



VOLUME II

Specifications
for
Consulting
Engineers'
Services



**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
VOLUME II**

Prepared by:

**MARYLAND DEPARTMENT OF
TRANSPORTATION**

STATE HIGHWAY ADMINISTRATION

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Specifications for Consulting Engineers' Services

Volume II

State Highway Administration Specifications

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NOTE:

The Maryland State Highway Administration has recently reorganized the Office of Planning and Preliminary Engineering. Any reference to the "Bureau of Project Planning" in these Specifications is to be construed to mean "Project Development Division".

INTRODUCTION

Volume II of The Specifications for Consulting Engineers' Services has been developed by the Highway Administration to set forth the guideline of technical criteria in connection with project planning, preliminary design, final design, preparation of construction contract plans and documents and construction phase services for Highway Administration projects. These Specifications are to be utilized by consulting engineering firms when preparing and submitting proposals to the Highway Administration, whether on a competitive or non-competitive basis. Furthermore, these Specifications will be made a part of all successfully negotiated contract Agreements, the same as though textually incorporated therein, and shall accordingly govern the performance of a Consultant's "Scope of Services" after the issuance of a Notice to Proceed for a specific Project.

This document supercedes the State Highway Administration's - "Volume II - Specifications for Consultant Engineers' Services" dated July, 1976.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section I

**DESCRIPTION OF PROJECT, PROJECT RESUME
AND/OR PROJECT PROSPECTUS**

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section I

**DESCRIPTION OF PROJECT, PROJECT RESUME
AND/OR PROJECT PROSPECTUS**

A. PURPOSE

The purpose of this Section of the Specifications is to set forth a standardized format for the development and presentation of the requirements and details of a particular Highway Administration Project necessitating the services of a Consulting Engineering firm. Specifically, while each Project may vary in terms of the scope and intensity, this Section of the Specifications will be developed in detail describing the scope of services required and the procedures and methods to be employed in carrying out the Project Services with reference to applicable Specifications and changes, deletions and waivers thereto.

B. PROCEDURE

Included hereinafter is the general format, to be used by the Highway Administration for the development of the Description of Project, Project Resume and/or Project Prospectus. This Section of the Specifications as outlined will be developed by the Highway Administration and furnished to the Consultant at the time of initiating negotiations. The Technical Proposal developed by the Consultant shall be responsive to the specifics set forth. Said Technical Proposal shall present the criteria and methodology proposed by the Consultant to accomplish the required Project services. The Section I of the Specifications will be incorporated into and made a part of the contract Agreement.

^C^

SAMPLE

SPECIFICATIONS FOR
CONSULTING ENGINEER'S SERVICES
Section I
DESCRIPTION OF PROJECT, PROJECT RESUME
AND/OR PROJECT PROSPECTUS

State Contract Number:

Federal Project Number:

State Route Number:

Federal Programming Submitted:

yes _____ no _____

Federal Programming Approved:

yes _____ no _____

If FHWA funds are involved, this Section must be
approved by FHWA

Approved date _____

Approved by _____

COUNTY:

PROJECT: (Route and limits)

PROGRAM AUTHORITY: For Consultant Services:

For Construction:

FUNCTIONAL CLASSIFICATION:

FEDERAL SYSTEM:

PROJECT DESCRIPTION: (brief description of services required)

PROJECT COST (neat):

STATUS OF EXISTING MATERIAL (eg., plans, studies, mapping)

SAMPLE

SCOPE OF CONSULTANT SERVICES: (detailed scope of services required with specific reference to applicable Specification.) Specify by Section eg.,

- SECTION I - Description of Project, etc.
- SECTION II - General Conditions
- SECTION III - Administrative Preliminaries
- SECTION IV - Project Development
- SECTION V - Highway Design
- SECTION VI - Structure Design
- SECTION VII - Surveys and Plats
- SECTION VIII - Traffic Engineering
- SECTION IX - Landscape Architecture
- SECTION X - Construction Engineering and Inspection
- SECTION XI - Critical Path Network

PROPOSAL DEVELOPMENT: See latest "REQUEST FOR PROPOSAL" (R.F.P.)

