative to the hydraulic conductivity of the soil, i.e., drained or undrained strengths;
- the effect of applied load direction on the measured shear strengths during testing;
- the effect of expected levels of deformation for the geotechnical structure; and
- the effect of the construction sequence.

Laboratory consolidated undrained (CU) and unconsolidated undrained (UU) testing shall be used to estimate the undrained shear strength, Su, supplemented as needed with values determined from in-situ testing. Where collection of undisturbed samples for laboratory testing is difficult, values obtained from in-situ testing methods may be used after proper and acceptable correlation practices approved by State Geotechnical Engineer. For relatively thick deposits of cohesive soil, profiles of Su as a function of depth shall be obtained so that the deposit stress history and properties can be ascertained. Strength measurements from hand torvanes, pocket penetrometers, or unconfined compression tests shall not be used to evaluate undrained shear strength for design analyses. Correlations for Su based on in-situ test measurements shall not be used for final design unless they have been calibrated to the specific soil profile under consideration. Correlations for Su based on SPT tests will not be allowed.

Long-term effective stress strength parameters, c’ and ϕ’, of clays shall be evaluated by slow consolidated drained direct shear box tests, consolidated drained (CD) triaxial tests, or consolidated undrained (CU) triaxial tests with pore pressure measurements. In laboratory tests, the rate of shearing shall be sufficiently slow to ensure substantially complete dissipation of excess pore pressure in the drained tests or, in undrained tests, complete equalization of pore

pressure throughout the specimen. The selection of peak, fully softened, or residual strength for design analyses shall be based on a review of the expected or tolerable displacements of the soil mass. The use of a nonzero cohesion intercept (c') for long-term analyses in natural materials will not be allowed.

The drained friction angle of granular deposits shall be evaluated by correlation to the results of SPT testing, CPT testing, or other relevant in-situ tests. Laboratory shear strength tests on undisturbed samples, if feasible to obtain, or reconstituted disturbed samples, may also be used to determine the shear strength of granular soils. If SPT N values are used, unless otherwise specified for the design method or correlation being used, they shall be corrected for the effects of overburden pressure and for hammer efficiency. If SPT correlation is used to estimate the drained friction angle of granular deposits, Table 5 shall be used. Care shall also be exercised when using SPT blow counts to estimate soil shear strength if in soils with coarse gravel, cobbles, or boulders. Large gravels, cobbles, or boulders could cause the SPT blow counts to be unrealistically high.

TABLE 5
CORRELATION OF SPT $N1_{60}$ VALUES TO DRAINED FRICTION ANGLE OF GRANULAR SOILS

<4	25
4	27
10	30
30	35
50	38

Consolidation parameters Cc, Cr, C_α shall be determined from the results of one-dimensional consolidation tests. To assess the potential variability in the settlement estimate, the average, upper and lower bound values obtained from testing shall be considered. Where evaluation of elastic settlement is critical to the design of the foundation or selection of the foundation type, in-situ methods such as PMT or DMT for evaluating the modulus of the stratum shall be used.

The coefficient of consolidation, Cv, shall be determined from the results of one-dimensional consolidation tests. The variability in laboratory determination of Cv results shall be considered in the final selection of the value of Cv to be used for design. CPTu tests in which the pore pressure dissipation rate is measured may be used to validate the laboratory testing for the value of Cv.

Direct shear test results on cohesive soils will not be allowed.

The strength of intact rock material shall be determined using the results of unconfined compression tests on intact rock cores, splitting tensile tests on intact rock cores, or point load strength tests on intact specimens of rock. The rock shall

be classified using the rock mass rating system (RMR). For each of the five parameters in the table, the relative rating based on the ranges of values provided shall be evaluated. The rock mass rating (RMR) shall be determined as the sum of all five relative ratings.

The soil and rock properties are vital in the analysis of the stability of structures. The Design-Builder shall validate the properties of each soil or rock stratum with the testing program.

3.14.03.02.02 Design of Bridge Foundations

The criteria set forth herein shall pertain to the geotechnical and foundation design and shall conform to AASHTO Standard Specifications for Highway Bridges 17th Edition, using the service load (allowable stress) design method, or as otherwise specified herein.

A deep foundation shall be used where a shallow foundation cannot be designed to carry the applied loads or displacements safely. Deep foundations shall also be used where scour, erosion, or unacceptable settlement might occur. See the Structures Performance Specification for design scour depths and/or requirements for scour analyses. Refer to the Structures Performance Specification for scour analysis requirements.

3.14.03.02.03 Shallow Foundations

Shallow foundations shall include spread footings for strip footings and mats or raft foundations beneath an entire structure area.

Shallow foundations may be used where there is a suitable bearing stratum near the surface and where there are no highly compressible layers or soils susceptible to collapse or expansion below. Shallow foundations shall not be placed in existing or proposed fills or embankments. Foundation design shall accommodate potentially detrimental substances in soil or groundwater, such as chlorides and sulfates.

Shallow foundations shall be designed to meet the bearing capacity, settlement and stability requirements of AASHTO. Effects of adjacent foundations, variable groundwater conditions and surcharge loads shall be accommodated when evaluating foundation settlements and bearing capacity.

3.14.03.02.03.1 Bearing Capacity

Shallow foundations shall be analyzed for bearing capacity to confirm that the underlying soil can resist the footing loads without bearing capacity failure. A factor of safety of at least 3.0 shall be provided against bearing capacity

failure for AASHTO Group I loading. The desired bearing value shall be validated by the required site investigation and laboratory testing program. The Design-Builder will be required to confirm the bearing value using an in-situ testing program.

Groundwater and its variation shall be documented in the calculation of the bearing value. An approved ground improvement technique may be accepted to improve the bearing value.

3.14.03.02.03.2 Settlement

Analyses shall be conducted to estimate the total and differential soil settlement induced by the foundation loads. Immediate settlements for granular soils and immediate, primary and secondary consolidation settlements for cohesive soils shall be accommodated. Shallow foundations shall be designed to keep estimated settlements within the allowable values specified in the Structures Performance Specification.

3.14.03.02.03.3 External Stability

Shallow foundations shall be analyzed and constructed for external stability, including sliding, overturning and global failure. A minimum factor of safety of 1.5 shall be provided against sliding and global failures. A minimum factor of safety of 2.0 shall be provided against overturning failure. Passive earth pressure in front of the foundation shall not be used in the evaluation of sliding and overturning modes. Shallow foundations shall be designed such that the resultant load falls within the middle third of the foundation.

3.14.03.02.04 Deep Foundations

Deep foundations may include timber driven piles, steel driven piles or drilled shafts. Pre-cast pre-stressed concrete piles, auger cast in place, rammed aggregate piers, screw piles, or existing foundations will not be considered for use on this Project. When designing deep foundations, design and construction shall include accommodations to minimize the level of construction noise and the radius of influence from construction vibrations.

Piles and drilled shafts shall be designed in accordance with the requirements of AASHTO 17th Edition Standards. See the Structures Performance Specification for material requirements and structural design of foundation elements. The minimum length for steel driven piles shall be 12-feet.

The center-to-center spacing of drilled shafts and round piles shall not be less than three times the drilled shaft or pile diameter. Piles shall be designed and constructed such that neither tension loads nor load reversals occur under any loading conditions.

3.14.03.02.04.1 Axial Capacity

Deep foundations shall be analyzed for axial compression, using static analysis methods in accordance with AASHTO specifications and FHWA manuals. A factor of safety consistent with the level of construction control shall be applied to the ultimate capacity of driven piles in accordance with AASHTO Standard Specifications for Highway Bridges 17th Edition Table 4.5.6.2A. The capacity shall be verified by field tests including static load tests and the allowable capacity shall be based on the field tests. For drilled shafts, the factor of safety shall be consistent with AASTHO 17th Edition Section 4.6.5.4.

3.14.03.02.04.2 Group Spacing and Performance

The design of deep foundations shall consider soil properties, type of foundation and group effects due to spacing of foundation elements. See AASHTO 17th Edition 4.5.6.4.

3.14.03.02.04.3 Settlement

The design of deep foundations shall accommodate the total and differential settlement caused by the structure loads. Settlement of individual deep foundation elements and settlement of pile groups shall be estimated. The foundation shall be designed and constructed to keep the settlement within the allowable values established in the Structures Performance Specification.

3.14.03.02.04.4 Downdrag (Negative Skin Friction)

The design of deep foundations shall accommodate the effect of negative skin friction from existing ongoing ground settlement, construction dewatering, variable groundwater conditions, placement of fill or embankments, or pile installation. Downdrag loads shall be determined by accounting for the load transfer distribution along the deep foundation element as well as the group layout. The magnitude of the downdrag load shall be applied as prescribed in AASHTO 17th Edition. Battered piles may not be used in areas where downdrag may occur.

To reduce downdrag forces, corrugated metal sleeves or bituminous coatings may be utilized after approval by the Administration. The use of friction-reducing rings welded on steel pipe piles to reduce downdrag will not be allowed. The driving of piles shall commence after the completion of settlement and after approval by the Administration.

3.14.03.02.04.5 Lateral Load Capacity

Deep foundations shall be designed to adequately resist the lateral loads

transferred to them from the structure without exceeding the allowable deformation of the structure or overstressing the foundation elements. See Structures Performance Specification for allowable lateral deformations. The lateral load resistance of the individual and group of deep foundation elements shall be analyzed and included in the design. The analysis shall accommodate nonlinear soil pressure-displacement relationships, soil/structure interaction, group action, groundwater, and cyclic and static and dynamic load conditions. The deep foundation performance evaluation shall include the determination of vertical and horizontal movements, rotation, axial load, shear, and bending moment for the foundation elements and the bending stresses in the batter piles due to the weight of settling soils. Equivalent points of fixity shall be determined using the equivalent stiffness method accounting for the soil-structure p-y stiffness and the equivalent fixed end method.

Where the lateral resistance of the soil surrounding the piles is inadequate to resist the applied loads, batter piles shall be provided. Batter piles shall not be flatter than one horizontal to four vertical. Where battered piles are proposed, the design shall account for the potential of encroachment on property outside the right-of-way and interfering with underground and aboveground structures, facilities, and utilities. The use of battered drilled shafts will not be considered. Deadmen and ground anchors will be allowed for lateral load resistance where such features can be accommodated within the Right-of-Way without encumbering the space for utilities and/or stormwater management facilities.

See the Structures Performance Specification" for lateral deflection criteria.

3.14.03.03 Design of Retaining Walls and Retaining Wall Foundations in Fill

See the Structures Performance Specification for design criteria of retaining walls. Mechanically Stabilized Earth (MSE) retaining walls shall have a minimum design life of 75 years.

3.14.03.03.01 Vertical Loads

The loads used in the design of permanent Work shall be in accordance with the requirements of the relevant design codes and Standards, except where herein modified or augmented. Estimation of live loads due to pedestrian, or highway traffic shall be in accordance with the requirements of AASHTO 17th Edition Specifications.

3.14.03.03.02 Lateral Earth Pressure

Lateral earth pressures shall be estimated in accordance with AASHTO 17th Section 5.5.2. The design of the retaining structures shall be based on the maximum lateral pressures that will develop behind the structures.

Loads due to soils or backfill shall be derived using the maximum values of the saturated densities. Only where it can be clearly demonstrated that the fill is well drained, and will remain well drained in the future, shall any reduction in the degree of saturation may be allowed. The submerged densities shall be used for soil unless the location is above the standing water table.

Hydrostatic pressure induced by the groundwater table, when present, shall be included in the lateral pressures. Additional hydrostatic pressures and variations in groundwater conditions due to drainage, flooding and rapid drawdown conditions shall be accommodated in the design of retaining structures.

3.14.03.03.03 Shallow Foundations

See Shallow Foundations for Bridges, above. Shallow foundations for retaining walls shall be designed to maintain wall settlements (total and differential), bearing values and other stability criteria within the applicable tolerances specified in FHWA "Mechanically Stabilized Earth Walls and Reinforced Slopes, Design and Construction Guidelines".

3.14.03.03.04 External and Internal Stability

See Shallow Foundations for Bridges, above, for minimum Factors of Safety for External stability for all types of retaining walls, including sliding and overturning. Minimum factors of safety for MSE walls with respect to failure modes are as follows:

External Stability

Sliding :	F.S. ≥1.5
Eccentricity e, at Base :	≤ L/6 in soil; L/4 in rock
Bearing Capacity :	F.S. ≥ 2.5
Deep Seated Stability :	F.S. ≥ 1.3
Compound Stability :	F.S. ≥ 1.3
Seismic Stability :	F.S. ≥ 75% of static F.S. (All failure modes)

Internal Stability

Pullout Resistance :	F.S. ≥ 1.5

Allowable Tensile Strength

steel strip reinforcement :	0.55 F_y
steel grid reinforcement:	0.48 F_y (connected to concrete panels or blocks)

geosynthetic reinforcements : T_a

The vertical spacing of primary reinforcement shall be a maximum of 32 inches and the vertical spacing of secondary reinforcement shall be a maximum of 12 inches.

3.14.03.03.05 Deep Foundations

Deep foundations for retaining walls shall be designed in accordance with "Deep Foundations for Bridges", above.

3.14.03.04 Design of Top-Down Retaining Walls (Walls in Cut)

Top-down retaining walls shall include steel sheet-piling, tangent or secant pile systems, soldier pile and lagging, soil nails, slurry walls and ground anchored wall systems.

All retaining walls types shall be designed in accordance with AASHTO17th Edition Specifications. For requirements related to loading, stability and drainage, see Design of Retaining Walls and Retaining Wall Foundations in Fill, above.

Where soil nail, tie-backs or ground anchors are required for resistance of lateral loads, the elements shall be designed in accordance with either FHWA "Geotechnical Engineering Circular No. 7: Soil Nail Walls" or "Geotechnical Engineering Circular No. 4: Ground Anchors and Anchored Systems". Prior to the design of any tie-back wall system, a check for aggressive soil surrounding the tie-back wall system shall be made.

3.14.03.05 Design of Fill Embankments

3.14.03.05.01 Slope Stability

The analyses, design and construction of soil and rock embankment side slopes shall accommodate the effects of deterioration and loss of soil resistance due to local climatic and construction conditions. The Design-Builder shall perform the site investigation as per requirements of AASHTO and FHWA NHI-01-031 drilling guidelines. The minimum acceptable drilling spacing for the fill embankments shall be not greater than 150 feet. Closer spacing may be required if the site conditions indicate the presence of varying materials. At critical locations (i.e. highest fill), provide a minimum of three borings in the transverse direction to define existing conditions for stability analyses. All slopes shall be designed to minimize erosion by rainfall and runoff. Adequate drainage and erosion control provisions shall be incorporated in the design and construction of the embankments. Embankments in excess of 20 feet in height shall include a bench at least 15 feet in width, shall be graded to drain, and shall include a minimum 12-ft long Geosynthetic inclusion placed every three feet (vertical

spacing) along the edge of fill embankments for compaction aid and surficial stability. In the absence of required right-of-way, the Design-Builder shall engineer the slope to maintain the stability of wall systems. Subsurface drainage shall be provided for all fill slopes greater than 15-feet in height that do not have graded drainage at the top of the slope. Subsurface drainage may also be required on all other slopes depending upon the analysis of the slope design.

Slope stability analyses shall be conducted using limit equilibrium methodologies using an computer program such as PCSTABL, ReSSA or StedWIN. Circular, sliding, compound and wedge type failures shall be analyzed for potential occurrence for each embankment configuration and slope. The Modified Bishop, simplified Janbu, Spencer, or other widely accepted slope stability methods shall be used for rotational and irregular surface failure mechanisms. Soil parameters based upon valid testing requirements shall be used. At a minimum, three laboratory test results may be required to confirm the soil parameters. Shear strength testing shall be performed by an AMRL certified laboratory. The testing program shall be acceptable to the Administration. The evaluation of global slope stability (long term and short term) shall accommodate potential seepage forces, water infiltration, surficial water runoff and any weak deposits and seams that are adversely impacted by water flow. The global stability analyses shall account for the use of buttressing, placement of select material, or improvements to the foundation material of the embankment, especially at the toe of slope near ponds, wetlands, streams and other locations of poor materials. For all slope stability analyses where the fill material consists of silts or is unknown at the time of analysis, cohesion (c) shall be equal to zero (0). A minimum factor of safety of 1.3 shall be provided under static loads for fill embankment slopes for both global stability and surficial stability analyses. In addition to global and surficial stability analyses, the Design-Builder shall provide stability analyses for the rapid drawdown condition with a minimum factor of safety of 1.1.

All requirements of the Planting and Landscape Architectural Performance Specification shall be coordinated and accounted in the Design-Builder's slope analysis. The Design-Builder shall coordinate landscape features to account for landscaping, revegetation and/or reforestation operations to address potential adverse impacts and reductions in the factor of safety for fill embankment slopes for the as-built condition. At these locations, the Design-Builder's Geotechnical Engineer shall perform site-specific global stability studies for the landscaping condition, which may require pre-emptive measures such as localized areas of reinforcement and/or localized areas with buttressing at the toe of slope to maintain the required factors of safety. In areas where water features (such as stormwater management ponds) intercept the toe of slope, the toe of slope shall be buttressed.

3.14.03.05.02 Settlement

Analyses shall be conducted to estimate the soil settlement induced by the embankment loads. Immediate settlement in granular soils and both immediate and consolidation settlements in cohesive soils shall be accommodated. Embankments shall be designed to keep estimated total long-term settlements limited to 0.5-inches during a period of 50 years after completion of the pavement construction. Differential settlements within fill sections and across fill/structure interfaces shall be limited to 1/300. For soft ground situations, see "Design of On-Site Soil Improvement", below.

3.14.03.06 Design of On-Site Soil Improvement

The use of soil improvement techniques to increase soil shear strength and reduce compressibility in order to increase the safety factors for external and internal stability and reduce settlements to the allowable range will be allowed in the design. The Design-Builder shall demonstrate their suitability for local conditions and installation methods. Techniques such as soil-cement, vertical drains, surcharge, stone columns, vibrocompaction, dynamic compaction, lime columns, cement columns, deep mix methods, rammed aggregate pier, and grouting may be included in the design in order to increase strength and/or expedite consolidation of the subsoils, where it is required to increase bearing capacity or reduce post-construction settlements.

All soil improvement systems shall be designed using current practice and procedures. The performance of all ground improvement techniques shall be verified with a pre-production and post-production field testing program developed to demonstrate that the proposed methods and design will provide the ground improvement level required to satisfy the performance requirements specified herein. Long term performance of the soil improvement systems shall be demonstrated. The Administration may require instrumentation or sampling to verify the strength gained using the Design-Builder's ground improvement techniques.

3.14.03.07 Alternative Embankment Materials

Alternative embankment materials for reducing load and settlement such as foamed concrete, expanded polystyrene and fired/expanded clay shale will be considered for use on the Project. Materials such as tire shreds, recycled glass and wood chips/products will not be considered for use on the Project. By-products from steel and coal production, such as slags and fly ashes, will not be allowed for embankment construction.

3.14.03.08 Design of Reinforced Soil Slopes (RSS)

Where reinforced soil slopes are approved for reducing impacts to wetlands and/or other natural resources, the design procedures and considerations shall conform to the

requirements of the Maryland State Highway Administration Specification and FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines. Performance requirements are presented in the following table:

MINIMUM FACTORS OF SAFETY FOR DESIGN OF RSS	
Failure Mode	Minimum Safety Factor
External Stability:	
Sliding	1.3
Local Bearing Capacity	1.5
Global Slope Stability	1.3
General Bearing Capacity	2.5
Settlement	See ”Settlement” under “Design of Fill Embankments”
Internal Stability:	
Internal Stability	1.3
Compound Failure	1.5
Rupture Strength	> Allowable Reinforcement Tension
Pull-out Resistance	1.5 (granular soils)
Pull-out Resistance	2.0 (cohesive soils)
Surficial Stability	1.3

Adequate drainage provisions, slope protection and erosion control provisions shall be incorporated into the RSS designs in accordance with requirements of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines. The vertical spacing of primary reinforcement shall be a maximum of 32 inches and the vertical spacing of secondary reinforcement shall be a maximum of 12 inches. Material requirements such as gradation, partial reduction factors of safety (creep, installation damage, durability, etc) for reinforcement fill, geosynthetic materials: geogrid, geotextile, etc., shall be submitted for review.

Material Requirements:

Geosynthetic Reinforcement: The geosynthetic reinforcement material for RSS shall be a geogrid or high tenacity polyester geotextile. Geosynthetic reinforcement shall be manufactured from high strength polypropylene (PP), or high density polyethylene (HDPE), or high tenacity polyester (PET) material. This reinforcement material shall

have a high resistance to damage during construction, to ultraviolet (UV) degradation, and to all forms of chemical and biological degradation in the soil being reinforced.