STATE HIGHWAY ADMINISTRATION SERVICES:

FINANCING: Be specific re: Consultant Services
re: Construction Services

COMPLETION SCHEDULE: (Total and/or by critical functions, if necessary)

GENERAL COMMENTS:

CA PROCEDURE: Applicable or Not Applicable

PREPARED BY: (Bureau and date)

APPROVED by: (Title and date) Chief Engineer or Director

NOTE: The Description of Project, Project Resume and/or Project Prospectus is to be developed by the Engineering Bureau requiring the need for Consultant Services, in accordance with the format set forth in this Section of the Specifications. Same is to be processed for approvals in accordance with State Highway Administration standard procedures.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
Section II
TRANSPORTATION PLANNING PROCESS
AND
GENERAL CONDITIONS**

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section II

TRANSPORTATION PLANNING PROCESS

AND

GENERAL CONDITIONS

A. PURPOSE

The purpose of this Section of the Specifications is to briefly describe the State Highway Administration's transportation planning process and tasks which may be performed by the Consultant in connection with a specific Project.

B. BACKGROUND

1. The Maryland Action Plan

The Maryland Action Plan has been prepared in accordance with the Federal Highway Administration's Policy and Procedure Memorandum 90-4, Process Guidelines (Economic, Social and Environmental Effects on Highway Projects). Said Guidelines were developed and issued pursuant to the 1970 Federal Highway Act, Title 23, United States Code (Section 109 (h)) and require each State to prepare an Action Plan describing procedures to assure that social, economic and environmental factors are adequately considered throughout the planning and development of Federal-Aid highway projects. The Action Plan describes the processes for the planning and the providing of transportation services and facilities in Maryland, processes which give full consideration to the attending social, economic and environmental effects and the overall development plans of the State and its local regions. These processes support a broad planning strategy aimed at effective and timely investment of resources in the orderly implementation of State, regional, county and local transportation plans.

2. Certification Acceptance

The Federal Highway Administration has approved the State Highway Administration Certification which authorizes the State Highway Administration to administer certain Federal-Aid highway projects under the certification acceptance procedure as provided for in 23 U.S.C. 117, and Volume 6, Chapter 5, Section 2 of the Federal-Aid Highway Program Manual. The State Highway Administration

acting under Article 89B of the Annotated Code of Maryland will administer projects under certification acceptance procedures in compliance with all applicable Federal statutes and Executive Orders. In addition, the State Highway Administration has agreed to comply with the provisions of Title 23, U.S.C., and all Federal Highway Administration regulations, directives, and standards in connection with all Federal-Aid projects, except those expressly prohibited by Volume 6, Chapter 5, Section 2, Paragraph 4 d. of the Federal-Aid Highway Program Manual. The State Highway Administration further states that it has authority under Section 76 of Article 89B "to do any and all acts and things necessary or desirable to comply with the terms, conditions and provisions and to obtain the benefits of the provisions of the federal acts".

3. Phase of Work

The "Phases of Work" included within the Transportation Planning Process as hereinafter defined in Paragraph C are in accordance with the Action Plan and the Certification Acceptance, with the exception that Phase V as outlined in the Action Plan has been included within Phase IV as defined by these Specifications. By this change, the Action Plan and the Certification Acceptance are in accord.

C. DEFINITION OF PHASES

The Transportation Planning Process for the State Highway Administration is divided into five (5) phases, hereafter referred to within the "SPECIFICATIONS FOR CONSULTING ENGINEERS' SERVICES" as Phase I, etcetera. Consultant services are not normally required for Phases I and V.

Phase I Administrative Preliminaries

This is at the initiation of Project Planning and includes items such as retention of Consultant when applicable, Federal programming for funds and ends with the commencement of corridor location studies or Location/Design studies.

Phase II-III Location/Preliminary Design

Phase II and III begin with location studies and conclude with the receipt of "Location" and "Design Approval".

Specific objective of a location study is to develop and document the preliminary engineering design, typical section and right of way requirements, environmental impacts, and costs of the various alternatives under consideration.

The Consultant shall perform those preliminary engineering services as set forth in the project resume. The work shall include, but not be limited to, the identification and analysis of each alternate under consideration of all social, economic, and natural environmental impacts as currently required by the National Environmental Policy Act and implementing regulations of the Federal Highway Administration and/or the Maryland Environmental Policy Act, and the completion of appropriate reports and participation at the public hearing.

Other services include the development of: study plans, profiles; horizontal and vertical alignments; interchange and structure study concepts, including design alternatives; supplemental environmental services, if required; preparation of documents, brochures, exhibits, script, and participation in informational meeting(s) and public hearings.

The level of detail, and precision of the information provided must be appropriate to the decision under consideration.

Consideration of all logical levels of service, with evaluation of costs, transportation benefits, and all relevant social, economic and environmental factors, is required in order to arrive at a competent location decision.

The range of alternatives to be considered shall include alternate locations and designs, not implementing the proposed action ("No-Build" Alternate), postponing the action, providing a lower level of service, providing a reduced facility (lanes/design) and, if applicable, improvements in, or adoption of transit alternatives, including mass transit.

The required information at this stage of plan development shall be objective and complete. The Consultant is encouraged to seek and bring to the attention of the Highway Administration all information and issues which are relevant to the project decision.

The Consultant shall abstain from indicating preferences for any alternatives unless specifically directed by the Highway Administration.

The recommended alignment under consideration will be that alignment best meeting the study objectives.

Phase IV Final Design

This begins with the "Design Approval" and ends with the advertising for receipt of bids for construction.

Phase V Construction

This begins with the advertisement of the Project for construction and is terminated by the acceptance of the Project with opening to traffic.

D. SERVICES TO BE PROVIDED BY THE CONSULTANT

Under the terms of an Agreement, the Consultant agrees to perform all work in accordance with the terms, conditions and covenants set forth in the "Specifications for Consulting Engineers' Services", hereafter referred to as Specifications. Specifically, the Consultant shall perform those services as set forth in Section I of the Specifications, which Section is entitled "DESCRIPTION OF PROJECT, PROJECT RESUME AND/OR PROJECT PROSPECTUS", and the subsequent Sections of the Specifications, as applicable and as noted in Section I. All references to "Phases" shall be in accordance with the definitions set forth in this Section of the Specifications unless superseded by other definitions in Section I effected for the purpose of clarity or extenuating circumstances for a specific project.

E. PROSECUTION OF THE WORK

1. Within one (1) week after receipt of a written "Notice to Proceed" issued by the Highway Administration, the Consultant will begin the work covered by the Agreement and will prosecute the work to be performed continuously and diligently in accordance with the schedule established by and to the satisfaction of the Highway Administration. All work will be prepared in accordance with the "Specifications for Consulting Engineers' Services", unless directed otherwise by the Highway Administration.
2. The "Notice to Proceed" issued by the Highway Administration will designate a Highway Administration Liaison Office and Officer in connection with the performance of the contract Agreement services. All work performed by the Consultant shall be under the supervision and direction of the Highway Administration's Project Manager or Project Engineer of the Liaison Office designated.
3. Subsequent to the issuance of the "Notice to Proceed" and prior to the Consultant performing any productive work on the Project, the Highway Administration Liaison Office's designated Project Manager or Project Engineer will schedule a "Project Initiation Meeting" with the Consultant. At this meeting and all subsequent meetings between the Highway Administration and the Consultant,

the Consultant shall take minutes of all topics discussed and dispositions or conclusions reached, if any. Within one (1) week the Consultant shall prepare a formal set of meeting minutes and submit same to the Liaison Office's designated Project Manager or Project Engineer for approval. The Project Manager or Project Engineer shall review this documentation for accuracy, additions, deletions, modifications or rejections within one (1) week after the data has been received. At the prerogative of the Project Manager or Project Engineer and as conditions warrant, the minutes of the meeting will be returned to the Consultant for revision. After the Liaison Office has approved the Consultant's minutes of the meeting same will be dated, marked as approved and distributed within the Highway Administration and to the Consultant as the formal approved minutes of that meeting. The approved minutes of each meeting shall be distributed by the Liaison Office to the Administrator, Deputy Administrator, Chief Engineer, Director, Office of Planning and Preliminary Engineering and/or others as determined by the Liaison Office.

4. In addition to the preparation of a set of formal meeting minutes, all telephone conversations between the Highway Administration and the Consultant relative to instructions and/or authorizations must be confirmed in writing by the Consultant and submitted to the Liaison Office for approval. The Project Manager or Project Engineer will review the written report for approval, additions, deletions, modifications or rejection within three (3) working days after the data has been received in accordance with the procedures set forth in paragraph "3".
5. No modifications to "Scope of Work" changes or "Extra Work" will be considered by the Highway Administration unless conditions therefore have been specifically documented by approved minutes of a meeting and/or approved written report of telephone conversations. Additionally, this documentation will be verified prior to the Highway Administration's authorization to the Consultant to perform any "Extra Work", except in that case of an actual emergency situation which will be documented by other appropriate writings.

F. COMPLETION SCHEDULE

The completion schedule for the work to be performed by the Consultant will be as indicated in Section I of these Specifications. Said schedule is based on the assumption that the Highway Administration will act promptly in giving approvals and that no unforeseen delays or changes occur. If the project should be delayed on the part of the Highway Administration, the Consultant will be allowed additional time commensurate with the delay, and possible modification to the fees as set forth in the contract Agreement.