The Allowable Tensile Strength shall be determined using the following formula:

$$T_a = T_{ult} / FS_{CR} \times FS_{ID} \times FS_{CD} \times FS_{BD} \times FS_{JNT}$$

Where:

T_a = Allowable geosynthetic tensile strength,(plf) for use in stability analyses;

T_{ult} = Ultimate geosynthetic tensile strength, (plf)

FS_{CR} = Partial factor of creep deformation, ratio of Tult to creep limiting strength, (dimensionless);

FS_{ID} = Partial factor of safety for installation damage, (dimensionless);

FS_{CD} = Partial factor of safety for chemical degradation, (dimensionless);

FS_{BD} = Partial factor of safety for biological degradation, used in environments where biological degradation potential may exist, (dimensionless);

FS_{JNT} = partial factor of safety for joints (Seams and connection), (dimensionless).

Default Partial Factor of Safety Values: If test documentation is not provided, or the Engineer determines that the test documentation is not adequate, the following partial factor of safety values shall be used for the computation of allowable tensile strength. In absence of valid test results, the Administration will use the following values to determine the allowable tensile strength of Geosynthetic material:

FS_{ID}	FS_{CR}	FS_{CD}	FS_{BD}	FS_{JNT}
3.0	5.0	2.0	1.3	2.0

<u>Reinforced Fill Material</u>. The reinforced fill material for RSS shall conform to the following:

Sieve Size	Percent Passing
2"	100
No. 4	100 - 20
No. 200	0 - 30

Where the PI shall be less than 5, when tested in accordance with T 90 and the pH shall be in the range of 3 to 9 when tested in accordance with MSMT 602. MSMT A-4-7, A-5, A-6, A-7-4 and A-7 materials are not acceptable as reinforced fill material. Sodium Sulfate soundness loss shall be less than 30 percent after four cycles when tested according to T 104. The angle of internal friction (φ), and the effective angle of internal friction (φ') of the reinforced fill material shall be 32 degrees or greater. The shear strength parameters will be determined using one of the following: 1) D 3080 sheared at a slow rate to insure adequate drainage or 2) D 4767 (CU) and/or D 2850 (UU) triaxial tests with the pore pressure measured to determine the effective strength parameters

3.14.03.09 Design of Permanent Cut Slopes

Geotechnical analyses of soil cut slopes shall be performed to assess soil slope stability along new and existing roadway cuts. The Design-Builder shall perform the site investigation as per requirements of AASHTO and FHWA NHI-01-031 drilling guidelines. The minimum acceptable drilling spacing for the cut slopes shall be not greater than 150 feet. Closer spacing may be required if the site conditions indicate the presence of varying materials. At critical locations (i.e. deepest cut), provide a minimum of three borings in the transverse direction to define existing conditions for stability analyses. Potential circular and wedge type failure modes shall be analyzed for each soil cut and each slope and orientation. Slope stability analyses shall be conducted using limit equilibrium methodologies using an computer program such as PCSTABL, ReSSA or StedWIN. The Modified Bishop, simplified Janbu, Spencer, or other widely accepted slope stability methods shall be used for rotational and irregular surface failure mechanisms. Soil parameters based upon valid testing requirements shall be used. At a minimum, three laboratory test results may be required to confirm the soil parameters. Shear strength testing shall be performed by an AMRL certified laboratory. The testing program shall be acceptable to the Administration. Permanent soil cut slopes shall be no steeper than 2:1 with a minimum factor of safety of 1.5. In the absence of required right-of-way, the cut slope shall be engineered through the use of a toe wall, soil nail wall or other

engineering technique to allow for the required benching requirements.

Cut slopes in rippable rock shall be no steeper than 1.5:1 and shall be serrated when between 1.5:1 and 2:1. Cut slopes in rippable rock flatter than 2:1 shall not be serrated. Cut slopes in rock requiring blasting for excavation shall be no steeper than 0.25:1. Cut slopes in rock requiring blasting for excavation that are steeper than 1:1 shall be presplit, with lifts no greater than 20-feet. The State Geologist shall approve the final rock slope ratio requirements. At soil/rock interfaces or changes in slope ratio, benches with a minimum 5-foot width are required. Cut slopes (2:1) in excess of 20 feet in height shall include a bench at least 15-feet in width at approximately ½ the slope face height. The placement of a toe bench to contain rock fall material shall be included where appropriate. Drainage and erosion control provisions and means to control seepage shall be incorporated in the design and construction of the cut slopes. The Design-Builder shall have a record of water levels and the slope stability calculation shall model the effect of seepage in the slope stability calculations. The seepage line shall be intercepted with the use of slope drains or horizontal drains or any other techniques to enhance the stability of cut slopes.

3.14.03.10 Design of Ground Mounted Noise Barrier Foundations

Only drilled shafts are acceptable as foundations for Noise Barrier Panels. See Deep Foundations for Bridges, above, for design requirements of drilled shaft foundations. The drilled shaft length shall include an additional three-foot length to the designed length to account for freezing, thawing, weathering and other shall ground disturbances.

3.14.03.11 Design of Foundations for Traffic and ITS Structures

See Deep Foundations for Brides and Standard #6 for design requirements for deep foundations for sign structures, light poles and all other ancillary ITS components, including but not limited to cameras, cabinets and traffic poles. Refer to Shallow Foundations for Bridges for design requirements for shallow foundations.

3.14.03.12 Design of Subgrades for Pavements

The Top of Subgrade shall be identified by the Design-Builder on the pavement details. Any material placed above the Top of Subgrade shall be considered part of the pavement structure. Any material placed below or other work below Top of Subgrade shall be considered a subgrade improvement. The minimum design subgrade resilient modulus (Mr) at the Top of Subgrade shall be as specified in the Table in Section 3.10.03.05.05 of the Pavement Performance Specification. When the native soils are not capable of providing the minimum design strength, a subgrade improvement strategy shall be included in the pavement design to reach the minimum strength requirement at the Top of Subgrade. The Design-Builder shall specify the design subgrade strength, planned subgrade improvements, and as-needed subgrade improvements in the Interim Pavement Report. The same design subgrade strength

value shall be used throughout the entire area of each roadway element. In the case that a subgrade improvement is used throughout a significant portion of a roadway element, it shall be shown in the pavement details.

The Project shall be test rolled in accordance with Section 204.03.01(c) of the Standard Specifications for Construction and Materials. Passing test rolling shall signify that a section of subgrade has reached a stable construction platform and that the minimum subgrade strength, as specified in the Table in Section 3.10.03.05.05 of the Pavement Performance Specification, has been achieved at the Top of Subgrade. Test rolling records and field notes shall be required to confirm the minimum subgrade strength was achieved and shall be included in the Final Pavement Report. In the case that the Top of Subgrade does not pass test rolling, the Design-Builder shall improve the failed area to a point that it meets or exceeds the minimum required design subgrade modulus specified by the Design-Builder in the Interim Pavement Report. Additional test rolling of the failed area shall be performed after improvement to verify the minimum required design subgrade modulus has been achieved at the Top of Subgrade.

The Design-Builder may elect to use a design Mr value greater than the minimum requirement specified in the Table in Section 3.10.03.05.05 of the Pavement Performance Specification. A design subgrade strength value used in the pavement design that is greater than minimum required shall be supported by the Design-Builder with historical performance results and design documentation in the Interim Pavement Report. The maximum allowable values for subgrade strengths at the Top of Subgrade are specified in Table in Section 3.10.03.05.05 of the Pavement Performance Specification, regardless of the subgrade improvement.

A design subgrade strength value greater than the minimum requirements shall be field verified by the Design-Builder during construction through test data collected using a falling weight deflectometer (FWD) on the prepared Top of Subgrade. The FWD test set-up, load packages, test spacing, and analysis shall be as specified in the Construction of Pavement Subgrade section of the Geotechnical Performance Specification. The Design-Builder shall improve the subgrade area for each data collection point that FWD testing indicates the in-place Mr value is less than the design value specified by the Design-Builder. The subgrade improvement of the failed area shall result in the subgrade strength meeting or exceeding the minimum required design subgrade modulus specified by the Design-Builder in the Interim Pavement Report. Additional FWD testing of the failed area shall be performed after improvement to verify the minimum required design subgrade modulus has been achieved at the Top of Subgrade.

3.14.03.13 Interim Design Memoranda

The Design-Builder shall prepare Interim Design Memoranda for individual Project elements or groups of Project elements consistent with the Geotechnical Planning

Reports. The Interim Design Memoranda shall be submitted in accordance with "Submittals" in the Structures Performance Specification and shall include the following, at a minimum:

A) Description of the Project elements included in the Memorandum;

B) Locations of borings, rock coring, geophysical testing and other in-situ testing;

C) Field testing procedures;

D) Final typed boring logs updated with laboratory testing results;

E) Electronic copy of the gINT data of subsurface investigation data;

F) Results of any in-situ testing and geophysical testing;

G) A description of subsurface conditions, including groundwater, and subsurface profiles;

H) Results of laboratory tests;

I) Values assigned to soil parameters for design;

J) Descriptions of pertinent geotechnical analyses and designs;

K) Conclusions and recommendations for the specific Project elements;

L) Construction considerations such as blasting and vibration monitoring;

M) Level of construction control for deep foundations from AASHTO 17th Edition Table 4.5.6.2A, and

N) Instrumentation and monitoring requirements;

3.14.04 Construction

The Design-Builder is responsible for any and all damage (including, but not limited to settlement and vibrations) to property, structures, or utilities, both inside and outside of the State Right-of-Way, caused by the Work on the Project, and shall appropriately mitigate for these damages.

3.14.04.01 Temporary Support of Excavation

Temporary support of excavation shall be designed in accordance with all applicable OSHA standards and AASHTO requirements including, but not limited to, the appropriate lateral earth pressures, hydrostatic pressure, surcharges and construction loading. Detailed design of all components shall be completed by the Design-

Builder, including but not limited to, temporary decking, sheeting, bracing and tie-backs.

3.14.04.02 Utilities

See TC-3.15, SP – Section 875, and SP – Section 879. The Design-Builder shall identify all new and existing utilities crossing embankments, evaluate settlement impacts on these lines, and evaluate the impacts of abandoned lines on settlements.

The Design-Builder shall design new and relocated utilities to accommodate the anticipated settlements, to verify utilities operate effectively during and after construction as well as to satisfy the requirements of the utility owner.

New utilities shall not be placed within nor shall existing utilities remain within the pavement section. Abandoned utilities will not be allowed within the pavement section and shall be removed prior to placement of the pavement section. Utilities of any size that fall within 3 feet below the pavement section (below subbase) shall be relocated and the existing utility shall be removed. Other utilities shall be removed or abandoned as follows:

DEPTH	UTILITY DIAMETER	METHOD OF ABANDONMENT
0-feet to 3-feet	All sizes	Remove
3-feet to 15-feet	< 8-inches	Plug Ends
3-feet to 15-feet	>= 8-inches	Fill with Flowable Fill
15-feet or more	< 24-inches	Plug Ends
15-feet or more	>= 24-inches	Fill with Flowable Fill

3.14.04.03 Blasting Requirements

In addition to the requirements of Section 201.03.04 of the Standard Specifications for Construction and Materials, prior to blasting the Design-Builder shall submit a blasting plan to the Maryland State Fire Marshall for approval. The State Fire Marshal is empowered to regulate the character and strength of explosives used, and the manner of their use and storage. Handling and storage of explosives shall be in accordance with Federal Regulation 18 U.S.C., Chapter 40, Sections 841-848.

The location of magazines for the storage of explosives and for the separate storage of detonators shall be subject to the approval of the Administration. Explosives shall be kept under lock with the key only to be kept in the hands of a licensed blaster. In no case shall caps or other detonators be stored or transported with dynamite or other explosives.

Blasts shall be made only during daylight hours and all blasts shall be carefully

confined and adequately covered, to prevent injury to persons and to protect adjacent structures, utilities and property against damage. Before exploding each blast, ample warning shall be given to allow all persons to reach positions of safety. The Design-Builder shall complete, maintain and submit permanent blast reports including logs of each blast. Logs shall be available for review and verification by the Administration and/or authorized personnel at all times. Complete reports after each series of blasts shall include the following information:

A) Scale drawings showing the location of each hole, geometry of open face, height of face, and delay pattern.

B) Total charge for each blast, total charge of each delay, and approximate volume of rock removed.

C) Type of primer and of explosives used for each delay, type of primary location of primers, and manufacturer's specifications for explosives used.

D) Pattern design including burden, spacing, total length of each blast hole, length of subdrilling, and stemming.

E) Complete description of rock face before and after test including: amount of overburden, quality, of rock noted in face before test, amount of back break in face, condition of excavation floor after each test, and mount of displacement of and sizing of broken rock. All descriptive data shall be accompanied by photographs.

F) All monitoring locations for each test, including the plan coordinate of each monitoring station and distance from blast.

G) The monitoring record from each blast.

H) Date, time and limits of blast by station.

I) Amount of explosives used by weight and number of cartridges.

J) Name of qualified blasting foreman in charge of work.

K) Weather conditions including wind direction and velocity.

All blasting shall be monitored by the Design-Builder to control vibrations in the vicinity of roadways, structures and utilities. Blasting controls and techniques shall meet the following requirements:

1) The Design-Builder shall monitor the peak particle velocity for each blast. Peak particle velocity shall not exceed one inch per second as measured at the nearest structure, utility or Right-of-Way line, whichever is closest.

2) The monitoring device shall be capable of measuring the velocity parallel and transversely to the direction of the blast and vertically. The equipment shall be capable of providing a permanent record of all recordings. The monitoring devices shall include certificates of calibration upon delivery.

3) The Design-Builder shall coordinate all blasting activities with the appropriate public outreach and/or community notification personnel.

3.14.04.04 Construction of Bridge and Retaining Wall Foundations

Construction noise levels shall conform to the requirements outlined in the Environmental Performance Specification. Ground consolidation, existing structure settlements, and disturbance to local residents due to the installation of deep foundations shall be maintained within limits acceptable to the Administration.

3.14.04.04.01 Shallow Foundations

After excavation, the Design-Builder's Geotechnical Engineer and the Administration's Geotechnical Engineer shall verify that the exposed subgrade is suitable for the calculated toe-pressures exerted by the proposed abutment or fill-type retaining wall. The Administration shall require in-situ testing to verify the required bearing values.

3.14.04.04.02 Deep Foundation Testing and Monitoring

Field-testing shall be performed for deep foundations to evaluate foundation capacity and integrity, to verify design assumptions, to determine foundation installation characteristics, to evaluate the pile driving system performance, and to establish foundation depths. The deep foundation testing and monitoring shall include all necessary test piles or shafts, dynamic testing, static load testing, non-destructive integrity testing, and quality control testing.

At least 30 working days prior to driving piles, the Design-Builder shall present the results of wave equation analysis of piles (WEAP) on the hammer-pile-soil systems proposed for the Project. The WEAP analysis shall be performed for all hammers proposed for use and for each Project element with driven pile foundations. The Administration may provide written comments to proposed hammers based upon the results of the WEAP analysis.

A pile driving analyzer (PDA) shall be used to determine if each hammer is delivering the energy required by the WEAP analysis. Each hammer used to drive test piles and production piles shall deliver a minimum of 45 percent of the rated hammer energy. Foundation testing and monitoring shall be performed on both test and production deep foundations, and shall be located so that they will address all conditions of foundation type, capacity and soil conditions encountered. All PDA equipment, testing, recording and reporting shall be performed in accordance with ASTM D-4945 Standard Test Method for High Strain Dynamic Testing of Piles. CAPWAP shall be utilized to determine the as-built pile capacity from the PDA data. As a minimum, the first pile driven for each substructure unit shall be a PDA test pile. Additional piles may be PDA

piles depending upon the Design-Builder's selected level of construction control and the corresponding Factors of Safety, in accordance with AASHTO Table 4.5.6.2A.

The Design-Builder shall prepare and submit a detailed description of the proposed deep foundation testing and monitoring programs. The description shall include detailed specifications and plans presenting the foundation type, test type, purpose, number, location, and procedures for each test, and the recording and reporting procedures. The number, location, type, procedures, and extent of testing of the deep foundations shall be subject to review by the Administration. Testing and monitoring of deep foundations shall be in accordance with the applicable ASTM and AASHTO specifications.

Static load tests performed on piles or drilled shafts shall be in accordance with the ASTM D-1143 or AASHTO. The Design-Builder may also submit for review the use of either the Osterberg Load Cell or the Statnamic Testing arrangement. The number and locations of static deep foundation load tests shall be determined by the Design-Builder, but shall be performed at locations representative of the different subsurface conditions, foundation types, foundation capacities, and foundation depths. At least 30 working days prior to driving load-test piles, the Design-Builder shall submit proposed configuration for pile load tests, including the structural calculations for the reaction beam, piles, and connections; calibration results for the loading jack, load cell, and gages before the tests; and other pertinent details.

All foundation field-testing results shall be compared with the design capacity and proposed Factor of Safety. Where field testing results reflect a lower than required Factor of Safety, the Design-Builder shall prepare a Remedial Action Plan for review by the Administration.

3.14.04.04.03 Drilled Shaft Inspection and Integrity Testing

The Design-Builder shall assign one full-time inspector for each drilled shaft installation rig in use for bridges, retaining walls and other critical structures. The Design-Builder shall also assign inspectors for at least 15% of drilled shaft installation for ground mounted Noise Barrier Panels. At least 30 working days prior to drilled shaft installation, the Design-Builder shall present the qualifications for each proposed drilled shaft inspector to verify the following required minimum qualifications:

A) At least one year of drilled shaft installation experience working under the supervision of a licensed civil engineer specializing in foundations and geotechnical engineering; or

B) At least 2 months of inspection experience and attendance at the FHWA-NHI Drilled Shaft Foundation Inspection Course (#132070).

C) A Down Hole Camera may be required to inspect the drill shaft hole in order to ensure that the drill hole is stable and to verify that there is no presence of any loose material at the bottom of drilled hole.

Integrity testing consisting of ASTM D-6760 Crosshole Sonic Logging (CSL) or ASTM D-5882 Low Strain Pulse Echo Methods shall be performed on 25% of bridge foundations.

3.14.04.04.04 Pile Driving Records

The Design-Builder shall create and maintain a hand-written record of pile driving. For the entire length of each pile, the Design-Builder shall record blows and estimated delivered energy (hydraulic hammers) or stroke (diesel hammers) for each foot of penetration. The Design-Builder shall record the start and stop times to the nearest minute and record any stoppages in field pile driving.

Prior to beginning the placement of reinforcing steel around the piles, and/or prior to beginning any backfilling around the piles, the Design-Builder shall present for review and comment the complete driving records including tolerance measurements for all piles in each pile group and the PDA and CAPWAP results.

3.14.04.04.05 The Design-Builder's Pile Inspector and Geotechnical Engineer

The Design-Builder shall assign one inspector for each pile-driving rig in use. At least 30 working days prior to pile driving, the Design-Builder shall submit the required qualifications for each pile driving inspector who has the following minimum qualifications:

A) At least one year of pile driving inspection experience while working under the supervision of a licensed civil engineer specializing in foundations and geotechnical engineering; or

B) At least 2 months of pile driving inspection experience and successful completion of FHWA-NHI Driven Pile Foundation Inspection course (#132069)

The Geotechnical Engineer shall either be on-site during the driving of the first pile at each support (monitored with PDA) and until sufficient data is gathered to establish appropriate driving criteria for each support; or be in direct telephone contact with the PDA operator and the inspector observing the pile driving. The Geotechnical Engineer shall be notified immediately if any unusual or otherwise unanticipated pile driving conditions are encountered, including if the piles are

driven out of the tolerances specified by SHA Standard Specification for Construction and Materials Section 410.03.07.

Based upon the installation and testing data, the Design-Builders Geotechnical Engineer shall validate that the piles were adequately driven. If not adequately driven, the Design-Builder's Responsible Engineer shall recommend an appropriate resolution for review by the Administration.

3.14.04.05 Mechanically Stabilized Earth Retaining Wall Construction

Maryland Size No 57 stone shall be used within the reinforced mass for all preapproved MSE retaining walls without field verification testing with a Certificate of Compliance from the Design-Builders supplier. Maryland Crusher Run (CR-6) may also be used within the reinforced mass for all preapproved MSE retaining walls without field verification testing with a Certificate of Compliance from the Design-Builders supplier and with a quality control compaction plan.