The Consultant will promptly notify the Highway Administration of any circumstances which might prevent or delay the start of the work and/or which may delay completion of the work.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
Section III
ADMINISTRATIVE PRELIMINARIES**

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section III

ADMINISTRATIVE PRELIMINARIES

A. GENERAL

These services begin at the start of Project Planning and include such items as development of project planning prospectus, retention of Consultant when applicable, Federal programming for funding and ends with the commencement of Location/Design studies.

B. SERVICES TO BE PROVIDED BY CONSULTANT

The Highway Administration will perform all administrative preliminaries for a Project. When a Consultant is employed for the performance of specific tasks for a Project, that material and work performed by the Highway Administration which is pertinent to the performance of subsequent work will be furnished to the Consultant.

In those limited instances where, because of Project uniqueness or extenuating circumstances, the Consultant is required to perform administrative preliminary services, same will be specifically described in Section I, "DESCRIPTION OF PROJECT, PROJECT RESUME AND/OR PROJECT PROSPECTUS" of these Specifications.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
Section IV
PROJECT DEVELOPMENT**

-INITIAL-

PHASE II - PROJECT PLANNING

A/E	<u>STAGE I</u>
114	Organize Project Management Team
116	Perform Engineering Assessment
122-123	Environmental Inventory
105	Verify Traffic
119	Initial Project Announcement
185/115	Interdisciplinary Management Team Review (Scoping Meeting)
120	Develop Preliminary Concepts
127	Preliminary R/W and Relocation Costs;
189	Director's Review
153	Prepare for Alternates Public Meeting
121	Request Detailed Engineering Traffic
157	Hold Alternates Public Meeting
138	Select Alternates for Detailed Study
190	Complete and Circulate IPP Summary

STAGE I - TASKS & SUBTASKS

Organize Project Management Team:

a. Stage I - Initial Project Planning

(1) Organization of the Project Management Team (A/E #114)

The Consultant shall meet with personnel of the Highway Administration's Project Development Division following the receipt of the "Notice to Proceed".

The purpose of this introductory meeting is two-fold: The Highway Administration will render all relevant information in its possession. This may include previous correspondence, traffic figures, planning information, existing right of way and utility information. Additionally, the Highway Administration's Project Management Team will establish the ground rules upon which the study process will be conducted.

Perform Engineering Assessment (A/E #116)

The Consultant shall begin assessments of the study corridor from an engineering standpoint. This task is largely of a data-gathering nature. Input from the governmental agencies and citizens' groups contacted thus far, will make an important contribution.

The engineering Consultant shall provide suitable large-scale maps upon which the environmental/engineering considerations will be plotted. The scale of the mapping is specified in Appendix II of the Specifications.

Environmental Inventory (A/E #122-123)

- A. During this stage the social and economic activities, historic and archeological resources, parks and public recreation areas and natural environmental considerations in the project corridor should be identified and an Environmental Assessment Form (EAF) completed. Coordination with appropriate environmental review agencies will be initiated during this stage.
- B. A preliminary quantification of potential impacts associated with each alternate under consideration is prepared for the "Scoping Meeting". This information must also be prepared for inclusion in the Alternates Meeting brochure.

Verify Traffic (A/E #105)

The Project Development Division will verify the traffic data to be utilized for Stage I of the study. The Consultant will review the traffic data for completeness and identify any questions associated with that data.

Initial Project Announcement (A/E #119)

The Project Development Division will determine the method for announcing the project start and will generally perform this activity. The Consultant may be required to provide a draft notice and suitable graphics to accompany the notice.

Interdisciplinary Management Team Review (Scoping Meeting) (A/E #185/115)

The Highway Administration's Project Development Division will conduct an in-house review of the study. The Consultant shall attend and participate in this review. The review team could be comprised of the following State, Federal, and County agencies and personnel.

- (a) County Representatives
- (b) District Engineer(s), State Highway Administration
- (c) District Right of Way and Relocation Personnel
- (d) Maryland Department of Transportation
- (e) Federal Highway Administration
- (f) Project Management Team
- (g) Contributing Bureaus within the Highway Administration
- (h) Appropriate Environmental Agencies
- (i) Other agencies or individuals as required.

The Consultant will be required to make a presentation at the "Scoping Meeting" and document the meeting as this is the basis for the Stage I Studies. For more detail see Appendix II.

Develop Preliminary Concepts (A/E #120)

The Consultant will develop the preliminary concepts determined to be the most feasible at the "Scoping Meeting". The level of detail shall be sufficient to determine right of way requirements, preliminary environmental impacts, and preliminary costs. This information shall be presented to the public at an Alternates Public Meeting. See Appendix II for more detail.