As an alternative, material conforming to AASHTO Division II may be used if approved by the Administration.
– Construction Section 7.3.6.3 "Mechanically Stabilized Earth Walls", with the exception that the percent passing the #200 sieve shall not exceed 5% and the Plasticity Index shall not exceed 5, and MSMT A-4-7, A-5, A-6, A-7-4 and A-7 materials are not acceptable as reinforced fill material.

Prior to initiating construction, the Design-Builder shall submit a quality control plan for field verification testing of grain size distribution, Atterberg Limits and the moisture-density relationship for determination of compaction requirements. Field verification testing should be performed at intervals not to exceed 1,000 cubic yards of material placed within the reinforced mass.

Material shall be compacted to 95% of the maximum density as determined by AASHTO T-180. For material with more than 30% retaining on the 19-mm sieve, compaction shall consist of at least four (4) passes by a heavy roller. All material shall be placed at a moisture content not more than 2 percentage points less than or equal to the optimum moisture content. Maximum lift thickness shall not exceed 6-inches.

3.14.04.06 Fill Embankment Construction

The Design-Builder shall submit the source and material properties of all fills proposed for use, including the results of gradation tests, plasticity tests and shear strength testing. All laboratory tests shall be performed in accordance with the appropriate ASTM/AASHTO test methods. The bearing capacity of the embankment foundation shall be validated by the requirements of Section 204 of Maryland SHA's Standard Specifications for Construction and Materials and documented by the Design-Builder's Geotechnical Engineer prior to initiating construction. Sheet flow

across the slope face will not be permitted during construction or for the permanent condition until vegetation is established on the face of the slopes.

3.14.04.06.01 Settlement of Embankments

Prior to releasing any fills and/or surcharges and proceeding with subsequent construction activities, the Design-Builder shall compile, and submit as per TC-3.14.05.01, any settlement data, including proof that all settlements necessary have occurred.

3.14.04.06.02 Embankment Construction Near Existing Structures

Where embankments or walls are to be constructed in the vicinity of existing structures, the Design-Builder shall develop and implement a program for performing preconstruction surveys and monitoring movement of structures that shall include the following:

A) Estimate the settlement influence zone from embankment and construction loads that includes settlements in excess of ½-inch;

B) Site reconnaissance to determine the sensitivities of adjacent structures to settlement;

C) Identification of site-specific facilities that may be adversely affected by settlement;

D) Procedures to mitigate and to compensate property owners affected by settlement/movement resulting from construction activities.

3.14.04.07 Construction of Top-Down Walls (Cut Walls)

Where soil nails, tie-backs, or ground anchors are required for resistance of lateral loads, the elements shall be constructed in accordance with FHWA "Geotechnical Engineering Circular No. 7: Soil Nail Walls" or "Geotechnical Engineering Circular No. 4: Ground Anchors and Anchored Systems". This includes adhering to material requirements, components, installation and proof-testing procedures as described in Appendix E of the above references and AASHTO Division II - Construction.

3.14.04.08 Culvert Construction

See "Construction of Bridges and Retaining Walls", above.

3.14.04.09 Construction of Noise Wall Foundations

See "Construction of Bridge and Retaining Wall Foundations" above.

3.14.04.10 Construction of Foundations for Sign Structures

See "Construction of Bridge and Retaining Wall Foundations" above.

3.14.04.11 Construction of Pavement Subgrades

The Design-Builder shall be responsible for construction of a suitable and stable subgrade on which to place the pavement section. The Top of Subgrade shall be test rolled prior to placing the base course in the Pavement Section(s). Any movement in the Top of Subgrade during test rolling shall be an indication of unstable subgrade or the presence of unsuitable material. Unstable or unsuitable areas shall be treated as recommended in the Final Geotechnical Report. After treatment, the area shall again be test rolled. Any area still showing movement shall receive additional corrective treatment.

In the presence of surface water and/or within 3 feet below the proposed subgrade, the Design-Builder shall engineer the subgrade (Drainage Blanket, Subgrade drain…) to handle the water and moisture conditions. In case of pumping of subgrade the D-B shall stabilize the subgrade prior to placement of sub base or base material.

FWD testing shall occur after the Design-Builder has constructed and properly compacted the Top of Subgrade. The Design-Builder shall provide testing program guidelines and vendor qualifications for FWD testing in the Final Pavement Report. The FWD testing program for subgrade resilient modulus shall adhere to the following test parameters and requirements:

A) ASTM D 4694 shall be followed in the data collection with the FWD.

B) No data collection shall occur on a frozen subgrade and ambient air temperature shall be greater than 40 degrees F.

C) The Design-Builder shall use a FWD testing vendor that can demonstrate at least 3 years worth of experience in FWD testing and analysis and submit that information with the Final Pavement Report;

D) Load plate radius = 9 inches;

E) Minimum load applied = 4,000 pounds, maximum load = 9,000 pounds; and

F) All FWD data shall be collected and stored electronically and submitted as a package with the data analysis to verify subgrade resilient modulus strengths.

The FWD test set-up, load packages, test spacing, and analysis shall be as specified in the following table:

ITEM	REQUIREMENTS	COMMENTS
Sensor Spacing	0", 12", 18", 24", 36", 48", 60"	Additional sensors are acceptable
Load Package	AA1B2	A = Seating Drop of 6,000 lbs. B = Seating Drop of 9,000 lbs. 1 = Recorded Drop of 6,000 lbs. 2 = Recorded Drop of 9,000 lbs.
Test Pattern	One per every 100 yd^2 of prepared subgrade in the mainline and shoulder, minimum of 5 tests.	
Analysis	$Mr = \frac{1.5pa}{\Delta_z}$	p = applied load (psi) a = radius of load plate (in) Δ_z = measured deflection (in)

Any FWD test location of a roadway element that does not meet the minimum subgrade strength specified by the Design-Builder at the Top of Subgrade shall be improved to a point that it reaches or exceeds the minimum subgrade strength specified by the Design-Builder. The 100 yd^2 of prepared subgrade that does not meet or exceed the design strength shall be improved for any failing FWD test point. Improvements shall be made to ensure that the subgrade strength at the Top of Subgrade reaches or exceeds the minimum subgrade strength specified by the Design-Builder. The limit of improvement may be modified through more frequent and additional FWD testing in the travel lane or shoulder in question.

3.14.05 Submittals

All submittals shall be subject to review and approval as per TC Section 3.06.20.1.

3.14.05.01 Geotechnical Instrumentation for Construction

The Design-Builder shall prepare and submit instrumentation monitoring plans to either monitor facilities that may be affected by construction activities or to monitor

field performance of specific construction elements in accordance with the following criteria and requirements. The Design-Builder's Instrumentation Engineer shall have a minimum of 5 years of experience in planning instrumentation programs, monitoring, analyzing instrumentation data and providing control and threshold values.

A) The extent of the monitoring program will depend on the size and type of the facilities. The instrumentation program shall be implemented to monitor potential settlement, stability of fill or cut slopes and stability of surrounding structures;

B) The type and distribution of instrumentation shall demonstrate an understanding of the need, purpose and advantages of using each proposed instrument;

C) The plan shall include consideration of environmental effects such as temperature, rain, sun, wind, corrodibility, and electromagnetic wave interference;

D) Responsibilities for the instrumentation plan, procurement, installation, recording, maintenance and protection shall be the Design-Builders;

E) The instrumentation plan will provide construction-related control information and accommodate the collection of long-term performance data;

F) Test installations may be performed to demonstrate the compliance and acceptability of instrumentation in relation to the Contract requirements;

G) If instruments fail or are damaged they shall be replaced at no cost to the Administration and the Design-Builders Geotechnical Engineer may require that all work cease in the area to be monitored by the instruments, with the concurrence of the Administration;

H) Monitoring shall be initiated a minimum of 15 days prior to construction of the features being monitored to establish baseline readings; and,

I) The results of the vibration measurements shall be used to develop attenuation curves for predicting vibrations at varying distances from the source.

J) Qualifications of instrumentation personnel should be listed.

K) The Design-Builder shall provide calibration of all data acquisition equipment used to collect the required instrumentation data.

3.14.05.01.01 Monitoring Facilities for Effects of Construction Activities

The Design-Builder shall prepare instrumentation plans, where appropriate, to monitor existing facilities, temporary construction support structures and in-progress construction of permanent facilities for effects of construction activities such as excavation by blasting, pile driving and nearby construction equipment traffic. Monitoring may include vibrations, ground accelerations, tilt or rotation, and vertical and lateral movement during and after construction. The Design-Builder shall prepare a report detailing the proposed program of instrumentation and monitoring, establishing threshold values of monitored parameters, and describing the response plans that will be implemented when threshold parameters are exceeded. After the Administration's review and comment on the instrumentation plan, threshold values and response plan, the Design-Builder shall provide, install and monitor the instrumentation during and after construction and interpret the data. Construction instrumentation monitoring reports shall be submitted to the Administration prior to opening the instrumented work for subsequent construction. Corrective actions shall be taken where the instrumentation data so warrant.

The instrumentation plan shall provide that potentially affected facilities are protected against damage due to the construction of the Work. Limiting values of movement (horizontal and vertical), vibration and acceleration for each facility within the zone of influence of the Work shall be established by the Design-Builder. To establish these limiting values, the designer shall consider the nature of buildings and facilities within the sphere of influence of the construction activities, including their use, foundation systems, structural design and current condition. Records of facilities, where available, shall be examined during the design stage and, where no record exists, assessments shall be made and clearly stated. These assessments shall be subject to verification at the commencement of the construction phase prior to the adjacent construction activity.

In addition to the instrumentation plan, the Design-Builder shall conduct Preconstruction and Postconstruction surveys for nearby structures and facilities that may be affected by construction activities. The minimum distance for Preconstruction and Postconstruction surveys is 500 feet from existing facilities, temporary construction support structures and construction of permanent facilities to construction activities such as excavation by blasting, pile driving, and nearby construction equipment traffic.

3.14.05.01.02 Instrumentation for Monitoring Field Performance of Construction Elements

The Design-Builder shall prepare instrumentation plans, where appropriate, to

monitor field performance of specific construction elements such as settlement, lateral earth movement, rotation of structural elements and changes in groundwater. The instrumentation and monitoring program shall include appropriate types and quantities of monitoring instruments capable of measuring horizontal and vertical movements, tilt/rotation of structural elements, soil pore pressures and vibrations, as applicable.

Instrumentation that may be used in monitoring programs to control and assist design and construction include, but are not limited to:

A) Piezometers and observation wells;

B) Inclinometers;

C) Survey stations on structures and at ground level locations;

D) Tiltmeters;

E) Deep and shallow settlement points and extensometers;

F) Strain and load-measuring devices; and

G) Seismographs;

H) Optical survey.

The Design-Builder shall not release monitored elements for subsequent construction until completed monitoring reports have been submitted.

3.14.05.02 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

A. The corresponding Geotechnical Planning Report;

B. The corresponding Interim Design Memorandum;

C. Locations and results of borings, rock coring, geophysical testing and other in-situ testing;

D. A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);

E. Field investigation procedures;

F. A description of groundwater conditions;

G. Results of laboratory tests;

H. Values assigned to all applicable soil parameters for design;

I. All pertinent data and complete discussions of all geotechnical analyses and design;

J. All relevant design calculations and computer program results checked and initialed by a Professional Engineer licensed in the State of Maryland;

K. Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;

L. Groundwater problems encountered, means of dewatering and/or other solutions;

M. Designs for support of excavation;

N. Results of instrumentation and monitoring and post-construction monitoring summaries;

O. Potential settlement problems; and

P. Potential stability problems and analysis results;

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

Q. Foundations

1) Individual pile and pile group design calculations including axial and lateral capacity for the pile type, size, and length to achieve the required capacities (including any effects of liquefaction and downdrag); estimated pile and pile group settlement;

2) Shallow foundations calculations including allowable bearing capacity, estimated differential and total settlements, and rotations; and

3) Calculations of embankment settlement (magnitude and time rate) and downdrag forces on the piles, depths to zero or negligible settlement, and the proposed means to mitigate the downdrag.

R. Retaining Walls

1) Wall design calculations including the results of the global and internal stability analyses; analyses of total, differential, and secondary settlements; and, calculations for analyses of sliding, overturning, and bearing pressure for live and seismic loadings;

S. Embankments

1) The results of the slope stability analyses, including external loading from live and seismic loading, the recommended side-slopes of all

embankments;

2) The results of settlement analyses, including predictions of the magnitude and duration of primary, secondary, and post-construction settlements;

3) The results of the liquefaction analyses and the proposed methods of mitigation for any location deemed necessary to protect the integrity of bridges and adjacent walls;

4) The proposed method(s) of protecting and abandoning utilities.

T. Cut Slopes

1) The results of the slope stability analyses, including external loading from live and seismic loading, and the recommended side-slopes of all cuts;

U. Subgrades for Pavements

1) The results of all subgrade improvement testing including Falling Weight Deflectometer test results.

V. Instrumentation

1) All items included in Section 4.1 "Geotechnical Instrumentation" above.

TC 3.15 UTILITY DESIGN AND RELOCATION CRITERIA

The Design-Build Team shall incorporate and make provisions in the design for all existing and proposed utilities including relocations. The Design-Build Team shall establish and maintain ongoing coordination with utility owners after initial contact has been made by the Administration to fulfill the following requirements:

a. Obtain plans from the utility companies.

b. Assure adequate protection of their utilities.

c. Maintain utility service at all times during construction of the project.

d. Identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts.

e. Incorporate and accommodate utility relocations in the schedule and sequence of construction.

f. Conduct alternative studies to avoid utility relocation.

g. All costs associated with additional utility relocations caused by changes to the design will be incurred by the Design-Build Team and not the Administration. Additional utility relocations will be coordinated with the utility company and the District 1 – Utility Engineer of the State Highway Administration (SHA).

h. Incorporate utility relocations in the schedule and sequence of construction.

i. Coordinate with the utility company, the design and construction of any of all utility service connections to existing and proposed Traffic Control Devices. The Design-Build Team shall be responsible for all conduits, manholes, cabling, meter cans, and disconnect switches as required by the utility to obtain the electrical utility connection. Monthly energy use charges and the final connection fees will be the responsibility of the Administration.

TC 3.16 MAINTENANCE OF TRAFFIC (MOT), HAUL ROUTES AND ACCESS DURNING CONSTRUCTION PERFORMANCE SPECIFICATION

3.16.01 General

The Design-Builder shall develop and implement a Transportation Management Plan (TMP) in accordance with the requirements of this specification including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required reviews.

This performance specification provides the flexibility to establish a TMP and to adapt maintenance of traffic (MOT) operational changes throughout the Project life to produce benefits or savings to the Administration or the Design-Builder without impairing the essential functions and characteristics of the Project, such as safety, mobility, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

Work zone impacts, including impacts on the environment and surrounding communities, shall be kept to a minimum, and shall be considered when developing and implementing the Transportation Management Plan. To that end, a Transportation Management Plan Report shall be developed by the Design-Builder. The TMP Report will lay out transportation management strategies and how these strategies will be implemented to manage work zone impacts.

3.16.02 Guidelines and References

The Design-Builder shall design and implement maintenance of traffic set-ups in accordance with the relevant requirements of the standards listed by priority in Table 1 unless otherwise stipulated in this specification. Standards specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any

standard below conflict with those in another, the standard listed with the higher priority shall govern. It shall be the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Table1
Guidelines for Maintenance of Traffic

Priority	Author or Agency	Title
1	SHA	Temporary Traffic Barrier Policy
2	SHA	Guidelines for Late Lane Merge Concept
3	SHA	Flagger Policy at Signalized Intersections
4	SHA	Functional Guidelines for Portable Changeable Message Signs (PCMS)
5	SHA	Maryland State Police Criteria for Use in Work Zones and Interagency Agreement between SHA and Maryland State Police
6	SHA	High Visibility Apparel Policy
7	SHA	Work Zone on 65/60 MPH Roadways
8	SHA	Work Zone Safety Policy
9	SHA	Office of Traffic and Safety Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items
10	SHA	List of Qualified Removable Preformed Pavement Marking Material for Maintenance of Traffic
11	SHA	Maryland State Highway Standard Sign Book
12	SHA	Book of Standards for Highway and Incidental Structures for items identified as Standard in Appendix B of Part 3-Design Requirements
13	SHA	Standard Specifications for Construction and Materials Section for items identified as Standard in Appendix A of Part 3-Design Requirements
14	SHA	Work Zone Safety and Mobility Policy
15	SHA	Guidance on Maintenance of Traffic Alternatives Analysis
16	SHA	Transportation Management Plan Guidelines
17	SHA	Work Zone Lane Closure Analysis Guidelines
18	AASHTO	A Policy on Geometric Design of Highways and Streets
19	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
20	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
21	SHA	Roadway Delineation Policy
22	AASHTO	Roadside Design Guide
23	SHA	NCHRP Report 350 Implementation Schedule
24	FHWA	National Cooperative Highway Research Program (NCHRP) Report 553 Crashworthy Work Zone Traffic Control Devices
25	FHWA	National Cooperative Highway Research Program (NCHRP) Report 350 Recommended Procedures for the Safety

Table1
Guidelines for Maintenance of Traffic

Priority	Author or Agency	Title
		Performance Evaluation of Highway Features.
26	SHA	Work Zone Safety Tool Box
27	ATSSA	Quality Standards for Work Zone Traffic Control Devices
28	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways
29	ADA	Americans with Disabilities Act Accessibility Guidelines

3.16.03 Performance Requirements

Administration responsibilities

The Administration's responsibilities include the following activities:

A) Maintaining Quality Assurance (QA) of any MOT analysis, work zone impact management strategies and temporary traffic control plans from the Design-Builder;
B) Liaising with and monitoring the Design-Builder's performance for compliance with this Contract's requirements;
C) Maintaining documentation for the TMP as developed by the Design-Builder;
D) Providing a trained individual to implement and monitor the TMP during construction;
E) Monitoring implementation of the TMP to verify that strategies are being implemented on schedule and in the manner planned, and that they are effectively managing the work zone impacts.

6.16.03.01 Design-builder personnel requirements

This project requires the Design-Builder to have a team experienced in Maintenance of Traffic, including work zone design, work zone traffic analysis, and traffic control devices and setups.

Traffic Manager:

The Design-Builder shall provide a Traffic Manager (TM) on-site whose sole responsibility is to supervise and continuously monitor the installation and maintenance of all traffic control devices. The TM shall be equivalent to, meet the requirements of, and perform all duties of Section 104.18 of the Administration's Standard Specifications for Construction and Materials. The Design-Builder shall authorize the TM to direct traffic changes to ensure safe and continuous traffic flow and to direct traffic operations after a traffic incident has occurred. A TM shall be available at all times and be on-site within a ½ hour throughout the duration of the Project. The TM shall document all daily maintenance of the traffic control setup, including but not limited to maximum queue

lengths/delays, work zone modifications, incidents, and suggested improvements. Minimum qualifications of the TM include successful completion of the Administration's Temporary Traffic Control Traffic Managers Training Course and five years experience in work zone traffic control.

Flaggers:

The Design-Builder shall provide flaggers with a current American Traffic Safety Services Association (ATSSA) flagging certification.

3.16.03.02 Maintenance of Traffic – General Requirements

All maintenance of traffic design and implementation shall be performed in accordance with the following performance requirements:

F) Provide for the safe and efficient passage of pedestrians (including those with disabilities), bicycles, and vehicular traffic through and around construction zones;
G) Prohibit use of new permanent pavement construction as haul route(s);
H) Minimize negative impacts on residents, commuters, and businesses;
I) Provide convenient and logical rerouting of traffic (by using advance warning systems and directional and informational signing, lighting, and striping) to provide "driver friendly" detours and to maximize the safety of the traveling public;
J) Maintain and provide access at all times to property by owners, customers, visitors, and emergency vehicles;
K) Provide a safe travel corridor while minimizing any unnecessary investment in the existing infrastructure that is being replaced;
L) Develop and coordinate MOT activities with the Maryland State Police, local law enforcement, and other emergency service agencies to ensure public safety and emergency response times are not compromised;
M) Coordinate MOT activities and Traffic Control Plans with other construction projects;
N) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 3.16.06 of this performance specification); and
O) Provide for a Public Outreach campaign to be implemented in cooperation with the Administration.
P) Develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies.

6.16.04 DESIGN AND CONSTRUCTION CRITERIA

3.16.04.01 Traffic Through Construction Zones

The Design-Builder shall perform the following:

Q) Implement Traffic Control Plans for all roadways within the Project limits in a manner that safely and efficiently accommodates traffic at all times.
R) Provide all material, labor, equipment, and personnel to effectively carry out the TMP. All equipment and tools shall be in good operating condition and shall be kept in proper adjustment throughout the duration of the project. All materials and supplies shall be of good quality and suitable for the assigned work.
S) Provide and use all safety equipment including (but not limited to) hard hats, safety vests and clothing required by State and Federal regulations and SHA policies and procedures.
T) Begin maintenance of traffic activities at the start of construction work (including preparatory MOT work), or when first hauling construction materials and/or equipment, whichever is earliest and continue MOT activities until Completion of the Project.
U) Arrange and host a pre-traffic switch meeting with the Administration and all affected agencies at least two weeks prior to switching traffic.
V) Identify desired full roadway closures (for any period of time) to the Administration for review and concurrence during the design review process.
W) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.
X) Design all geometric aspects of temporary roadways for the assigned posted speed.
Y) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.
Z) Ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities.

3.16.04.02 Public Information and Outreach

Actively assist the Administration in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts. Actively coordinate these activities through frequent meetings with the Community Outreach Manager. Coordinate with the Administration regarding special events that may affect traffic patterns through and around the Project limits and adjust the TMP and TCPs as needed.

3.16.04.03 Public Access

Maintain access to all businesses, residences, local streets and private driveways at all times, including all temporary approaches and crossings of and intersections with roads and streets. Consider any special access needs of property owners and tenants, such as business hours, delivery schedules and circulation patterns.

3.16.04.04 Pedestrian and Bicycle Traffic

The Design-Builder shall maintain all existing pedestrian and bicycle access along existing facilities at all times during construction. The pedestrian access way shall be fully compliant with all applicable regulations for accessibility, as defined by the Americans with Disabilities Act (ADA). Whenever an existing pedestrian access route in the public right of way is blocked by a construction, alteration, or maintenance activity, an alternate accessible pedestrian route must be provided.

Recreational trails, including bicycle paths, shall also be maintained and kept in good condition. Access to all recreational facilities shall be provided and coordinated with the appropriate governing agency.

3.16.04.05 Schools and Public Transportation Agencies

The Design-Builder shall coordinate with the local schools, appropriate Board of Education, and public transportation agencies for both city and local counties to maintain bus, private vehicle, and pedestrian access to education facilities and public transportation services in the area. Access to bus stops shall also be maintained. Construction impacts on school bus and public transportation routes shall be coordinated with the local agencies.

3.16.04.06 Detour Routes

Design, place, and maintain all traffic detours required during construction. Wherever possible, use State routes for detour routes. Obtain all necessary permits from all agencies for temporary roadways, including construction and/or haul routes.

Detour routes shall be required when complete road or ramp closures are necessary. Proposed detour routes shall be included in the Traffic Control Plans and reviewed through the design review process (see Section 3.16.06 of this performance specification). Complete closures of roadways will not be permitted without the express written approval of the Administration as part of the design review process prior to closure. Specific identification and written documentation of the proposed closure, including traffic and operational impacts, shall be provided to the Administration during the design review process for each request.

3.16.04.07 Motorist Guidance

The Design-Builder shall provide guidance and signage to and along the entire length of every detour route to motorists who are diverted around or traveling through the construction areas. Signing that is not in compliance with the MD MUTCD or Category 1 of the Administration's Book of Standards shall be corrected within 24 hours, unless the sign is a critical regulatory or warning sign, in which case the sign shall be corrected within 6 hours of notice. If the deficiency is caused by an accident, the 6 hours begins when access to the area is available.

For closures of surface streets or changes in roadway configurations, the Design-Builder shall provide guide signs in accordance with the TCP for that particular phase, MD MUTCD and Category 1 of the Administration's Book of Standards. At least seven (7) Calendar Days before a road closure or major change in the roadway configuration or travel pattern, the Design-Builder shall utilize portable variable message signs warning motorists of the pending changes. Messages to be displayed shall be submitted to the Administration for review and comment. The Design-Builder shall coordinate motorist guidance activities with the Community Outreach Manager.

3.16.04.08 Work Zone Intelligent Transportation Systems (ITS)

Utilize existing and future CHART and SHA variable message signs as part of the TMP. Coordinate the operation of these signs and the implementation of the appropriate messages with the Administration.

3.16.04.09 Construction Access and Haul Routes

Provide all construction roads required for delivery of fill, asphalt, concrete, bridge girders, and all other materials required for the Project. Obtain all necessary permits from all applicable agencies for construction, maintenance, and removal of temporary roadways, including construction and/or haul roads. Refer to PS 310-Environmental for additional haul route requirements.

3.16.04.10 Local Roadway Crossings

The Administration will allow construction traffic to cross roadways that intersect with the Project as long as the crossing is maintained within the Project ROW. Proper flagging procedures and/or temporary traffic signals are required to facilitate construction traffic crossing local roadways. The Design-Builder shall ensure that delays incurred to local roadways as a result of at-grade crossing operations do not exceed the mobility thresholds established by the Administration's "Work Zone Lane Closure Analysis Guidelines".

3.16.04.11 Emergency Response

The Design-Builder shall cooperate with the Maryland State Police, local law enforcement, and other emergency response agencies in their response to accidents, fires, spills, or other emergencies in any area affected by the Project, including those on the construction site and on traffic lanes open to the public. The Design-Builder shall cooperate in all Administration investigation of accidents and other incidents along the Project.

The Design-Builder shall work with emergency service providers and address their concerns about emergency access to and in the corridor, which may include installing gates to allow emergency personnel to access the Project area.

3.16.04.12 Field Verification of Traffic Operations

The Design-Builder shall be responsible for monitoring queues and delays during maintenance of traffic operations. If the thresholds established in the Administration's "Work Zone Lane Closure Analysis Guidelines" are exceeded, the Design-Builder shall modify the maintenance of traffic plans or incorporate other mitigation strategies to reduce the queues and delays below the threshold levels. All proposed changes shall be submitted to the Administration for review.

3.16.04.13 MOT Restrictions

Refer to Special Provision – Section 104.01 – Traffic Control Plan for work restrictions and temporary lane closure and/or shoulder closure requirements.

Failure to restore full traffic capacity within the time specified will result in a deduction in Contract Price assessed on the next Periodic Payment. See below for the assessed MOT Deductions.

Type of Lane Closure	**Minimum Advanced Notice**	**Maximum Advanced Notice**
1	30 Days	45 Days
2	10 Days	21 Days
3	7 Days	14 Days
4	3 Days	14 Days

Type 1- Planned and acceptable closures of an arterial or local street, traffic switches, new road openings, or changed traffic patterns.

Type 2- A lane(s) closure that would have significant impact on traffic, such as temporarily stopping traffic completely (traffic drags), closing 2 or more lanes, or flagging operations.

Type 3- A lane closure that would have minor or no impact on the flow of traffic, such as closing one lane on a three-lane roadway during off-peak hours.

Type 4- A lane closure that would close a shoulder (right or left).

For Type 1 closures, the Design-Builder shall make provisions in the MOT Phase Plan for local traffic to access properties and businesses at all times on the closed arterial or local street.

Type 1 and 2 closures will require extensive media and stakeholder notification effort and coordination among various local and State agencies. The Design-Builder shall assist with all notification and coordination efforts

All notice exclude weekend and holidays.

3.16.04.14 Advance Notification Requirements

The Design-Builder shall submit to the Administration a lane closure permit request form for approval of each lane closure. Lane closures will not be allowed without an approved written closure request.

The lane/shoulder closure request shall be submitted on a Lane/Shoulder Closure Request Form provided by the Administration and shall be submitted electronically. The information provided on the form shall include but limited to the following:

1) Location: Roadway name or State route number;
2) Project Number;
3) Direction: West/East/North/South;
4) Lane Closure Type: 1, 2, 3 or 4;
5) Duration: Date and times;
6) Limits: Beginning or work zone to end or work zone;
7) Nature of work and justification of lane/shoulder closure;
8) Number of remaining lanes on roadway;
9) Lane(s)/Shoulder(s) to be closed-specifically left, right, middle, left middle, right middle, shoulder, etc.;
10) Ramp location to be closed;
11) Traffic Control Plan sheet number;
12) Appropriate Administration typical application;
13) Point of Contact: Field Inspector;
14) Contact Information;
15) Any detours required;
16) Notes: Any other pertinent information that may be needed to facilitate in clarifying closures; and
17) State Police request and required number of troopers.

The Design-Builder shall contact and notify the Administration 30 minutes prior to initiating all lane closures and after removing all lane closures.

3.16.04.15 NCHRP Report 350 Implementation Schedule

All items for the maintenance of traffic shall be crashworthy in conformance with the Administration's NCHRP Report 350 Implementation Schedule. When conformance with NCHRP Report 350 is required, the manufacturers' certifications that the devices comply with the specified criteria shall be reviewed by the Design-Builder and approved in writing, and copies of the certifications and approvals shall be provided to the Administration for consultation and written comment.

All maintenance of traffic products, including temporary pavement markings, used on the Project shall be listed on the Administration's (Office of Traffic and Safety) approved product list for Temporary Traffic Control Devices and Miscellaneous Items, unless submitted and approved through the Administration's Maryland Product Evaluation List (MPEL) Program.

3.16.05 DEVELOPMENT AND REVIEW OF THE TRANSPORTATION MANAGEMENT PLAN

The Transportation Management Plan (TMP) shall include Traffic Control Plans (TCP), as well as transportation operations and public information and outreach strategies. The TMP shall:

A. Evaluate work zone impacts and develop strategies to mitigate those impacts through the use of improved transportation operations and management of the transportation system (refer to Section 3.16.05.01 of this Performance Specification). Impacts and strategies shall be documented in a TMP Report.

B. Include traffic control plans that accommodate project and site specific considerations (refer to Section 3.16.06 of this Performance Specification).

C. Include strategies to communicate with the public and concerned stakeholders, before and during the project, through the development of a public outreach plan.

3.16.05.01 Transportation Management Plan Report

The Design-Builder is responsible for developing a temporary traffic control system that that best meets the performance requirements and construction activities. Therefore, maintenance of traffic design shall be done concurrently with a work zone impacts assessment and traffic analysis. This effort shall be documented in a Transportation Management Plan (TMP) report.

The Transportation Management Plan report shall be submitted to the Administration for review at the Definitive Design stage. The report shall include discussion of the following and all supporting documentation:

(A) Work zone impacts assessment for the proposed MOT;
(B) Traffic analyses for each phase of MOT;
(C) Work zone impact management strategies.

3.16.05.02 TMP Report Format

(A) All the pages within the report shall be numbered and dated.
(B) The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
(C) The Design-Builder shall make revisions to the report as required to keep

reports current with design and construction activities. The date of the revision shall be placed on all pages. Pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports.

(D) The final approved report shall be converted to a Portable Document Format (pdf) file, including all maps and exhibits. The electronic file shall be delivered to the Administration for their records.

(E) Sections for inclusion in the TMP include:

1) Introduction (Cover Page, Table of Contents, etc.)
2) Executive Summary
3) TMP Roles, Responsibilities and Contact Information
4) Project Description, including goals and constraints
5) Existing Conditions
6) Work Zone Impacts Assessment (Refer to Section 3.16.05.03 of this Performance Specification)
7) Work Zone Traffic Analysis (Refer to Section 3.16.05.04 of this Performance Specification)
8) Work Zone Impact Management Strategies (Refer to Section 3.16.05.06 of this Performance Specification)
9) Access and Mobility Plan (refer to Section 3.16.05.07 of this Performance specification)
10) Contingency Plan (Refer to Section 3.16.05.08 of this Performance Specification)
11) Incident Management Plan (Refer to Section 3.16.05.09 of this Performance Specification)
12) Public Outreach Proposal (Refer to PS 302 – Public Outreach)
13) Implementation and Monitoring Plan (Refer to Section 3.16.05.10 of this Performance Specification)
14) Supporting Documentation (e.g., Traffic Control Plans)

3.16.05.03 Work Zone Impacts Assessment

Identify how the project's construction phasing, temporary traffic control zone design, and work zone impact mitigation efforts will impact the project area, how they will affect each other, and how they might adversely impact specific areas, if any. Issues to be considered and discussed in this section of the TMP include:

A) **Identification of High-level Construction/Traffic Control Approaches**, including proposed construction phasing, traffic control and management, and construction schedule. Discussion may include need for lane closures, total roadway closures, shoulder closures, use of shoulder for travel during construction, use of detour routes and times related to these needs (off-peak, night-work, weekend work, intermittent closures, etc.). High-level maintenance of traffic plans shall be developed that include, but are not limited to, all major traffic shifts, use of temporary roadways, temporary

traffic signals, and access modifications to businesses or residences. The duration of each phase shall be noted on the plan. The plans may take the format of 8 ½ x 11, 11x17, or plan-sized (22x34) sheets. These high-level maintenance of traffic plans will be used as a basis for the development of the Traffic Control Plans.

B) **Identification of Safety Issues**, including pre-existing safety issues and safety implications of proposed construction approach(es). Pre-existing safety issues may include crash history, curve and gradient issues, line of sight issues, weather related safety issues, lack of adequate shoulder width or prevailing speeds. Examples of safety issues from proposed construction approach(es) include implication of night work, lane width issues, lane-closure related safety issues, channelization and work area separation issues, construction staging areas, construction traffic access issues, and management/enforcement of speed in advance of and through the work zone.

C) **Identification of Community Impacts and Related Issues**, including accessibility issues and other coordination issues. This involves the identification of work zone impacts on the community businesses and residents likely to be affected by the project. Examples include business access relocation, ramp-closure related access issues, detour related mobility impacts, and pedestrian and bicycle related impacts. Other coordination issues may include utility related issues and construction noise issues.

D) **Identification of Combined Impacts and Coordination Issues**, including identification of nearby and/or concurrent projects and assessment of potential combined impacts of these projects at the corridor/network level.

3.16.05.04 Work Zone Traffic Analysis

Using the date of opening traffic volumes (as provided by the Administration), the Design-Builder shall analyze all Maintenance of Traffic Phases to ensure that there are no operational or safety issues. Work Zone traffic analysis shall be performed in accordance with methods and tools described in the “Work Zone Lane Closure Analysis Guidelines”. Mobility impacts shall be limited to the allowable mobility thresholds as described in the “Work Zone Lane Closure Analysis Guidelines”.

The Administration recognizes that specific work activities and time periods may make it infeasible to comply with the threshold levels contained in the Work Zone Lane Closure Analysis Guidelines. These circumstances shall be outlined in the TMP. For these situations, the Design-Builder shall analyze other MOT Alternatives to reduce the mobility impacts below thresholds. If the MOT Alternatives Analysis does not produce an option that reduces impacts below thresholds, the Design-Builder shall propose additional impact management strategies (transportation operations and/or public information and outreach strategies) to minimize the impact, subject to review and

approval by the Administration.

Elements to be included in the traffic analysis portion of the TMP include:

A) **Traffic and Travel Characteristics at the Project Location** – Include a summary of traffic and travel characteristics in the project area. This may include recurring congestion issues (pre-existing bottlenecks, high-volume areas, etc.) and non-recurring congestion issues (special event traffic issues, weather related delays, potential for incident related traffic congestion, etc), heavy vehicle volumes, directional traffic, and recreational or seasonal traffic issues.

B) **Traffic Analysis Strategies** – Include a brief description on how the expected traffic conditions during construction were determined. Include source and date of traffic data. Any traffic reduction factors or other parameters assumed for the calculations should be documented.

C) **Identify Measures of Effectiveness** – List the measure of effectiveness used for the analysis, such as capacity, volume, queue, travel time, diversion rates, safety, adequacy of detour routes, etc.

D) **Analysis Tool Selection Methodology and Justification** – List the traffic analysis tools used. Include a brief summary on how the tool was selected and criteria used to select the most appropriate tool.

E) **Mobility Implications of Construction Approach(es) –** Discuss construction approaches that have the potential to impact mobility during the project. This may include lack of shoulders during construction that may require incident management strategies, doing work at night to reduce traffic delays, or traffic capacity and management issues that may exist on a proposed detour route.

F) **Analysis Results** – Compare existing and construction traffic conditions and operations, with and without work zone impact management strategies (where included). Detour route analysis should be included where detours will be used. Traffic analysis should also address, in more quantitative manner than the general impacts assessment, the impacts on:

1. Access for residences, businesses, and non-emergency services
2. Access for pedestrians, bicyclists and persons with disabilities
3. Emergency service impacts (fire, ambulance, police, hospitals)
4. Safety
5. Adequacy of detour routes
6. Intersection traffic control (signal timing, signage, etc.)
7. Heavy vehicle traffic (including over-height, over-weight vehicles)
8. Transit operations (bus stops, school buses, other transit operations)
9. Seasonal impacts (beach traffic, etc.)

3.16.05.05 Approved Analysis Techniques and Software

Design-Builder may utilize the following software packages for analysis of Maintenance of Traffic Plans.

A) For arterial maintenance of traffic operations, the Design-Builder shall QuickZone 2.0, MD QuickZone 2.0, Quewz-98, LCAP, CORSIM or approved equal (as appropriate) to determine the queuing impacts caused by the maintenance of traffic plans.

3.16.05.06 Additional Work Zone Impact Management Strategies

In addition to the impact management strategies and MOT requirements included in this Performance Specification, the DB Team shall list any additional work zone impact management strategies that will be included and discuss anticipated traffic and/or safety impacts of the strategy. The Design-Builder is encouraged to provide additional, cost-effective services to enhance the overall Transportation Management Plan. Additional services should adhere to the standards and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and are subject to the Administration's written acceptance.

3.16.05.07 Access and Mobility Plan

The Design-Builder shall develop an Access and Mobility Plan depicting haul routes and access points. The Access and Mobility Plan shall be reviewed through the design review process with participation by the Administration. Plans shall be presented on paper no smaller than 11" by 17" with appropriate scale.

3.16.05.08 Contingency Plan

The Design-Builder shall develop a contingency plan that specifies actions that will be taken to minimize traffic impacts should unexpected events (unforeseen traffic demand, inclement weather, etc.) occur in the work zone. This plan should also address activities under that contractors control within the work zone. The contingency plan should include, but not be limited to the following:

A) Information that clearly defines trigger points which require lane closure lifting (i.e., inclement weather, length of traffic queue exceed thresholds);
B) Decision tree with clearly defined lines of communication and authority;
C) Specific duties of all participants during lane closure operations, such as coordination with Maryland State Police;
D) Standby equipment and availability of personnel for callout.

3.16.05.09 Incident Management Plan

The Design-Builder shall develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures,

reporting requirements, and mitigation strategies. The incident management plan shall meet the following requirements:

The Design-Builder shall provide immediate response to emergencies by trained personnel from an incident response team per the requirement of PS 302 – Public Outreach. Immediately following the initiation of actions necessary for the security of people and property, the Design-Builder shall coordinate with the Administration on the investigation of accidents and other incidents. At minimum, the Design-Builder shall provide documentation to the Administration with details on:

A) Cause of disruption (i.e., whether it is construction oriented or not);
B) Actions being taken to alleviate the problem;
C) Responsible party for the actions; and
D) Anticipated duration of the disruption.

The Design-Builder shall establish and manage an emergency response telephone tree per the requirements of PS 302 – Public Outreach. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations.

3.16.05.10 Implementation and Monitoring Plan

The implementation and monitoring plan shall define processes to ensure that the Transportation Management Plan and associated elements, including the Traffic Control Plans and Incident Management Plan, are developed and implemented efficiently and appropriately, and that they are kept up-to-date with necessary modifications during the project.

3.16.05.11 Review of and Revisions to TMP Report

The TMP shall be submitted to the Administration for review at the Definitive Design stage. No construction shall occur until the Administration's comments have been successfully addressed.

Any major changes to the TMP Report and associated analysis presented during Definitive Design shall be submitted along with the supporting analysis and documentation to the Administration for review and comment at least 45 days prior to implementing the proposed change. Changes to construction phasing/staging or other impact management strategies that will have a substantial impact on safety or mobility in the project area can be considered major changes. Minor changes (e.g., change to work zone speed limit) shall be submitted to the Administration at least 7 days prior to implementing the proposed change.