Preliminary R/W & Relocation Costs (A/E #127)

The Consultant shall prepare and furnish to the Highway Administration sufficient maps outlining the right of way requirements. Unless otherwise specified in the Resume, the Highway Administration will perform the estimating function.

Director's Review (A/E #189)

Prior to the Alternates Meeting the Consultant and appropriate members of the project team will meet with the Director of the Office of Planning and Preliminary Engineering to review in-depth those alternates to be presented at the Alternates Public Meeting.

Prepare for Alternates Public Meeting (A/E #153)

As required, the Consultant will prepare all material, i.e. wall displays, graphic art displays, script, brochures, necessary for an Alternates Public Meeting. (See Appendix II)

Request Detailed Engineering Traffic (A/E #121)

The Consultant will prepare a request for Detailed Engineering Traffic Data necessary to complete the studies.

Hold Alternates Public Meeting (A/E #157)

Alternates Public Meeting

The purpose of this meeting is to present to the public the results of the study and obtain comments on the alternates. It is possible that additional alternatives may be proposed by citizen involvement.

Select Alternates for Detailed Study (A/E #138)

Following the Alternates Public Meeting, the Consultant may be required to attend a meeting held for the Highway Administrator and Division Chiefs of the Highway Administration. The Director of the Office of Planning and Preliminary Engineering, and in some cases the Highway Administrator, acting upon the information presented by the Consultant and the Highway Administration's Project Development Division, in cooperation with the appropriate support bureaus, will select the

alternatives to be developed in Stage II. The information amassed thus far, and the input from the Alternates Public Meeting will be the basis upon which the presentation is made, and will be included in the Alternates Summary. The possibility exists that the No-Build Alternate may be selected at this point. It is also possible that a single preferred alternate may be identified at this time. If so, early design activities may begin.

Complete and Circulate IPP Summary (A/E #190)

The Consultant will furnish to the Project Development Division a "Draft Summary" of the study which will include the results of the study to date and recommendations for final Project Planning. (For more detail see Appendix II). Generally, the State Highway Administration will prepare the summary and circulate to the appropriate elected officials.

STAGE II FINAL - PROJECT PLANNING

A/E

125	Develop Detailed Alternates
128	Request Categorical Exclusion
126	Prepare Detailed Engineering Analysis
148	Prepare Detailed Natural Environmental Analysis
147	Prepare Detailed Socio/Economic Analysis
144-145	Prepare Detailed R/W & Relocation Estimates & Report
143	Prepare Environmental Traffic
174	Detailed Design Review & Comment
151	Prepare Environmental Analysis
170	Value Engineering
149	Perform Noise Analysis and Prepare Draft Report
150	Perform Air Analysis and Draft Report
142	Determination of Environmental Significance
180	Prepare Notice of Intent & Receive Comments
152	Team Review and Recommend Alternate
161	Revise Alternates and Environmental Analysis (if necessary)
155	Prepare Environmental Document
146	Begin Design Preliminaries (if preferred alternate identified)
168	Hold Informational Meeting (if necessary)
156	Review Draft Environmental Document
176	Update Noise Report (if necessary)
177	Update Air Report (if necessary)
162	Finalize Draft Environmental Document
165	Circulate Draft Environmental Document
163	Prepare Hearing Presentation Material
167	Review Hearing Presentation Material
169	Public Hearing
172	Analyze Comments on Draft Environmental Document
194	Perform Supplemental Studies (if necessary)
191	Team Recommendation Meeting
173	Recommend Alternate to Administrator

Develop Detailed Alternates (A/E #125)

Following the completion of the Alternates Meeting and the in-house meeting with Highway Administrator, the Consultant will finalize/refine the preferred preliminary alternate(s). Information gathered in Stage I will be updated to reflect any changes in the alternate's location or typical section, plan or profile, intersection/interchange details, right of way requirements, quantities and cost estimates. (See Appendix II for more detail).

Request Categorical Exclusion (A/E #128)

After completion of Stage I activities, the State Highway Administration will determine that the project is either a Categorical Exclusion or a major action. A Categorical Exclusion determination will be forwarded to the Federal Highway Administration for their concurrence. If the Federal Highway Administration concurs that the project is a Categorical Exclusion, no further environmental analysis is required.

Environmental impact analyses will continue for those projects determined to be major actions or those categorical exclusions resulting in impacts to 4(f) properties and a determination regarding the type of document required will be made at a later date.