3.16.06 Traffic Control Plans

A MOT Phase Plan shall be developed for each major phase of construction that requires diversion of traffic. MOT Phase Plans shall be presented on paper no smaller than 22" by 34" with appropriate scale. The Design-Builder shall prepare and present each MOT Phase Plan for review and approval by the Administration. The MOT Phase Plans shall be site specific for each separate portion of Work and shall not simply reference typical drawings, taper tables, or illustrations in various Administration Guidelines or MUTCD. The following components shall be included in each MOT Phase Plan:

A) Description of MOT phase with respect to lane, ramp, or road closures and proposed detour routes;
B) Traffic Analysis/Traffic Modeling for the MOT phase;
C) Signal timing Plans if changed;
D) Temporary roadways and striping Plans;
E) Temporary drums and barrier locations with spacing and type of barricades;
F) All temporary traffic control devices necessary to safely and efficiently construct a particular portion of Work;
G) Motorist information and guidance;
H) Temporary signing, signals, and lighting plans;
I) Specific sign messages with sign sizes, spacing or referenced distances, and MD MUTCD sign designations. The Design-Builder shall provide details for all proposed non-standard MD MUTCD signs;
J) Pavement marker changes shall be specific and clearly shown on the Traffic Control Plan with respect to lane widths, pavement marking material, color, location, and widths. Dimensions are necessary to assure proper installation of the pavement markings;
K) Flagging locations; and
L) Emergency response information.

3.16.06.01 Review of and Revisions to Traffic Control Plans (TCP)

Major changes (e.g., changes in construction phasing or staging) to the Traffic Control Plans shall be submitted along with the supporting analysis and documentation to the Administration for review and comment at least 14 days prior to implementing the proposed change. Minor changes (e.g., slight changes in traffic shift location or taper lengths) shall be submitted to the Administration at least 3 days prior to implementing the proposed change.

The Administration understands that certain changes to traffic control setups may need to occur in a more timely manner during construction to address urgent safety or mobility problems. These changes should be discussed with the Administration before implementation; however, revisions to the TCP may be documented after their implementation in these circumstances. In these situations, TCP revisions should be documented within 10 days of their implementation. All TCP changes shall be reflected

in revisions to the TMP Report when necessary and these revisions shall be made within 21 days of their implementation.

TC 3.17 DRAINAGE, STORMWATER MANAGEMENT, AND EROSION & SEDIMENT CONTROL PERFORMANCE SPECIFICATION

3.17.01 GENERAL

The Project requires a combination of roadway rehabilitation and new construction. All areas shall require assessment to determine adequacy of existing drainage systems (e.g. capacity, outfall stability, system condition, and other parameters) to meet US 113 drainage needs and future roadway needs as identified in the Roadway Performance Specifications. New construction areas shall require complete design and construction of new drainage systems. The Mainline of the proposed roadway is predominantly open section with median ditches, requiring storm drain inlets and cross culverts. Roadside ditches may be required beyond the hinge point to intercept and convey off-site runoff. Segments of the Mainline, local road connections, and access roads may require roadside ditches.

3.17.02 GUIDELINES AND REFERENCES

3.17.02.01 Guidelines

Design and construct the drainage system in accordance with the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any guideline conflict with those in another; the guideline listed with the higher priority shall govern. The Design-Builder shall obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design of construction.

Use the most current version of each listed guideline as of the publication date of this RFP.

TABLE 1
GUIDELINES FOR DRAINAGE

Priority	Author or Agency	Title
1	SHA	Maryland Department of Transportation, publications entitled "Highway Drainage Manual" dated December 1981 or as amended herein and any revisions thereof.
2	MDE	Regulation COMAR 26.09.01, "Erosion and Sediment Control"
3	MDE	"Erosion and Sedimentation Guidelines for State and Federal Projects"

TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author or Agency	Title
4	MDE	"1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control"
5	MDE	MDE Regulation COMAR 26.08.04, "National Pollutant Discharge Elimination System General Permit for Construction Activity".
6	MDE	Regulations COMAR 26.17.02, "Stormwater Management"
7	MDE	"Stormwater Management Guidelines for State and Federal Projects"
8	MDE	"2000 Maryland Stormwater Design Manual", Volumes I and II.
9	MDE	Regulations COMAR 26.17.04 "Construction on Nontidal Water and Floodplains."
10	MDE	"Guidelines for Construction on Nontidal Waters and Floodplains."
11	MDE	Regulation COMAR 26.08.02.10, "Water Quality Certification"
12	SHA	"Stormwater Management, Erosion and Sediment Control and Waterway Construction Permit Issues and Approaches"
13	SHA	Standard Specifications for Construction and Materials
14	FDOT	"State of Florida DOT Drainage Manual", January 2006, Tables 6.2 and 6.3 regarding service life of corrugated metal pipes
15	NRCS	Pond Code MD-378

3.17.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the drainage system. These publications have no established order of precedence.

TABLE 2 REFERENCES FOR DRAINAGE	
Author or Agency	Title
SHA	"Guidelines for Preparing Stormwater Management Concept Reports", April 2003 draft.
SHA/MDE	"Stormwater Quality Management Banking Agreement" dated June 2, 1992, and amended March 1, 1994 and August 2003.
SHA	Grass Channel Credit Paper
SHA	"SWM Concept Report US 113 Phase 2B, N. of Goody Hill Rd. to Massey Branch"
SHA	"Stormwater Management Site Development Criteria - Review Guidelines, January 2007"
SHA	"Drainage Design Guidelines"
SHA/MDE	"Stormwater Management Process Agreements and Interpretations, April 2003"

3.17.03 REQUIREMENTS

3.17.03.01 Surface Storm Drainage Design

The Design-Builder shall design all surface drainage conveyances including but not limited to open channels, inlets, closed storm drainage systems, cross culverts and entrance driveway pipes. The drainage design, in report form as indicated herein, shall be submitted to the Administration for review and concurrence prior to construction.

Waterway Construction (COMAR 26.17.04) review and approval is required for the crossings at Massey Branch and Goody Hill Branch. Submittals for MDE approval shall be delivered to the Administration for review and coordination with MDE. The Administration has established a review and approval process with MDE for US 113. Under that process, the Administration will review and comment on the Design-Builder's plans and, once satisfied that the plans will meet MDE requirements, the Administration will coordinate with MDE to obtain formal approval of the Design-Builder's Waterway Construction plans and calculations.

3.17.03.02 Surface Drainage Design - General Requirements

All drainage design shall be performed in accordance with the following criteria and regulations:

A. The design and construction of the drainage system shall include the repair and/or replacement of unstable or deteriorating outfalls, inlets, manholes, cross culverts or pipes, or other drainage structures, clean-out of existing clogged inlets, as well as replacement of any existing brick drainage structures regardless of condition within the Project limits. Design shall also include the repair of existing outfalls and the replacement of adversely sloped and level (zero gradient) pipes to remove adverse slopes and provide positive drainage.

B. The drainage design shall provide positive drainage flow in all open and closed systems. The Design-Builder shall provide completed designs for all temporary and permanent pipe systems and obtain Administration approval prior to their construction.

C. The Design-Builder shall not construct work so as to trap water along any section. If during design or construction an area of the Project is identified as not having positive drainage in pre-construction conditions, the Design-Builder shall provide adequate measures to ensure positive drainage after construction.

D. The Design-Builder shall provide adequate connections to maintain all existing drainage systems. Provisions shall be made to ensure that adequate drainage is provided during interim paving operations (e.g., constructing asphalt berms to divert flow from base course paving to storm drains in closed sections or other precautions as necessary).

E. All existing downstream cross culverts and driveway culverts impacted by the roadway improvements shall be evaluated for capacity according to the guidelines set forth in Section 317.03.03.02. All culverts failing to meet the capacity requirements shall be replaced. This may require work to be performed beyond the accepted limits of the roadway improvements, based upon the approved contract limits set forth in the Stipulated Sum agreement.

3.17.03.03 Surface Drainage Design - Specific Criteria

This section contains criteria that are in addition to that contained under Drainage Design General Requirements. Where conflicts arise between these Specific Criteria and those contained in the General Requirements, these Specific Criteria will have precedence.

3.17.03.03.01 Cross Culverts

Refer to Structures Performance Specification, Section 3.11, and Environmental Performance Specification, Section 3.20, for additional cross culvert design requirements.

A. Discharges for appropriate return period storms for cross culverts shall be calculated using USDA, NRCS TR-55 and TR-20 hydrology models unless the drainage area exceeds 200 acres, for which GIS Hydro is added as an acceptable model. For storm drain design, procedures found in the SHA Highway Drainage Manual shall be used. Floodplain modeling shall be performed using HEC-RAS.

B. The 100-year headwater pool at new culverts shall remain within the right-of-way or easements. In the case of existing, replacement, or extended culverts, the 100-year storm headwater elevation for the proposed conditions shall be at or below the existing 100-year headwater elevation.

3.17.03.03.02 Roadway Drainage Design

A. The flow spread in a closed section for a 2-year storm event shall not exceed 8 ft. and in no case cover more than one half of any travel lane. Exceptions to these criteria will be considered on a case-by-case basis.

B. The maximum flow across entrances shall be 1 cfs for the 2-year storm event. Maximum flow from the end of curb and gutter shall be 0.5 cfs for the 2-year storm event.

C. Roadway inlets and drainage structures shall conform to the Administration's "Book of Standards for Highways and Incidental Structures" or approved equal(s). Type COG or COS are preferred. Other inlets and non-standard structures proposed shall receive concurrence from the Administration prior to

construction. When grate inlets are used within the roadway section and where the roadway is subject to pedestrian or bicycle traffic, inlets shall be fitted with ADA compliant grates such as WR or curved vane grate.

D. No break in curb, such as curb cuts, will be allowed for drainage purposes without concurrence from the Administration prior to construction.

E. Ditches shall be designed to ensure positive drainage flow. Standing water will not be acceptable, except for stormwater management. Side ditch capacity shall be based on the 10-year storm and 9-inches of freeboard shall be maintained in the ditch. Any ditches that do not meet these criteria shall be called to the attention of the Administration during the design process.

F. Ditch surface lining shall be Soil Stabilization Matting (SSM) rather than riprap, wherever possible. Type A matting is temporary matting and shall be used in ditches with 10-year storm discharge velocity of less than 5 fps or for slope stabilization. Type B matting is permanent matting and shall be used in ditches with 10-year storm discharge velocities ranging from 5 fps to 8.5 fps (refer to the Administration's "Standard Specifications for Construction and Materials").

G. Riprap shall only be used as a ditch lining where SSM cannot be used or to provide velocity attenuation (e.g., outfall protection). Concrete lined ditches (except at K-inlets) and concrete slope or channel protection will not be allowed unless prior approval is received from the Administration.

H. Refer to Geotechnical Performance Specifications for slope design and construction requirements, and the Environmental Performance Specification for permitted wetland impacts and wetland avoidance.

I. All existing pipes and drainage structures to be used in the Final Design shall be inspected and assessed for structural integrity and hydraulic capacity by the Design-Builder. Existing brick drainage structures shall be replaced with Administration approved cast-in-place or precast concrete structures (See Table 3). Inspection reports shall be compiled and submitted for concurrence and shall include photographs and a written report describing the structural integrity of the drainage structure. Those existing pipes and drainage structures failing to meet structural integrity requirements or those not having positive drainage shall be replaced.

J. Conversion of existing drainage structures into junction boxes within the roadway shall not be incorporated into the design without the Administration's consultation and written comment prior to construction. Inspection report data shall be provided for the Administration's review and written comment.

K. As a condition of Final Completion, all storm drains shall be cleaned to the satisfaction of the Administration at no additional cost to the Administration.

L. Pipes shall conform to the following service life requirements:

1. Culverts

   a. Mainline Roadway-100 years;

   b. Roadway pavement width greater than 27 feet or cover greater than 10 feet-75 years; and

   c. Roadway pavement width 27 feet or less-50 years.

2. Storm Drain

   a. Beneath the Roadway Pavement-See Culvert criteria above; and

   b. Outside the Roadway Pavement-50 years.

Q. The assumed service life for concrete pipe shall be 100 years. The service life for metal pipes shall be determined using Tables 6.2 and 6.3 from the "State of Florida, Department of Transportation, Drainage Manual, January 2006". The assumed service life for plastic pipe shall be 50 years.

R. Horizontal Elliptical Reinforced Concrete Pipe (HERCP) may be specified when necessary to meet the minimum cover requirements as set forth in the Highway Drainage Manual. Any exception to the minimum cover requirements shall be approved by the Administration prior to ordering and installation of the pipe.

S. Safety at hydraulic structures shall be designed and constructed according to the Administration Stormwater Management Site Development Criteria - Review Guidelines. This includes railings at headwalls and endwalls.

T. The pipe material shall conform to Table 3:

Table 3
PIPE SELECTION CRITERIA

Abbreviation	Description	Specification	Limitations	Range of Application
CSP	Corrugated Steel Pipe - Aluminized Type 2	M 36, M274	15" to 60" - 2 2/3" x ½" Corrugations; 54" to 60" - 3" x 1" Corrugations	Metal pipes: Soil and water pH
CSPA	Corrugated Steel Pipe Arch - Aluminized Type 2	M 36, M274	17" x 13" to 71" x 47" - 2 2/3" x ½" Corrugations; 60" x 46" to 71" x 47" - 3" x 1" Corrugations	

Table 3
PIPE SELECTION CRITERIA

Abbreviation	Description	Specification	Limitations	Range of Application
CSP-P	Corrugated Steel Pipe-Perforated	M 36	Not for use in roadway	should be between 5.0 and 9.0 and minimum resistivity should be above 1500 ohm-cm. Minimum gauge is 14.
SPP	Structural Steel Plate Pipe	M 167	60" to 96" diameter * #	
SPPA	Structural Steel Plate Pipe Arch	M 167	60” to 96" diameter equivalent. * #	
SRP	Steel Spiral Rib Pipe - Aluminized Type 2	M 36, M274	18" to 60" - ¾" x ¾" x 7 ½" Corrugations	
SRPA	Steel Spiral Rib Pipe-Arch - Aluminized Type 2	M 36, M274	21" x 15"to 71" x 47" -¾" x ¾" x 7 ½" Corrugations	
PCSP	Corrugated Steel Pipe, Polymer Precoated	M 245	18” to 60”; Not for use as culvert.	
APP	Structural Aluminum Plate Pipe	M 219	Up to 96” diameter. Must be approved by Administration’s Highway Hydraulics Division for use in roadway.* #	
APPA	Structural Aluminum Plate Pipe Arch	M 219	Up to 96” diameter. Must be approved by Administration’s Highway Hydraulics Division for use in roadway.* #	
ASRP	Aluminum Spiral Rib Pipe	M 196	18" to 60" - ¾" x ¾" x 7 ½" Corrugations	
CAP	Corrugated Aluminum Pipe	M 196	15" to 60" - 2 2/3" x ½" Corrugations; 54" to 60" - 3" x 1" Corrugations	
CAP-P	Corrugated Aluminum Pipe-Perforated	M 196	Not for use in roadway	
CAPA	Corrugated Aluminum Pipe Arch	M 196	17" x 13" to 71" x 47" - 2 2/3" x ½" Corrugations; 60" x 46" to 71" x 47" - 3" x 1" Corrugations	
CPP-C	Corrugated Polyethylene Pipe - Type 'C'	M 294	15” to 48” – Temporary installations only	
CPP-CP	Corrugated Polyethylene Pipe -	M 294	15” to 48” – Temporary installations only	

Table 3
PIPE SELECTION CRITERIA

Abbreviation	Description	Specification	Limitations	Range of Application
	Type 'CP' (Perforated)			
CPP-S	Corrugated Polyethylene Pipe - Type 'S' (Smooth Interior)	M 294	18" to 48" - 2' minimum cover, granular backfill; Must be approved by Administration's Highway Hydraulics Division for use in roadway.	
CPP-SP	Corrugated Polyethylene Pipe - Type 'SP' (Perforated)	M 294	(Smooth Interior) Not for use in roadway	
PEP	Corrugated Polyethylene Drainage Pipe	M 252	4" to 12", underdrain outlets	
PEP-P	Corrugated Polyethylene Drainage Pipe-Perforated	M 252	4" to 12", underdrains	
PPWP	Polyvinyl Chloride Profile Wall Pipe	M 304	4" to 48" - 2' minimum cover, granular backfill; Must be approved by Administration's Highway Hydraulics Division for use in roadway.	
PPWP-P	Polyvinyl Chloride Profile Wall Pipe-Perforated	M 304	4" to 12", underdrains	
PVCP-P	Polyvinyl Chloride Pipe - Perforated	M 278	4" to 12", underdrains	
PVCP	Polyvinyl Chloride Pipe	M 278	4" to 12", underdrain outlets	
HERCP	Horizontal Elliptical Reinforced Concrete Pipe	M 207	23" x 14" to 53" x 34" Class HE-IV minimum	
RCP	Reinforced Concrete Pipe	M 170	12" to 84" - Class IV minimum *	
RCPP	Reinforced Concrete Low- Head Pressure Pipe	C 361	Code 378 Spillways	
FCP	Non-Asbestos Fiber-	C1450	12" to 48"	

Table 3
PIPE SELECTION CRITERIA

Abbreviation	Description	Specification	Limitations	Range of Application
	Cement Storm Drain Pipe			
Box Culvert	Box Culvert	M 259, M 219	Must be approved by Office of Bridge Development	

Notes:

***** Pipes greater than 84" diameter (or equivalent) must be approved by Chief, Highway Hydraulics Division.

Metal Pipes greater than 96" (or equivalent) diameter must be approved by the Office of Bridge Development.

3.17.03.04 Floodplain and Waterway/Wetland Coordination

The Design-Builder shall be responsible for coordinating analysis of applicable drainage crossings with FEMA and the Administration. Floodplain crossing requirements can be found in Structures Performance Specifications.

Prior to construction, the Administration may be required to notify property owners adjacent to floodplains and jurisdictional waterways and wetlands of the upcoming construction project. The Design-Builder shall incorporate the time requirements of this notice into their design and construction schedule, and shall make available the necessary construction plans for property owner review, in accordance with MDE Water Management Administration requirements.

3.17.03.05 Stormwater Management General Requirements

Stormwater management (SWM) Best Management Practices (BMPs) shall conform to MDE's *2000 Maryland Stormwater Design Manual* and *Stormwater Management Guidelines for State and Federal Projects*, and the following US 113 commitments with regard to SWM:

A. The Design-Builder shall capture and provide water quality and quantity control for runoff from roadway and bridge decks through methods acceptable to the Administration and MDE.

B. The Design-Builder shall demonstrate compliance with MDE's overbank flood protection volume (Qp) requirements in accordance with Table 2.1, 2000 Maryland Stormwater Design Manual. Two year storage shall be provided in surface facilities depending on available right of way and with concurrence from the Administration prior to construction (refer to Table 6).

C. Waivers of or variances from strict adherence with MDE requirements shall be evaluated on a case by case basis. No waivers from MDE's Qp requirements shall be granted unless a stable outfall is documented and a detailed hydraulic

analysis demonstrates the downstream discharge for the 2-yr storm will increase as a result of SWM.

D. Note that stormwater quality and quantity management shall be provided for all roadway improvements in this Contract. The Concept SWM Report addresses management for the maximum project limits; however, if under the Stipulated Sum format, a reduced roadway improvement scope is implemented, it is the Design-Build Team's responsibility to provide management acceptable to the SHA and MDE.

3.17.03.05.01 BMP Selection

The Design-Builder shall present SWM facility types for the Administration's consultation and written comment prior to advancing SWM design. The Administration will use the following criteria in evaluating proposed facilities:

A. The best fit given the site context and minimization of footprint shall be considered.

B. Grass Channels (see Grass Channel Credit paper included in this advertisement package for design guidance) and other non-structural practices shall be considered first when feasible.

C. BMPs requiring lower maintenance shall be considered first. Potential maintenance needs shall be considered when designing SWM facilities.

D. Underground SWM facilities are discouraged.

3.17.03.05.02 Water Quality Bank

Impervious surface created for the Project shall be accounted from a stormwater management perspective in the Water Quality Bank. The Project falls within the Coastal Watershed. The intent of the Project is to achieve a positive balance of impervious surface treated at the completion of the Project. The aggregate amount of new impervious surface added to the Project shall be treated for water quality according to the above-mentioned regulations and/or guidelines, and the treatment provided shall be tallied according to:

A. MDE/SHA Stormwater Quality Management Banking Agreement dated June 2, 1992, and amended March 1, 1994, with revisions as described below:

1. 100% credit for on-site (SHA) treatment of untreated impervious with any MDE approved BMP.

2. Off-site (non-SHA) treatment of untreated impervious areas may be eligible for 80% credit with MDE concurrence.

3. Non-structural BMPs qualify for only Project credit, not bank credit. Excess grass channel credit cannot be applied to the bank.

4. Pavement removal with soil amendments to promote infiltration will be considered as redevelopment and will receive 80% credit. If it is demonstrated that the pavement removal is solely for water quality treatment purposes, then 100% credit will be applied.