Prepare Detailed Engineering Analysis (A/E #126)

A summary of the key points of each alternate will be prepared in an organized and quantitative manner that will facilitate comparing the alternates. This data will be contained in the Project Technical Engineering Summary. Some major considerations are:

- (a) Highway user benefits
- (b) Economic and community developments
- (c) Environmental considerations
- (d) Cost minimization
- (e) Operational capacity analysis
- (f) Perform hydrologic & hydraulic study
- (g) Stormwater management
- (h) Exceptions required
- (i) Design criteria used

Prepare Detailed Natural Environmental Analysis (A/E #148)

When the detailed engineering studies are completed, an in-depth natural environmental analysis (abiotic, biotic, and visual resources) will be prepared.

The analysis should identify beneficial and adverse ecological impacts associated with each alternate under consideration. Information gathered should be sufficient to determine the type of permits required.

A natural environmental technical report and a summary of the analyses suitable for inclusion in the environmental document should be prepared.

Prepare Detailed Socio/Economic Environmental Analysis (A/E #147)

After completion of the detailed engineering studies, an in-depth social, economic land use and cultural resources analysis will be prepared. This analysis should identify the beneficial and adverse impacts for each alternate under consideration including the No-Build Alternate. Impacts to any 4(f) or 6(f) properties will be identified and appropriate coordination with review agencies undertaken. A technical report and summary of the analysis results suitable for inclusion in the environmental document will be completed.

Prepare Detailed R/W & Relocation Estimates & Report (A/E #144-145)

The Consultant will furnish sufficient numbers of maps outlining the right of way requirements for all alternates in sufficient detail to perform right of way and relocation estimates and reports. (See Appendix II). Unless otherwise noted in the Resume the State Highway Administration will perform the estimating function.

Prepare Environmental Traffic (A/E #143)

As early in Stage II as possible, the Consultant will prepare a request for all traffic data required to complete the environmental document. Unless otherwise noted in the Resume, this data will be compiled and furnished by the State Highway Administration.

Detailed Design Review & Comment (A/E #174)

The Consultant will furnish sufficient plan and profile maps, and other pertinent study data to the Project Manager. The Manager will furnish the information to the appropriate design bureaus for their review and comment of the alternates.

Prepare Environmental Analysis (A/E #151)

Results of the socio/economic and natural environmental studies will be submitted for review. This documentation should outline all impacts as they relate to the proposed project.

Value Engineering (A/E #170)

Where appropriate, the Consultant may be required to furnish material and participate on a Value Engineering Team of the alternates under consideration. This task is generally accomplished, however, during the final design phase of a project.

Perform Noise Analysis and Complete Draft Report (A/E #149)

A noise impact analysis shall be performed in accordance with appropriate Federal criteria and regulations.

The Consultant will prepare a technical noise report for the State Highway Administration's review and a summary of the same suitable for inclusion in the Draft Environmental Document.

Perform Air Analysis and Complete Draft Report (A/E #150)

An air quality analysis shall be performed in accordance with all applicable Federal criteria and regulations.

The Consultant will prepare a technical air quality report for review by the Highway Administration and a summary of the same suitable for inclusion in the Draft Environmental Document.

Determination of Environmental Significance (A/E #142)

Based on the results of studies to date, the Highway Administration will make a determination as to whether an Environmental Effects Report, Environmental Impact Statement, Environmental Assessment/ Finding of No Significant Impact or Section 4(f) Evaluation will be prepared. The information will be sent to the Federal Highway Administration for review and concurrence.

Prepare Notice of Intent & Receive Comments (A/E #180)

This is the responsibility of the Federal Highway Administration.

Team Review and Recommend Alternates (A/E #152)

The Consultant shall attend a review meeting held by the Highway Administration's Project Development Division. The purpose of the review is to assure that the design study is complete and ready for presentation to the public.

The sufficiency of the Consultant's work will be determined at this time and further refinements of the study alternate(s) will be performed following this review.

Revise Alternates and Environmental Analysis (if necessary) (A/E #161)

As a result of the team review, the Consultant will revise all alternates and analyses as necessary.

Prepare Environmental Document (A/E #155)

The Consultant will prepare the Environmental Document in accordance with all appropriate regulations and guidelines. (See Appendix II)

Begin Design Preliminaries (if preferred) (A/E #146)

If a preferred alternate has been identified the Consultant will furnish sufficient information to the Project Manager, in order for him/her to prepare a Draft Resume for Phase IV Services.

Hold Informational Meeting (if necessary) (A/E #168)

The State Highway Administration may deem it necessary to hold an "Informational Public Meeting" prior to the formal public hearing. If so, the Consultant may be required to prepare all materials and participate in the meeting. (See Appendix II)

Review Preliminary Draft Environmental Document (A/E #156)

Fifteen (15) mock-up copies of the preliminary draft document will be prepared and distributed to the Project Team for concurrent review by the Federal Highway Administration and the State Highway Administration. If necessary, the Consultant will attend an in-house meeting for the review of this document. Both engineering and environmental data will be reviewed for quality, accuracy and format.

Update Noise Report (if necessary) (A/E #176)

A final review of the project is made and revisions to the noise analysis are made if necessary before finalization of the environmental document.

Update Air Report (if necessary) (A/E #177)

After the Public Hearing, a review of the project is made and revisions to the air analysis are made if necessary.

Finalize Draft Environmental Document (A/E #162)

Upon receiving review comments (either from an in-house review or from individuals), the Consultant shall prepare a final edition of the Draft Environmental Document for final review. Three (3) photocopies will be submitted to Environmental Management for final review. The State Highway Administration will submit the Draft Document to the Federal Highway Administration for review and approval.

Circulate Draft Environmental Document (A/E #165)

After the final review of the Draft Environmental Document, the State Highway Administration will forward the appropriate number of documents and the original title page to the Federal Highway Administration for signature and concurrence in the document distribution.

When approved and signed by the Federal Highway Administration, the title page is returned to the State Highway Administration for distribution. The Draft Environmental Document is then made publicly available a minimum of 30 days prior to the scheduled Public Hearing.

Prepare Hearing Presentation Material (A/E #163)

The Consultant will prepare all Public Hearing presentation material, i.e. script, brochure, graphics, wall displays, as determined by the Project Planning Team. (See Appendix II)

Review Hearing Presentation Material (A/E #167)

The Consultant will submit to the Project Planning Team, all material in draft form for review and comment. (See Appendix II)

Public Hearing (A/E #169)

The Consultant will attend and participate in the Location/Design Public Hearing. The level of participation will be determined by the Project Planning Team.

Analyze Comments on Draft Environmental Document (A/E #172)

Comments received from any agency, public official or interested individual within the allotted time period after the Public Hearing will be addressed in the Final Environmental Document.

Perform Supplemental Studies (A/E #194)

The Consultant will be prepared to perform any supplemental studies, as deemed necessary by the Project Planning Team. These studies are generally required as a result of comments received at the Public Hearing or on the Draft Environmental Document.

Team Recommendation Meeting (A/E #191)

The Consultant will attend, participate, and document the team recommendation meeting. As a result of this meeting, a team recommendation summary will be prepared for presentation to the Administrator. For more detail see Appendix II.

Recommend Alternate (A/E #173)

The Project Planning Team will present the findings of the study to the State Highway Administrator for his selection of an alternate. The Consultant will attend, participate and document this meeting. (See Appendix II)

STAGE III - FINAL PROJECT PLANNING

A/E

175	Begin Final Environmental Document
178	Complete Final Environmental Document
181	Submit Final Environmental Document
183	Obtain Location and Design Approval

Begin Final Environmental Document (A/E #175)

After the Recommendation Meeting with the Administrator, the Consultant shall prepare the designated Final Environmental Document. This document will contain factual justification for supporting the recommended alternate. The document will also include a summary of substantive environmental and engineering comments made at the Public Hearing as well as copies of all correspondence of the Draft Document with appropriate responses. See Appendix for additional information.

Complete Final Environmental Document (A/E #178)

The Consultant will incorporate all updated reports and coordination documents as well as all other supportive documents. The Consultant will submit ten (10) photocopies of the Preliminary Final Environmental Document to Environmental Management for review. After making the indicated corrections, the Consultant will submit ten (10) bound copies of the document.

The State Highway Administration will submit the Final Environmental Document to the Federal Highway Administration for final review and approval.

Submit Final Environmental Document to Agencies (A/E #181)

Upon receiving Federal Highway Administration approval, the State Highway Administration will circulate the document to Federal, State and local agencies and interested citizens.

Obtain Location and Design Approval (A/E #183)

The Consultant may be required to furnish the Project Manager a Draft Ad with appropriate maps, along with any needed reports and documentation necessary to obtain Location and Design Approvals. (See Appendix II)

APPENDIX I

STAGE I - INITIAL PROJECT PLANNING

A/E #114 Organize Project Management Team

The purpose of the meeting is to introduce the key members of the Consultant staff and the State Highway Administration's Project Management Team. The State Highway Administration will turn over to the Consultant all material available to begin the study and discuss with the Consultant the project schedule.