3.17.03.02.02 SWM Specific Engineering Criteria

A. Proposed stormwater management facilities shall have coordinated detailing throughout the Project and they shall be worked into the concepts for the corridor landscaping. This means that facility types, outfall structure designs, detailing, colors, planting palette, landforms, surface area shapes and fencing (if required) shall be consistent. Refer to Stormwater Management Site Development Criteria Review Guidelines for further information regarding landscaping design and SWM.

B. All stormwater management ponds and constructed wetlands for stormwater treatment shall be located a minimum distance of 15 feet from the edge of pavement. This distance shall be measured from the 2-year water surface elevation limit at its closest point to the roadway. Though preferred, this criterion does not apply to existing SWM facilities within the Project.

C. Linear SWM in fill/embankment with the potential to infiltrate surface water into the fill material and possibly cause a fill slope failure should be avoided.

D. Riser structures and pipe outfall systems shall be concrete. Concrete structures that are visible shall meet the requirements set forth in the Stormwater Management Site Development Criteria Review Guidelines. Any structure, including weir wall, will be required to meet the requirements of said guidelines.

E. Concrete pipe used for stormwater management pond outfalls shall meet the requirements of ASTM C-361. Riser structures shall be set in embankments or placed so they are easily accessed for maintenance. Riser structures shall also be placed so they are visually unobtrusive. Risers shall be cast in place or precast as one unit. Refer to the 2000 Maryland Stormwater Design Manual for additional SWM specifications.

F. The finish and appearance of trash racks where required on stormwater management pond risers visible from the roadway or adjacent communities shall be consistent with roadway aesthetic requirements found in the Stormwater Management Site Development Criteria - Review Guidelines. Trash racks not visible from the roadway or adjacent communities shall be hot-dipped galvanized metal, M 111-80. Trash racks shall be designed as flat-fronted cages that stand away from and completely enclose the riser opening(s). Ends of the steel rods

shall be attached to a frame that attaches to the structure. Trash rack designs shall use similar detailing for all openings on the structure. Trash rack detailing shall be similar throughout the Project.

G. Open tops on outfall structures are not preferred. If they are used, a trash rack shall be designed that is not placed horizontally but is placed at an angle of not less than 1" vertical for every 12" horizontal in order to reduce the potential for clogging.

H. Low flow, perforated pipes shall be wrapped with galvanized wire mesh rather than geotextile. Pipes extending into ponds shall be anchored against flotation.

I. SWM embankments shall be planted in accordance with the Stormwater Management Site Development Criteria Review Guidelines. No woody material shall be planted on pond fill embankments, within 15 feet of the toe of pond embankments, or within 25 feet of pond outfall structures. Material for the SWM embankments is required to conform to NRCS Pond Code MD-378 as found in the 2000 Maryland Stormwater Design Manual, Appendix B1, embankment clay core and cut-off trench shall conform to A-2-7, A-7-2, A-4-7, A-7-4, or A-7. Maximum particle size shall be three inches.

J. The maximum grade allowed for side slopes at stormwater management facilities shall be in conformance with Stormwater Management Site Development Criteria Review Guidelines.

K. Filter diaphragms shall be used for embankment seepage control in place of anti-seep collars within the SWM embankment when classified as embankment ponds under the 2000 Maryland Stormwater Design Manual, Appendix B1. The design criteria for filter diaphragms shall be as outlined in the 2000 Maryland Stormwater Design Manual, Appendix B1.

L. A BMP number shall be obtained from the Administration for each structural BMP constructed on the Project.

M. A minimum 15-foot clear zone shall be provided within the Project right-of-way at the toe of SWM pond embankments to keep woody vegetation clear.

N. Fencing of SWM facilities shall meet requirements set forth in the Stormwater Management Site Development Criteria Review Guidelines.

3.17.03.06 Design-Builder Responsibilities

The Design-Builder shall demarcate with stakes and flagging and maintain for the duration of the Project boundaries of all wetlands, wetland buffers, floodplains, tree protection areas, and the Limits of Disturbance (LOD) as specified. Prior to beginning any earth disturbing activity the Design-Builder shall have all demarcated wetlands, wetland buffers, floodplains, tree protection areas, and LOD inspected and approved by

the Administration and MDE. The Design-Builder shall construct all ESC measures in conformance with this Specification. The Design-Builder shall have all control measures inspected and approved by the EMT and MDE Inspector prior to beginning any other earth disturbing activity. The Design-Builder shall ensure that all runoff from disturbed areas is directed to the sediment control measures. The Design-Builder shall not remove any demarcation device or erosion and sediment control measure without the consent of the Administration and MDE Inspector.

3.17.03.07 Schedule

At least 14 days prior to initiating any earth disturbance on the Project, the Design-Builder shall submit an ESC Schedule to implement the ESC Plan to the Administration and MDE for approval, The schedule shall indicate the sequence of construction, implementation and maintenance of controls, temporary and permanent stabilization, and the various stages of earth disturbance. After acceptance of the schedule by the Administration, it will be forwarded to MDE for formal approval. The schedule shall, as a minimum, include the following:

A. Demarcation (and maintain demarcation for the duration of the local earth disturbing activity) of all wetlands, wetland buffers, floodplains, tree protection areas, and the LOD prior to any earth disturbing activity;

B. Clearing and grubbing of areas necessary for installation of perimeter controls specified in the Contract Documents;

C. Construction of perimeter controls specified in the Contract Documents;

D. Remaining clearing and grubbing;

E. Roadway grading (including off-site work).

F. If applicable, utility installation and whether storm drains shall be used or blocked after construction;

G. Conversion of sediment basins to permanent SWM facilities;

H. Final grading, landscaping, and stabilization; and

I. Removal of perimeter controls.

No earth disturbing activities shall be started on-site or off-site until the ESC schedules and methods of operation have been accepted by the Administration and MDE. The Design-Builder's Project Superintendent and ESC Manager shall complete the Administration's ESC course successfully prior to initiation of any land disturbing activities on the Project.

3.17.03.08 Severe Weather Event

Erosion and sediment controls shall be maintained at all times. When a Severe Weather Event, which for Erosion and Sediment Control Purposes is defined as 3.0 inches of rainfall within 24 hours occurs, the Contractor shall maintain, repair or replace any damaged devices within 48 hours. Qualification as a Severe Weather Event will be based upon rainfall recordings at the nearest official National Weather Service gage station. A payment of **$xx,xxx.xx** will be paid for each Severe Weather Event occurring between the start of grading operations and removal of the erosion and sediment controls. The payment will be full compensation for the maintenance, repair and/or replacement of any and all Erosion and Sediment Control devices damaged by the event provided that a minimum rating of "B" is maintained immediately before and within 48 hours after the rainfall event. The Contractor is responsible for submitting the official weather records documenting the event.

3.17.03.09 ESC Specific Design Criteria

Prior to permanent seeding and mulching, slopes outside the roadway hinge point, flatter than and including 2:1 slopes, shall be covered with 2 inches of topsoil. Slopes within the roadway hinge points, flatter than and including 2:1 slopes, shall be covered with 4 inches of topsoil.

Slopes steeper than 2:1 shall be evaluated for slope stability and prepared to promote vegetative growth in accordance with Geotechnical Performance Specification and Planting and Landscape Architectural Performance Specification.

Daily stabilization for land disturbance within any drainage areas adjacent to wetlands and streams shall be accommodated in the design and implementation of the ESC plans.

Potential strategies to limit the potential for erosion may include, but are not limited to, the following:

A. The use of clear water diversions shall be used to the maximum extent feasible to limit the amount of area required to be controlled;

B. Staging the construction to limit clearing, grubbing and area of disturbance to what is necessary to carry on a grading operation (EDA) to minimize the area and duration of soil exposure;

C. Providing top of fill berms with pipe slope drains to convey discharge down steep slopes,

D. Benching long cut or fill slopes to limit the risk of rilling on steep slopes and to lessen the slope of longitudinal ditches; and

E. Other innovative techniques presented by the Design-Builder with prior written concurrence from the Administration and approval from MDE prior to

construction.

The Design-Builder shall make every attempt to retain sediment generated by construction operations within the site. Some examples of these may include, but are not limited to, the following:

2. To address Concentrated Flow discharge -

   a. Stone check dams, compost socks, linings, strip sod, or other erosion inhibitors in influent ditches to sediment traps;

   b. Ensuring effective drawdown and dewatering of sediment traps and basins prior to forecast rain events by pumping to filter bag(s) and mulch berm(s) or other approved devices to ensure that dewatered storage component of sediment trap is available for the future storm event(s);

   c. Efforts to minimize the potential for re-suspension of particulates; and

   d. Other innovative techniques presented by the Design-Builder with concurrence from the Administration and approval from MDE prior to construction.

TC 3.18 NOISE ABATEMENT PERFORMANCE SPECIFICATIONS

No Noise Walls are anticipated on this project.

TC 3.19 CONSTRUCTION REQUIREMENTS

3.19.01 Construction Standards

3.19.01.1 Book of Standards

Details and dimensions of drainage structures, TCPs, traffic barriers, etc., shall comply with the Administration's "Book of Standards, Highway and Incidental Structures."

3.19.01.2 Specifications for Construction and Materials

Shall comply with the Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, January 2001,including all Special Provision Inserts and these Special Provisions.

3.19.01.3 Industry Standards

Industry standards, such as ASTM and AASHTO, that are referenced in the Administration's or Utility and utility owners' specifications and standards shall also be met. If an item of work is not covered by the Administration's specifications and standards, the materials and construction methods used shall meet the appropriate, nationally accepted industry standards and be submitted to the Administration for approval.

3.19.01.4 Utility Details

All Utility work shall be done in accordance with the latest edition of the utility owners' details and specifications.

3.19.02 Construction Stakeout

The Design-Build Team shall refer to SP 107 - CONSTRUCTION STAKEOUT (For Design-Build Projects) for project specific requirements.

The Design-Build Team shall engage a Registered Professional Land Surveyor, licensed in the State of Maryland, to determine all lines and elevations for various parts of the Work, as the work progresses:

a. Verify that the field locations of the established horizontal controls and benchmarks correspond with figures shown on the Design-Build Team's Contract Drawings.
b. Establish vertical references and axis lines showing elevations and other lines and dimensional reference points as required for the execution of the work.
c. Field check facilities and surveys thereof as required by the technical sections of the Specifications.
d. Stake out the limit of disturbance at all wetland areas and tree protection fencing at all Tree Preservation Areas.
e. Stakeout the Right-of-Way Line

3.19.03 Maintenance of Traffic

All maintenance of traffic work is to comply with the approved traffic control plans, the Manual on Uniform Traffic Control Devices (MUTCD), the Maryland Supplement to the MUTCD and special provisions. The Design-Build Team shall maintain vehicle, bike and pedestrian traffic at all times.

a. Advanced Notice Requirements

The Design-Build Team shall notify the Administration's Engineer in advance of implementing any changes in traffic patterns as per requirements of the Maintenance of

Traffic Performance Specification.

b. Schedules/Sequences of Construction

The Design-Build Team shall schedule tie-in operations so as not to be working intermittently throughout the area. Schedule and pursue excavation and other construction activities to permit making the connection without unnecessary delays. Perform utility work in conformance with the maintenance of traffic requirements shown on the approved Drawings and/or as indicated in the Standards.

c. Protection of Open Excavation

Pursuant to the General Provisions, the Design-Build Team is responsible for protection of the work and safety of the public.

The use of decking or plates to close trenches, temporary wedge material to prevent pavement edge drop-off, and the installation of temporary channelizing devices and/or traffic barriers may be required as unforeseen conditions develop during construction operations.

3.19.04 Erosion and Sediment Control

Except as noted below, all work shall be done in accordance with the erosion and sediment control (E&S) plans to be prepared by the Design-Build Team and approved by the Maryland Department of the Environment.

a. Plan Adjustments and Revisions

If approved by the MDE Sediment Control Inspector, minor field adjustments of the sediment control facilities may be made as required to accomplish the intended purpose.

Major revisions to the approved sediment control plan, as determined by the MDE Sediment Control Inspector, require the review and approval of the State of Maryland Department of the Environment. The Design-Build Team must provide for such review and obtain approval at no additional cost to the Administration.

Any changes to the approved sequence of construction shall be submitted for approval to MDE, Plan Approval Division, and the Administration, Highway Hydraulics Division.

When directed by the Administration's Engineer, the contractor shall be responsible to implement additional erosion and sediment control measures and modifications to the approved erosion and sediment control plan as required by the MDE Sediment Control Inspector and the Administration's Environmental Monitor to address unforeseen site conditions and errors and omissions during design at no additional cost to the Administration.

Comply with all Federal, State and local laws, ordinances and regulations pertaining to

environmental protection.

b. Protection of Existing Waterways and Highways

Do not dump debris or rubbish of any kind or allow it to fall into a river or on highways. This includes paint splatters and spillage during painting operations. Take care to prevent damage and injury to personnel, vessels, and vehicles using rivers, highways, or pedestrian ways. Provide devices and maintain as required to prevent such occurrences. Promptly remove any material or items falling in a river, on adjacent banks, or on highways and immediately report to the Engineer and the jurisdictional agency.

c. Fish and Wildlife Resources

Do not alter water flows or otherwise disturb native habitat near or adjacent to the project construction area, unless otherwise stipulated in the project's permits and approved as an authorized action by the appropriate regulatory agencies.

d. Staging Areas

Do not use, in connection with this Contract, for storage, as a staging area, or as a preparation site any cultural resource facility, building, site or cleared area that is, as of the date of this Contract, on or eligible for listing on the National Register of Historic Places (16 U.S.C., paragraph 470a) without prior approval of the Engineer.

For the purpose of the preceding paragraph, the term "cultural resource" includes districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, or culture.

3.19.05 Topsoil, Turf Establishment, and Sodding

Topsoil shall be placed according to 3.17.03.09, E&S Specific Criteria.

Seeding shall be performed as per Section 705. The amount of limestone and starter fertilizer for SALVAGED topsoiled areas shall be found in the Nutrient Management Plan Special Provisions of this IFB OR WILL BE DEVELOPED PRIOR TO PERMANENT SEEDING AND SODDING. The Design-Build Team shall provide a minimum of 95 percent stand (coverage) of turf meeting 705 specifications for flat and slope areas. For slope areas 3:1 and steeper tracked with a bulldozer, the stand (coverage) of turf shall be a minimum of 50 percent.

Sodding shall be performed as per Section 708. Two inches of topsoil shall be placed UNDER the sod. The Design-Build Team shall provide a minimum of 99 percent stand (coverage) of turf with adequate soil moisture meeting Section 708 specifications.

TURF STANDS AND SODDING SHALL BE EVALUATED BY DIVIDING THE PROJECT INTO 10 EVENLY SPACED CROSS SECTIONS. EVALUATIONS SHALL BE CONDUCTED ALONG EACH CROSS SECTION, EVERY 25 SQUARE FEET.

The turf from seeding and sodding shall have a dark green color. Both the seeding and sodding requirements shall be met at the time of the semi-final and final inspections, as approved by the the Design-Build Team and a representative of the Landscape Operations Division.

Mowing shall be performed as per the Administration's INTEGRATED VEGETATION MANAGEMENT MANUAL FOR MARYLAND HIGHWAYS. Mowing shall be evaluated at the beginning of each month during the growing season.

3.19.06 Landscape and Reforestation Plantings

All materials shall conform to Section 920 of the Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, January 2001.

All construction shall conform to Sections 701 through 715, inclusive, of the Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, January 2001.

3.19.07 Protection of Existing Utilities

Attention of the Design-Build Team is directed to the presence of utility lines of various types in the existing and proposed streets or highways in which the construction project is to be performed. The Design-Build Team shall exercise special care and extreme caution to protect and avoid damage to utility company facilities as described in this RFP/IFP. The Design-Build Team shall take into consideration the adjustments and installations by public utilities in areas within the limits of this contract. Existing utilities are located and shown in the utility designation file as they are believed to exist; however, the Administration assumes no responsibility for the accuracy of these locations. The Design-Build Team shall be responsible for determining the location of all existing utilities and incorporating them into the design prior to initiating construction.

The Design-Build Team shall locate all existing utilities and be responsible for their safety and continuous service. Should any existing utilities be damaged or destroyed due to the operations of the Design-Build Team, the damaged or destroyed components shall be immediately replaced or repaired as necessary to restore the utility to a satisfactory operating condition. These repairs or replacements shall be at no additional expense to the Administration or the owner of the utility.

The Design-Build Team shall inform the respective utility companies at least fourteen days prior to working in any area. In addition, the Design-Build Team shall give sufficient notice to the specific utilities of the Design-Build Team's overall plan for construction and utility relocations. The utility companies will establish the lead time necessary to meet the applicable utility work schedule and coordinate with the Design-Build Team's work operations based upon the Design-Build Team's overall plan.

For a list of the known utility owners have existing facilities within the limits of this contract see Section 875 – Utility Statement, location elsewhere within this RFP/IFB:

All notifications to the above utility companies and "MISS UTILITY", 1.800.257.7777, shall be given 48 hours (two full working days) in advance of working in the area of the specific affected utility. The notification to "MISS UTILITY" is required whenever any excavating or similar work is to be performed.

The Design-Build Team shall be responsible for all frame and cover adjustments required by the project, either making the adjustment, or reimbursing the utility owner. The Design-Build Team shall provide for access to all utility manholes, valves, vaults, poles, and all other above ground utility equipment, both during and after construction. This access shall consist of a firm, ten foot minimum width, route to the equipment, drivable for an AASHTO SU 30 truck. This access shall also consist of a ten foot minimum width by twenty foot minimum length parking area immediately adjacent to the equipment. Both the route and the parking area shall be completely with in State right-of-way, shall have a four percent maximum cross slope, and shall have an eight percent maximum longitudinal slope. Shoulders may be part of these routes and parking areas, but travel lanes shall not be. The Design-Build Team shall design and construct this access so utility company personal and vehicles can safely get to the equipment from public roads, work at the equipment, and safely return to the public road.

If an adjustment is required to facilities, it is necessary that the existing facilities remain in service until the new construction is complete and placed in service. Also, when adjustments are required, establishment of lead times is necessary to meet the applicable utility schedule and coordination with the Design-Build Team's work operation.

Working around or protecting the utilities, removal and disposal of materials from the utilities and cooperation with the owners of the utilities and with other contractors will not be measured but the cost will be included in the Contract Lump Sum price bid.

TC 3.20 ENVIRONMENTAL PERFORMANCE SPECIFICATION

3.20.01 General

The Design-Builder shall conduct its design and construction activities in accordance with these specifications such that no action or inaction on the part of the Design-Builder shall result in non-compliance with the requirements of the necessary permits and approvals required by the Project.

3.20.01.01 General Environmental Philosophy

The US 113 Project passes through an area of diverse environmental, community, and cultural resources. Protection of these resources is of paramount importance. The philosophy followed by the Maryland State Highway Administration (Administration) during the development of the Concept Plans was to incorporate environmental stewardship measures and avoid and minimize impacts to the natural and forest areas, community, cultural resources (Section 106 Resources), and Parkland (Section 4(f)) to the greatest extent feasible and practical. The Design-Builder

shall continue this environmentally sensitive approach and philosophy during the preparation of final design plans and through Project implementation. The Administration has implemented innovative approaches to reward the Design-Builder for high quality environmental performance, as stated in various sections of this Performance Specification. These innovative approaches include incentives for reductions to forest impacts and incentives for reductions to wetland/waterway impacts.

3.20.02 Guidelines and References

The Design-Builder shall design and implement Environmental requirements in accordance with the relevant requirements of the Guidelines listed by priority in Table 1 unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Appropriate professional standards and regulations shall be utilized for design and construction implementation of all commitments, considerations, permit conditions and approval requirements.

Guidelines shall include, but are not limited to the following:

TABLE 1
GUIDELINES FOR ENVIRONMENTAL

Priority	*Author or Agency*	*Title*
1		Section 106 of the National Historical Preservation Act (16 USC § 470f)
2		Section 4(f) of the US Department of Transportation Act (23 USC § 138)
3		Code of Federal Regulations (CFR)
4		Code of Maryland Regulations (COMAR)
5	MDE / USACE	Joint Federal / State MDSPGP-3 Permit Application and Authorization for US 113
6		Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983 and successors)
7		Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole 1994)
8		Standards and Guidelines for Architectural and Historical Investigations in Maryland (Maryland Historical Trust, 2000)
9		Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites, ACFIP 1999 (64 FR 27085-27087)
10		Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Past 68)
11	SHA	Standard Specifications for Construction and Materials
12	SHA	Book of Standards for Highways and Incidental Structures

3.20.03 Owner's Environmental Roles and Responsibilities

The Administration has conducted extensive coordination with various environmental and regulatory agencies and the public. The Administration will provide an Independent Environmental Monitor (IEM), on behalf of the USACE and MDE, who will work with the Design-Builder to confirm that the Design-Builder's plans and construction methods are in compliance and that all regulatory permit conditions and commitments are met. The Independent Environmental Monitor will:

A. Review plans as they are developed;

B. Review the Design-Builder's environmental compliance implementation;

C. Notify the Design-Builder's of deficiencies in the compliance with the commitments, considerations, permits and approvals; and

D. Coordinate and attend any meetings involving resource or regulatory agencies.

3.20.04 Design-Builder's Responsibilities

The Design-Builder shall be responsible for compliance with the permit conditions throughout the design and construction of the Project. The Design-Builder shall demonstrate compliance by producing a Compliance Report each quarter, which tracks and confirms compliance with each commitment pertaining to the construction of the Project, and also tracks impacts to wetlands and Waters of the US. The checklist and memorandum shall be submitted to the Administration within one week after the end of each quarter.

3.20.05 Permits and Approvals

The Administration will be relying on the Design-Builder to achieve and maintain commitments and permits through a strong Environmental Compliance Plan and partnering with the Administration. The Design-Builder is encouraged to consider environmental stewardship measures that exceed those in the standards and permits, while considering reasonable cost and practicality.

A. As part of this RFP, the Administration is providing the following permits and approvals based on the proposed activities:

   1) Joint Federal / State MDSPGP-3 (from MDE and USACE)

   2) Reforestation Site Review Permit (from DNR)

B. The Design-Builder shall obtain the following permits and/or approvals:

   1) Erosion and Sediment Control Approval (from MDE)

2) Stormwater Management Permit (from MDE)

3) All other approvals, permits and licenses, pay all charges, fees and taxes and give notices necessary or appropriate for the implementation of the Project beyond those obtained by the Administration. This includes but is not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrows pits; and

3.20.06 Permit Modifications and Approvals

The Design-Builder shall obtain approvals from the Administration for any changes in design and/or construction activities that affect any permit conditions and would require a modification approval from the regulatory agencies.

All conditions in the permits shall be adhered to unless modifications are accepted and approved by the Administration and the regulatory agencies.

Delays due to permit modification approval for permits listed in TC Section-3.20.05A, requested by the Design-Builder, will not result in additional costs to the Administration nor will the Contract be extended.

The Design-Builder shall not alter the design in such a manner that increases or creates new impacts to forest, cultural resources, parkland, wetland, wetland buffer, waterway, or floodplain compared to those impacts which were authorized by the permits, illustrated in the Concept Plans and defined in the Joint Permit Application tables. If the Design-Builder determines that changes to impacts are to be considered through design and/or construction, the Design-Builder shall be responsible for providing to obtain the permits, approvals or modifications from the regulatory agencies. Request for modification to the permits listed shall be accompanied by documentation provided by the Design-Builder to demonstrate that there is no practical alternative. Additional mitigation required with approval of modifications shall be the responsibility of the Design-Builder.

3.20.07 Natural Resources

3.20.07.01 Groundwater

The Design-Builder shall be responsible for design measures that maintain and discharge natural groundwater flows and seeps associated with waters of the US and wetlands.

The Design-Builder shall provide protective measures at cut slopes, ditching and other activities adjacent to non impacted or temporarily impacted wetlands to ensure that the source of hydrology to that wetland is preserved. If it is determined that the wetland has been altered hydrologically, it will be considered an additional impact, for which the Design-Builder shall be responsible for providing permit modification documentation as well as mitigation at the designated ratios, per COMAR, for the impacts.

Within one year of the completion of the construction, an inspection will be conducted by the Administration and the regulatory agencies to determine whether any remnant wetlands have lost their hydrology. If it is determined that remnant wetlands are no longer functioning as a jurisdictional wetland, the Design-Builder shall be responsible for costs associated with the additional mitigation required. Mitigation ratios for the lost wetlands shall be in accordance with COMAR

3.20.07.02 Surface Water

For details on Erosion and Sediment Control and Stormwater Management, see the Drainage, Stormwater Management, and Erosion & Sediment Control Performance Specification.

The Design-Builder shall not discharge or allow the release of any sediment laden construction water unless properly treated. The Design-Builder shall obtain Administration approval of all dewatering operations prior to pumping and discharge. Water to be pumped and discharged shall be in conformance with the COMAR Standards.

To minimize potential for untreated discharge, the Design-Builder shall designate, design and construct, utilize, maintain and upon conclusion of operations, properly close concrete wash-out pits for all concrete production, transport and placement operations. The location of concrete wash-out pits shall be approved by the Administration prior to use. The pits shall be managed such that no concrete waste or wash water is discharged into waters of the US. This may include the implementation of drying beds with proper sediment controls and treatment of excess wash water on-site or proper off-site disposal.

If construction discharges exceed water quality standards identified in COMAR, the Design-Builder shall immediately notify the Administration and resolve any Project related deficiencies within 24 hours.

The Administration will request spot-check downloads at any time to verify compliance.

3.20.07.03 Aquatic Biota

The Design-Builder shall:

A. Conduct all work so as to avoid/minimize fish mortality from both construction related water quality impairment and in-stream activities. The Design-Builder shall notify the Administration 48 hours prior to the commencement of any stream dewatering or other in-stream activities.

B. Comply with all water quality standards stated in the COMAR for the protection of aquatic biota.

C. Conduct all in-stream work for the culvert replacement in compliance with the Maryland mandated stream closure period for the Use I stream (March 1 through June 15, inclusive in any year). Any riprap placed shall be constructed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to temporarily impound water.

3.20.07.04 Wetlands and Waters of the US

Direct impacts to wetlands and waterways are anticipated to occur under the Project. The Table in the Joint Permit Application presents the total impacts permitted for the US 113 Project. All wetlands and waterways were identified, delineated and surveyed within the Project. Surveyed boundaries of waterways and wetlands are depicted on the Concept Plans. Prior to performing any work on the Project, the Design-Builder shall be responsible for installing temporary orange safety fence and prohibitive signage in English and Spanish adjacent to non-impacted areas of wetlands and their buffers, identified in the Section 404 Permit, along the limits of disturbance and/or right of way. The orange safety fence shall be installed at a maximum of 25 feet from the proposed toe of cut/fill adjacent to wetlands as depicted on the Concept Plans. The wetland fencing locations should be staked prior to the pre-construction meeting. All personnel of the Design-Builder or subcontractors shall be alerted to these designated protection areas.

3.20.07.04.01 Occupying Wetlands/Waterways and Best Management Practices for Work in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains

See Contract Provisions CP – Occupying Wetlands.

3.20.07.04.02 Avoidance and Minimization

The Administration proposed avoidance and minimization techniques during the planning and preliminary engineering phase consisted of alignment shifts where practicable, avoiding a skewed stream crossing and reductions in overall roadway section width at the stream crossing where safety considerations allow.

The Design-Builder shall focus its efforts to continue to minimize impacts to wetlands, waterways, floodplains, in all areas of the Project, especially sensitive areas. Engineering designs shall continue to emphasize avoidance and minimization of impacts as the feasibility and effectiveness of using measures such as retaining walls, steeper fill slopes, increased headwall heights, reduced roadway sections and any other feasible minimization efforts are evaluated.

Side slopes shall be 2:1 or steeper wherever the fill material is adjacent to wetlands or waterways. Additional avoidance and minimization efforts such as retaining walls, MSE walls, and Reinforced Earth Slopes are encouraged, especially at wetlands. Refer to the Geotechnical Performance Specification.

3.20.07.04.03 Wetland and/or Waterway Impact Reduction Incentive

The Design-Build Team is advised upon final acceptance of the constructed project, completion of as-built plans and approval of permit modification by USACE, the contractor will be reimbursed for any wetland or waterway impact reduction in increments of 0.10 acre. The reimbursement only pertains to reduced impacts within the Limit of Disturbance. This determination will be made by comparing the impacts determined in the as-built plans against the impacts permitted by USACE/MDE in the initial Joint Federal / State MDSPGP-3 Permit. This incentive will be paid at $8000.00 per 0.10 acre saved.

3.20.07.05 Reforestation

Reforestation work shall include the performance of all required and applicable Maryland Roadside Tree Law, Reforestation Law and Maryland Forest Conservation Act work associated with the Project.

3.20.07.05.01 Forest Avoidance and Minimization

Direct impacts to forest are anticipated to occur under the Project. Surveyed boundaries of forests are depicted on the Concept Plans. Prior to performing any Work, the Design-Builder shall be responsible for performing all tree preservation measures in accordance with Section 120-Tree Preservation of the Standard Specifications for Construction and Materials.

Specimen trees (trees greater that 30” diameter at breast height measured 4.5’ above the ground) were identified, evaluated and are depicted on the Landscape Plates. The Design-Builder shall avoid as many specimen trees as possible without affecting resources with equal or greater regulatory protection. As the design advances, it may be found that specimen trees are located near the outer edge of the required LOD/ROW or just outside the LOD/ROW. If this condition exists, the Design-Builder shall coordinate with the Administration to mark and provide a buffer for any such tree to avoid its removal during clearing and grubbing activities. An adequate buffer is defined as the critical root zone (drip line).

Before reforestation is approved by the DNR, every reasonable effort shall be made by the Design-Builder to minimize the cutting or clearing of trees. Only the minimum number of trees may be cut, and sound design practices shall be utilized.

3.20.07.05.02 Forest Impact Reduction Incentive

The Design-Builder is advised upon final acceptance of Work, completion of as-built plans and approval of modifications by the DNR, the Design-Builder will be provided additional compensation for any upland forest impact net reduction in increments of 0.25 acre. The additional compensation only pertains to a net reduction of impacts within the limits of disturbance. This determination will be made by comparing the

impacts determined in the as-built plans against the impacts approved by the DNR. The incentive will be paid as follows:

PROJECT LOCATION	INCENTIVE
Inside the LOD immediately adjacent to, or contiguous with, park boundaries,	$10,000/Acre
In all other areas	$5,000/Acre

3.20.07.05.03 Forest Mitigation

Land disturbed by construction activities shall be revegetated as soon as practical after construction is completed in accordance with the Drainage, Stormwater Management, and Erosion & Sediment Control and Planting & Landscape Architectural Performance Specifications.

Mitigation shall be the responsibility of the Design-Builder for additional impacts proposed beyond those originally approved by DNR for the Project, and may include a site search, agency reviews and approvals, design, and obtaining right of way and construction. If available and compensation agreed, the Administration may allow the Design-Builder to use excess mitigation at the approved mitigation sites.

The Administration will pay an incentive bonus of $5,000 per 0.50 acre for additional on-site upland reforestation, which meets DNR requirements that is accomplished beyond the approximately 4.22 acres of on-site reforestation specified.

3.20.07.06 Terrestrial Wildlife (TW)

3.20.07.06.01 Rare, Threatened and Endangered Species (RTE)

No federally listed rare, threatened, or endangered (RTE) species are anticipated to be directly impacted by construction of the Project.

3.20.07.07 Cultural Resources

Except where otherwise noted below, the Administration will be responsible for conducting all cultural resources activities. These activities will include all historic and archaeological testing and data recovery, coordination with the Administration staff and consultation with all federal, state and local historic preservation agencies and public parties, including affected landowners. The project is governed by a Memorandum of Agreement (MOA) between the Administration, the Federal Highway Administration (FHWA), and the Maryland State Historic Preservation Officer (MD SHPO).

A. Unauthorized Project Impacts are prohibited;

B. Material changes to the highway alignment that result in impact beyond those identified in the Concept Plans will not be allowed without the prior written

consent of the Administration;

C. Proposed changes shall be supported by the necessary investigations, documentation, and submittals needed for these approvals by applicable resource management agencies; and

D. Time and cost implications resulting from design changes shall be solely borne by the Design-Builder.

3.20.07.07.01 Work Area Access During Design-Build Activities

The Design-Builder shall provide the Administration access to the work site to conduct cultural resources investigations as needed. The Design-Builder shall be responsible for coordinating an access plan that supports the timely completion of the required investigations. The Administration will make every effort to develop plans that avoid or minimize restriction of construction activities.

It is not anticipated that archeological resources are present within the area identified in the Concept Plans based on the negative results of prior studies; however, should such resources be encountered during Design-Build activities, the following procedures will be followed:

3.20.07.07.02 Unanticipated Discoveries of Archeological Resources During Design-Build Activities

In the event that previously unidentified archeological resources are discovered during ground disturbing activities, The Design-Builder shall immediately notify the Administration's Project Engineer, and shall immediately halt construction work involving subsurface disturbance in the area of the archeological resource, and in the surrounding area where further subsurface remains can be expected to occur. The Administration's Project Engineer shall contact Administration archeologist Dr. Julie Schablitsky (410-545-8870), Assistant Division Chief of the Environmental Planning Division, who shall notify the MD SHPO of the discovery.

The Administration and the MD SHPO, or an archeologist approved by them, shall immediately inspect the work site and determine the area and nature of the archeological resource. Following this inspection, construction may resume in the area outside the archeological resource as defined by the Administration and the MD SHPO.

Within no more than three working days of the original notification of discovery, the Administration, in conjunction with the MD SHPO, shall determine the National Register eligibility of the resource. If the resource is determined eligible for the National Register, the Administration shall prepare a plan for its avoidance, protection, recovery, of destruction without recovery. Such a plan shall be approved by the MD SHPO prior to implementation.

Work in the affected area shall not proceed until either:

- The development and implementation of appropriate data recovery or other recommended mitigation measures, or
- The determination is made that the located remains are not eligible for inclusion on the National Register.

3.20.07.08 Air Quality

3.20.07.08.01 Hazardous Materials

A. The Design-Builder shall prepare and implement a plan for management and disposal of controlled hazardous materials and contaminated soil and groundwater that may be encountered during structure demolition, land clearing, or excavation activities.

B. The plan shall address worker safety and health in accordance with applicable federal, state, and local regulations.

C. The plan shall provide procedures for management, handling, transportation, and disposal of demolition debris and contaminated soils and groundwater that contain controlled hazardous substances in accordance with applicable federal, state, and local regulations.

3.20.07.08.02 Tracking of Sediment

The Design-Builder shall implement means to reduce tracking of sediment such as:

A. Elongated and widened stabilized construction entrances;

B. Use of wash racks;

C. Use of street cleaning equipment;

D. Increased maintenance of entrances; and

E. On-site concrete wash-out pits in proximity to all major pour sites.

3.20.08 Submittals

The Design-Builder shall provide the following:

A. Surveyed as-built 22x34 plans of post construction conditions in the same format as the Concept Plans and the revised impact tables that were included in the Joint State/Federal Nontidal Wetlands and Waterways Permit application.

B. Forest Impact Plans.

TC 3.21 PUBLIC OUTREACH PERFORMANCE SPECIFICATION

3.21.01 General

This Performance Specification outlines the requirements for Public Outreach (PO) and defines the roles and responsibilities for this effort.

The PO program includes Administration and Design-Builder activities, including the following:

A. Public Outreach;

B. Community involvement and meetings;

C. Communications with the public;

D. Public notices;

E. Media relations; and

F. Maintenance of Traffic (MOT) plan.

The residents, businesses, elected officials, communities, motorists, and other interest groups within the project area have been kept informed and their engagement in the construction process is critical to the successful completion of the Project. In support of the Administration, the Design-Builder shall commit to significant assistance of the Administration with regard to community participation and interaction activities during the development of the design and throughout the construction of the Project.

3.21.02 Guidelines and References

The Work shall be in accordance with this Public Outreach Specification.

3.21.03 Requirements

The community involvement and participation element is intended to carry forward the dialogue with residents, landowners, community groups, local officials, and other similar groups. This effort shall include activities such as, but not limited to, the Design-Builder supporting the Administration in meetings with individual land owners, local officials, and community groups and public meetings to keep the public involved in design and construction activities.

Public Outreach is intended to keep the public informed of major activities and decisions through design and construction. This element will involve the preparation and distribution of Project information to the assigned Administration representative for further dissemination to the public and media.

The Design-Builder shall make a good faith effort to address any concerns the public may have, and take under consideration any suggestions or wishes they express if those suggestions are reasonable in regard to cost, time, and construction effort. Documentation shall be in the form of

meeting minutes and correspondence, including e-mails. The Design-builder shall direct requests it receives to the Administration and shall assist in preparing responses. All design or construction modifications are subject to written acceptance by the Administration.

3.21.03.01 Administration Public Outreach Responsibilities

The Administration and the Design-Builder have shared responsibility for the PO Program. The Administration will be the lead on Public Outreach activities, with active support provided by the Design-Builder, to include project research, adequate support staff, graphic design, materials, and printing .

The Design-Builder shall have primary responsibility for performing the activities specified in this Public Outreach Specification as was well as in the Contract Documents.

The Administration's responsibilities include the following activities:

A. Maintain Questions & Answers/Frequently Asked Questions of any approved communication efforts by the Design-Builder; and

B. Liaising with and monitoring the Design-Builder's performance for compliance with the Contract's public outreach requirements.

3.21.03.02 Design-Builder Responsibilities and Requirements

3.21.03.02.01 Design-Builder's Response to Inquiries and Comments

A. Questions or comments from residents, businesses, or other member of the public shall be referred to the Administration within 4 hours. The Design-Builder shall take necessary steps to facilitate such contact.

B. If Design-Builder receives a complaint regarding its conduct of work on the Project, the Design-Builder shall notify Administration within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.

C. On occasions specified by the Administration, the Design-Builder shall commit its Project Manager to serve as a spokesperson for the Project for technical and safety issues with certain audiences.

3.21.03.02.02 Public Notifications

A. The Design-Builder shall facilitate the Administration's notification of the public and community in general and specifically affected businesses and residents along the Project. As directed by the Administration, this may include personal contact to affected parties of construction progress and upcoming events.

B. The Design-Builder shall provide the specific notifications listed in Table 1.

C. Utility shut-off/diversion announcements shall be coordinated in advance with the Administration and the utility company. The Design-Builder shall prepare a written notice to the affected parties.

TABLE 1
NOTIFICATIONS

Notice	Requirement
Lane Closure	Written notices posted at least 7 days in advance of planned closures at start and end of Project and at intermediate intersections/junction with United States (US), state, or county highways and roads. Notice provided to Refer to Maintenance of Traffic Performance Specifications.
Critical Utility Shut-off/Diversion	Written notice at least 72 hours in advance of, but not more than 96 hours before, shut-off and/or diversions. Copy of notice to Administration and Utility Company.
Business/Commercial Utility Shutdown	Written notification of Utility shutdown or diversion for businesses and commercial property at least 72 hours in advance of shut-down. Notice shall be coordinated in advance with Administration and Utility Company.
Residential Utility Shutdown	Written notification of Utility shutdown or diversion for residential property 72 hours in advance of shut-down. Notice shall be coordinated in advance with Administration and Utility Company.
Weekly Construction Updates	Construction updates shall be provided weekly and shall identify all planned traffic shifts, lane closures and utility shut-downs and activities.
Road and Driveway Closures	Written notice and personal contact at least 72-hours in advance of closure. Copy of notice to Administration. Refer to Maintenance of Traffic Performance Specifications

3.21.03.02.03 Public Contact Records

The Design-Builder shall maintain a consistent system for documenting all contact with business owners, residents, media and property owners. Unless otherwise directed, the Design-Builder should not act as spokesman for the Project. The Design-Builder shall provide Administration an electronic copy of all public contact records. File should be received by the 1st of each month and should include all contacts made prior to the 25th of the previous month.

3.21.03.02.04 Construction Schedule/Maintenance of Traffic and Access

Information regarding Project design and construction shall be readily available in a form that can be quickly disseminated to the public. Information provided to the public shall be consistent with information contained in the Baseline Progress Schedule, schedule updates, and the applicable Maintenance of Traffic Plan.

3.21.03.02.05 Signage

The Design-Builder shall install signs throughout the Project to be placed at the start and end of the Project, at intersections with County and State highways, at Design-Builder's main office (if along the Project alignment), and at all field

offices. The signs shall identify the Administration by its SHA official logo and show the name of the Project, the Project hotline number, and the Project Web site address is applicable. Signs and lettering shall be sized appropriate for the speed limit in the area using MUTCD size guidelines.

3.21.03.02.06 Telephone Trees

The Design-Builder shall establish and manage an emergency response telephone tree. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations.

3.21.03.02.07 Public Forums

At the specific request of the Administration, the Design-Builder shall participate in Administration organized public forums to give the public the opportunity to discuss the Project.

The Design-Builder should also work with the Administration to provide all graphics and printed materials for these forums.

3.21.03.02.08 Construction Progress Photographs

The Design-Builder shall provide to the Administration high-resolution construction progress photographs in electronic format at least monthly or at any time that a new significant activity commences. Monthly submission should include at a minimum of 10 (ten) new progress photos. In addition, the Design-Builder will facilitate requests and make arrangements for the Administration to take additional photos on an as-requested basis. Distinct from progress documentation photos, the purpose of photos identified in this section is to facilitate public information via the Project Web site, newsletters and other such materials.

3.21.03.03 Other Design-Builder Activities

The Design-Builder is encouraged to provide additional, cost-effective services to enhance the overall Public Outreach Community Relations Program. Additional services should adhere to the standards indicated in the Public Outreach Plan and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and subject to Administration's written acceptance.

These activities may include part of the federal Transportation Management Plan guidelines to draft a Public Information & Outreach plan for the project, which shall include:

Standard language for constituent response (i.e. correspondence, phone inquiries, memos,

etc.) in accordance with the Administration's guidelines.
Creation/printing of overall project brochure and supporting materials
Creation/printing of community updates for distribution
Development of community contacts list
Educating the publics on work zone safety

3.21.03.04 Media Relations

An ongoing media relations effort will be handled by the Administration. The Design-Builder shall assist in providing timely information to the Administration regarding construction activities for use in media events.

NEITHER THE DESIGN-BUILDER NOR ANY SUBCONTRACTOR NOR THEIR EMPLOYEES SHALL INTERFACE WITH THE MEDIA WITHOUT THE EXPRESSED CONSENT OF THE ADMINISTRATION, EXCEPT AS SPECIFICALLY DIRECTED BY THE ADMINISTRATION. IN EMERGENCY SITUATIONS, THE DESIGN-BUILDER SHALL IMMEDIATELY NOTIFY THE ADMINISTRATION OF ANY SITUATIONS THAT MAY INVOLVE THE MEDIA.

TERMS AND CONDITIONS

TC SECTION 4
CONTROL OF WORK FOR DESIGN-BUILD

TC-4.01 WORKING DRAWINGS.

(a) General.

DELETE: Paragraph 3 in its entirety.

INSERT: The following:

The Design-Build Team shall prepare working drawings as described in the Standard Specifications, with the exception that the drawings shall not be submitted to the State Highway Administration, but shall be submitted to the Design-Build Team's engineer for review and approval. Following approval by the Design-Build Team's engineer, two copies of the approved drawings shall be forwarded to the Administration. The Administration shall review the drawings to determine that they meet minimum job performance specifications only. Acceptance of the drawings shall not relieve the Contractor of any responsibility in connection therewith and the Administration assumes no responsibility for the accuracy of the drawings. A two-week period will be permitted for SHA review of the working drawings. The approved working drawings shall be stamped and signed by the Design-Build Team's engineer and forwarded to:

Maryland State Highway Administration
Director
Office of Highway Development
707 North Calvert Street
Baltimore, Maryland 21202

(b) Working Drawings for Falsework Systems.

In the first paragraph, substitute Design-Build Team's Engineer for Engineer.

In the third paragraph, substitute Design-Build Team's Engineer for Engineer.

TC-4.02 FAILURE TO ADEQUATELY MAINTAIN PROJECT.

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

Additionally, a deduction of $1,000 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 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 hours of receiving a notice to comply with the required maintenance provisions. The amount of monies deducted will be a permanent deduction and are not recoverable.

TERMS AND CONDITIONS

TC SECTION 4
CONTROL OF WORK

TC-4.02 FAILURE TO ADEQUATELY MAINTAIN PROJECT

98 **ADD:** To the second 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 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 $IFB_FailureToMaintain 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 4
CONTROL OF WORK

98 **ADD:** After TC-4.04.

TC-4.05 DISPUTE MEDIATION

When a dispute arises out of or relates to the Contract or breach thereof, and if the dispute can not be settled through negotiation or the partnering issue resolution process, either party may first elect to try in good faith to settle the dispute by non-binding mediation administered by a mutually agreed upon qualified mediator before proceeding with other dispute resolution procedures including litigation.

TERMS AND CONDITIONS

TC SECTION 5
LEGAL RELATIONS AND PROGRESS FOR DESIGN-BUILD

TC-5.01 INSURANCE.

.01 Commercial General Liability

99 **DELETE**: All 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 Administration. The State of Maryland shall be listed as an additional named insured on the policy. The limit of liability shall be no less than $1,000,000 per occurrence/$2,000,000 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 30 days notice of cancellation or non-renewal to:

Deputy Chief Engineer - Construction
State Highway Administration
707 North Calvert Street
Baltimore, Maryland 21202

Evidence of insurance shall be provided to the Administration prior to the award of the Contract by means of a Certificate of Insurance with copies of all endorsements attached or, in the event insurance is provided by a policy form other than a CGL form, by certified copy of the complete policy with all endorsements.

Any policy exclusions shall be shown on the face of the Certificate of Insurance.

The Certificate of Insurance shall be accompanied by a document (a copy of State License or letter from insurer) which indicates that the agent signing the certificate is an authorized agent of the insurer.

When specified in the Contract Documents, the Contractor shall carry the type and amounts of insurance in addition to any other forms of insurance or bonds required under the terms of the Contract and these Specifications.

The cost of the insurance will not be measured but the cost will be incidental to the Contract lump sum price.

Contractor and Railroad Public Liability and Property Damage Insurance shall be provided as specified in TC-6.03.

.02 Indemnification

The Design-Build Team shall indemnify, defend and hold the Administration and its officers, directors, employees, agents and consultants from and against all claims, actions, torts, costs, losses, and damages for bodily injury (including sickness, disease or death) and/or tangible property damage (other than to the Work itself) arising out of or resulting from the performance of the Work by the Design-Build Team, any subcontractor, subconsultant, engineer, supplier, any individual or entity directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Damages covered by the preceding sentence include, but are not limited to, all fees and charges of engineers, attorneys and all other professionals and all mediation, arbitration, court or other dispute resolution costs.

The indemnity obligation set forth in the preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Design-Build Team or any subcontractor, subconsultant, engineer, supplier, or other individual or entity under Workers' Compensation acts, disability benefit acts, or other employee benefit acts.

.03 Additional Insurance Requirements

.03.1 Professional Liability Insurance

Professional Liability Insurance Policy, which covers the Indemnification Clause of this contract (paragraph .02 above), as it relates to errors, omissions, negligent acts or negligent performance in the work performance under this contract by the Designer, its subcontractors, employees and agents. The limitation of the Courts and Judical Proceedings Article states Annotated Code of Maryland Section 5-108(b) shall apply.

.03.2 Workers' Compensation Insurance

Workers' compensation, as required by the laws of the State of Maryland, including Employer's Liability Coverage and coverage for the benefits set forth

under the U.S. Longshoremen and Harbor Workers' Compensation Act, the Jones Act, and other federal laws where applicable.

.03.3 Comprehensive Automobile Liability Insurance

Comprehensive Business Automobile Liability covering use of any motor vehicle to be used in conjunction with this contract, including hired automobiles and non-owned automobiles. Loading and unloading of any motor vehicle must be covered by endorsement to the automobile liability policy or policies.

.03.4 Administrative & General Provisions

a. Each policy, with the exception of Workers' Compensation and Professional Liability Insurance, shall name the State Highway Administration.

b. Defense of Claims

Each insurance policy shall include a provision requiring the carrier to investigate and defend all named insured against any and all claims for death, bodily injury or property damage, even if groundless.

c. Compliance

The Design-Build Team shall be in compliance with this Section provided it procures either one policy or insurance covering all work under the contract or separate insurance policies for all segments constituting the entire project. In either case, a certificate of insurance must be filed for each policy with the Administration indicating that all required insurance has been obtained.

The Design-Build Team is responsible for assuring that insurance policies required by this Contract comply with all the requirements. The Design-Build Team is also responsible to determine that all subconsultants, subcontractors, suppliers, and all other individuals or entities performing Work for the Project carry all applicable insurance coverages set forth in this section, including, in all cases, Workers' Compensation, Automobile, and Commercial General Liability Insurance. The Design-Build Team shall indemnify and hold harmless the Administration from any claims arising from the failure to fulfill said responsibilities.

d. Reporting Provisions

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Administration, its officers, agents and employees.

e. Separate Application

The insurance provided by the Design-Build Team shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

.03.5 Notice of Cancellation or Modification

All policies of insurance provided in this Section shall be endorsed to provide that the insurance company shall notify the Administration, the Design-Build Team, and each named insured at least thirty (30) days prior to the effective date of any cancellation or modification of such policies.

TC-5.03 SUBCONTRACTING AND SUBCONTRACTORS

.01 Percentage of Own Workforce Required

INSERT:

The Design-Build Team must perform at least fifty percent of the value of the on-site construction work with its own workforce, not including the percent goal required in the contract proposal to be performed by DBE's. The Designer must perform at least fifty percent (50%) of the value of the design work with its own workforce, not including the work required by DBE's.

TC-5.06 OWNERSHIP OF DOCUMENTS

All plans, specifications, inspection records, or other documents ("Documents") generated by the Design-Build Team and all consultants, subcontractors, suppliers, manufacturers performing Work on the Project are the property of the Administration. Upon request by the Administration, the Design-Build Team or any other person or entity performing Work will produce and deliver such Documents as requested, both in hard copy and electronic format.

TC-5.07 ACCESS TO AND RETENTION OF RECORDS

The Design-Build Team and its employees and Subcontractors shall make all project records available for inspection by the Project Manager and all other persons authorized by the Administration, and shall permit such representatives to interview employees during working hours. Project records include daily time reports, records of force account work, quality control or assurance documentation, inspectors reports, employment records, payrolls, equal opportunity records, construction conference records, partnering records, and any other documents in any way related to the Project substantiating payment. These records shall be retained at least three years after final acceptance of the project.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS FOR DESIGN-BUILD

TC-6.10 RECYCLED OR REHANDLED MATERIALS.

111 **ADD**: The following before the first paragraph.

The Contractor shall submit to the Engineer, using MD SHA Form TC-6.10, the specific type and quantity of recycled materials (a) through (h) anticipated for use on the project prior to receipt of the Notice to Proceed. This submission does not preclude the normal materials process.

TERMS AND CONDITIONS

TC SECTION 7
PAYMENT FOR DESIGN-BUILD

TC-7.01 MEASUREMENT OF QUANTITIES

DELETE: This section in its entirety.

INSERT: The following:

Unless specifically noted herein, payment for all work within the Scope of Work shall be included in the Lump Sum Price shown on the Proposal Form. The Design-Build Team shall disregard all references in the Standard Specifications to actual quantities, Contract items, Contract unit prices, and any measurement or payment method other than inclusion in the Lump Sum Price.

Payments to the Design-Build Team shall be full compensation for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS

DELETE: The opening statement:

INSERT: The following statement:

When the Contractor requests payment allowance for stored materials, those materials must be identified as an Item within the Contractor's Lump Sum Breakdown, the following terms and conditions shall apply:

TC-7.05 PROGRESS PAYMENTS

ADD: The following:

.01 Application for Progress Payment

In order to receive payment, the Design-Build Team shall submit to the Administration a written Application for Progress Payment, including receipts, invoices, or other vouchers, including invoices from subcontractors. Applications for Progress Payment shall be made to the Administration monthly. Said invoices shall be based on the proportionate quantities of the various classes of work satisfactorily designed, checked, and completed or incorporated in the work in accordance with the Schedule of Work and the value thereof determined from the Contract Cost Breakdown as described in TC 7.09. If Applications for Progress Payment are inconsistent with the Cost Breakdown, the Projected Schedule of

Payments, or the actual progress of work, the Application must include a written explanation for such inconsistencies and the Administration reserves the right to withhold payment regarding said Application in whole or part.

.02 Payment of Invoices

All invoice payments shall be subject to correction in subsequent invoices and payments and upon the final acceptance and payment. No payment shall be made when, in the judgement of the Administration, the work is not proceeding in accordance with the provisions of the Contractor or when the total value of the work done since the last estimate amounts to less than $500.00. Portions of the progress payment may be withheld in accordance with provisions of this Contract, including Section TC 7.09.

.03 Mobilization Payments

Payment for mobilization and demobilization shall be governed by the specifications and this subsection.

The maximum amount of payment that the Department shall pay for mobilization is 10 percent of the Lump Sum Price.

.04 Payment for Changes

.04.1 Methods of Payment

Differing site conditions, changes, and extra work meeting the requirements of this Contract will be paid for using the following methods as appropriate:

a. Unit prices agreed upon in the order authorizing the work.

b. An agreed upon lump sum amount.

c. If agreement cannot be reached and/or if directed by the Administration, on a force account basis.

.04.2 Force Account Work

Compensation for items of force amount work shall be computed according to Section TC 7.03.

TC-7.09 COST BREAKDOWN AND SCHEDULE OF PAYMENTS

.01 Submittal of Cost Breakdown

Concurrent with the submission of the Price Proposal, the Design Build Team shall submit to the Administration and itemized Cost Breakdown and supporting documentation to be used to evaluate bids and as a basis of payment. This

breakdown shall present a realistic and documentable presentation of the costs for the major elements of work that comprise the lump sum price for the work. The breakdown shall be sent to the Director, Office of Highway Development, Mr. Kirk G. McClelland. At a minimum, the following Lump Sum Items shall be included:

Clearing & Grubbing
Mobilization
Design Engineering
Engineer's Office
Maintenance of Traffic
Construction Stakeout
Excavation & Embankment
Drainage
Erosion & Sediment Control
Hydraulic Structures
Hot Mix Asphalt
Concrete
Pavement Markings
Fencing
Seed & Mulch
Landscaping
Lighting & Electrical
Permanent Signing
W-beam barrier

The breakdown shall be tied to the Critical Path Method Project Schedule Design Build. The breakdown shall also contain the Design Build Team prices for Hot Mix Asphalt, HMA for Pavement Patching, Various Concrete Mixes, and each type of pavement marking. These prices will be used to determine a reduction in payment if necessary due to materials not meeting required specifications such as PCC compressive strength, AC content, asphalt density, pavement marking thickness, and reflectivity.

The Design Build Team shall use the Contract Cost Breakdown format in preparing and documenting its Applications for Payment. The Administration will use the Cost Breakdown to assist in evaluating requests for payment. All costs associated with preparation, submission, revision of the Cost Breakdown will not be considered as an item for payment, and shall be included in the Design Build Team's Lump Sum price.

The successful Design Build Team will be required to submit an Initial Critical Path Method Project Schedule Design Build Activities Chart within twenty (20) working days after notification of Award. This requirement for the submission of the an Initial Critical Path Method Project Schedule for Design Build does not supersede but supplements that which is outlined in Section 112- Critical Path Method Project Schedule Design Build.

.02 Review and Approval

Within 15 days after Execution of the Contract, the Administration shall approve the Cost Breakdown or return it to the Design Build Team with deficiencies noted. The Administration will not approve a Contract Cost Breakdown that is unbalanced. The Design Build Team shall then submit the Cost Breakdown until an acceptable Cost Breakdown is approved. No progress payment, including an initial request of mobilization costs, will be made until a Cost Breakdown is approved. The Design Build Team is responsible for incorporating time for submission and approval of the Cost Breakdown in its Schedule of Work.

.03 Projected Schedule of Payments

See TC 2.13

.04 Justification of Cost Breakdown or Projected Schedule of Payments

The Department may require the Design Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by the Department.

Within 15 days after Execution of the Contract, the Administration shall approve the Cost Breakdown or return it to the Design Build Team with deficiencies noted. The Administration will not approve a Contract Cost Breakdown that is unbalanced. The Design Build Team shall then submit the Cost Breakdown until an acceptable Cost Breakdown is approved. No progress payment, including an initial request of mobilization costs, will be made until a Cost Breakdown is approved. The Design Build Team is responsible for incorporating time for submission and approval of the Cost Breakdown in its Schedule of Work.

.03 Projected Schedule of Payments

See TC 2.13

.04 Justification of Cost Breakdown or Projected Schedule of Payments

The Department may require the Design Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by the Department.

TC SECTION 7
PAYMENT

TC-7.06 FINAL ACCEPTANCE AND FINAL PAYMENT

128 **DELETE:** (b) in its entirety.

INSERT: The following.

(b) The Contractor shall then have a period of 30 days, dating from the date upon which he received the aforementioned tabulation from the Administration, in which:

(1) To decide whether or not he will accept final payment upon such a basis, and

(2) To notify the Administration, in writing, of his decision. The Contractor may request an additional period up to 30 days in which to notify the Administration of his decision. In the event the Contractor notifies the Administration that he protests final payment on such a basis, that notification shall outline the reasons for said protest.

TC SECTION 7
PAYMENT

TC-7.09 PRICE ADJUSTMENT FOR DIESEL FUEL

(a) General. A Price Adjustment (PA) is included in this Contract to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of diesel fuel from the prevailing price as quoted herein.

Contract items, if included in this project, which are subject to adjustment of the price of diesel fuel and the adjustment factors which apply to each item, are included in Table TC-7.09 of this provision.

The prevailing base price of diesel fuel for this Contract is $ 4.860 per gallon.

The monthly index price to be used in the administration of this provision will be Diesel Fuel Price published by the U.S. Department of Energy, Energy Information Administration on highway diesel prices, for the Central Atlantic region at www.eia.doe.gov. The monthly index price to be used for the price adjustment will be the price for diesel fuel calculated by averaging each of the weekly posted prices for that particular month.

The PA only applies to any increases or decreases in excess of 5 percent of the base index provided in this provision and the index for the current month. The total dollar amount of the fuel adjustment for this Contract is 5 percent of the Contract Total amount as bid. If an increase or decrease in costs exceeds 5 percent of the Contract Total amount as bid, no further adjustment will be made.

Computations for adjustment will be as follows:

$$PA = (E-B)\ FQ$$

Where:

PA = Monetary amount of the price adjustment (plus or minus)
B = Adjusted base index price (B plus or minus 5 percent of B)
E = Current index price (USDOE)
F = Appropriate fuel factor
Q = Quantity of individual units of work

PA for any period may be either plus or minus.

The gallons of diesel fuel will be determined by multiplying the usage factors listed in the table by the amount of acceptable work performed on the separate adjustable items during an estimate period.

TABLE TC-7.09

COST ADJUSTMENT FACTORS FOR DIESEL FUEL			
ADJUSTMENT	**DESCRIPTION**	**UNITS**	**FACTOR**
A	Sum of Cubic Yards of Excavation in Category 200	Gallons/Cubic Yard	0.29
B	Sum of Structure Concrete in Category 400	Gallons/Cubic Yard	1.892
C	Sum of Aggregate Base in Category 500	Gallons per ton	0.60
D	Sum of HMA in Category 500	Gallons per ton	3.50
E	Sum of Rigid Concrete Pavement in Category 500	Gallons/Cubic Yard	0.95

Any difference between the checked final quantity and the sum of quantities shown on the monthly estimates for any item will be adjusted by the following formula:

$$FPA = [(FCQ \div PRQ) - 1] \times EA$$

Where:

FPA = Final PA (dollars) for the item which increased or decreased.
FCQ = Final Checked Quantity of the item which increased or decreased.
PRQ = Total Quantity of said item reported on the most recent estimate.
EA = Total PA in dollars of said item shown on most recent estimate.

(b) Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining a PA for diesel fuel fluctuations.

(1) Payment. The PA will be computed on a monthly basis and a Change Order will be prepared quarterly or at intervals determined by the District Engineer. The monthly base price for determining a PA for all work performed after the Contract completion date, as revised by an approved time extensions, will be the monthly base price at the time of the Contract completion date (as extended) or at the time the work was performed, whichever is less.

(2) Expiration of Contract Time. When eligible items of work are performed after the expiration of Contract time with assessable liquidated damages, no PA will be made.

(3) Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting Change Order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities.

(4) Inspection of Records. The Administration reserves the right to inspect the records of the Contractor to ascertain actual pricing and cost information for the diesel fuel used in the performance of the applicable items of work.

(5) Additional Work. When applicable items of work, as specified herein, are added to the Contract as additional work, in accordance with the Contract provisions, no PA will be made for the fluctuations in the cost of diesel fuel unless otherwise approved by the Engineer. Contractor shall use current fuel costs when preparing required backup data for work to be performed at a negotiated price.

(6) Force Account. Additional work performed on a force account basis, reimbursement for material, equipment, and man hours as well as overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.