A/E # 116 Perform Engineering Assessment

The first order of business in this task will be to prepare the base maps for the project. This will generally be aerial photography provided by the Highway Administration. The Consultant may have to piece the photography together. If the engineering and environmental responsibilities are split, the engineering Consultant is expected to furnish prints of the base maps to the Project Manager to allow information to be plotted and analysis to be made of the study corridor. The responsibility for the base maps will generally be the engineering Consultant unless otherwise specified in the project resume. Engineering and environmental considerations to be identified or plotted on the base maps should include but not be limited to the following:

Railroads	Airports
Utilities	Property Lines
Subdivisions	Historic Site Boundaries
Schools	Flood Plains
Public Buildings	Wetlands

The next step for the engineering Consultant will be to identify the preliminary alternates to be presented at the scoping meeting. A suggested method is the use of overlays where several alternates appear feasible.

A/E #122-123 Environmental Inventory

The scope of environmental work performed by the Consultant for Phase II, III services for a Project shall be in compliance with the CEQ Regulations, DOT Order 5610.1c, the Maryland Environmental Policy Act, the applicable Sections of the Federal Aid Highway Program Manual, and any other appropriate State and Federal environmental procedures and regulations:

Objective

The objective of performing the environmental services set forth herein is to prepare environmental documentation in accordance with the National Environmental Policy Act (NEPA) and/or the Maryland Environmental Policy Act (MEPA) resulting from the Engineering and Environmental Studies and Public Hearing Process. The State Highway Administration will determine the type of environmental document required, if any.

Correspondence

Copies of all written correspondence between the Consultant and any party pertaining specifically to the environmental aspects of the study shall be provided to the Highway Administration for its records within one week of the receipt or sending of such correspondence.

Early Scoping & Agency Contacts

The Highway Administration will establish initial contacts with the various local, State and Federal agencies. The purpose is to introduce the Consultant as the Highway Administration's representative for future contacts requiring data gathering.

Social and Economic Inventory

The Consultant shall identify social and economic activities and land use considerations in the Project corridor. This preliminary data will include, but not necessarily be limited to, the following considerations:

Parks, recreation areas, and other 4(f) lands (wildlife refuges)

Land use patterns including forest and agricultural lands

Location of cities and towns

Location of communities of minority groups (elderly, handicapped, racial, etc.)

Schools, churches, other community facilities, i.e., libraries, police stations

Major employment areas

Cultural Resources Inventory

The Consultant (must have minimum architectural history qualifications or be a qualified archeologist) in cooperation with Environmental Management of the State Highway Administration, will identify historic and archeological resources in the project corridor. All coordination and consultation will be fully documented.

A. Historic Sites

1. The Consultant will conduct research and consult with agencies and individuals with cultural resources expertise to determine what actual or potential resources exist in a Project corridor. Sources for this research include data from previously conducted studies (obtained from SHA or the Md. Historical Trust files including National Register and Maryland Historical Trust Historic Sites Inventory forms). Additionally, any relevant Historic American Buildings Survey, Historic American Engineering Record or county/local planning department's studies relating to historic sites may be used.

If required by Environmental Management of the Highway Administration, the Consultant will compile a brief outline of the history of the area for the purpose of establishing a context within which to evaluate the significance of historic resources identified. Full documentation of sources consulted will be provided and retained in project files for future reference. Information concerning buildings which are shown in historical atlases, etc., but which field work confirms as no longer existing, will be provided to the Highway Administration.

2. The Consultant will conduct a field inspection of the Project corridor or alternates to determine the present status and condition of any historic resources identified during the research phase and to locate any additional historic resources not previously identified. For newly identified sites, the Consultant will provide documentation.

All identified historic resources will be classified as being of Maryland Historical Trust Inventory quality, likely to meet the criteria for inclusion in the National Register of Historic Sites (specific criteria will be identified), included in the National Register, or eligible for the National Register. As requested and in consultation with Environmental Management, historic boundaries will be developed for designated sites.

3. For each project, the Consultant will prepare a preliminary report of information gathered during the research and field inspection. This report will include but not be limited to a summary of the Consultant's work including survey methods, a listing by name and Maryland Historic Trust inventory number, if available, of all historic resources considered with level of significance, map(s) indicating precise location of identified resources and contact sheet(s) along with negatives and 3 1/2" x 5" black and white prints of site photographs.

4. Environmental Management of the Highway Administration will forward to the State Historic Preservation Officer required documentation requesting his concurrence with levels of significance and boundaries for the historic resources.

* **B. Archeological Sites**

A preliminary archeological reconnaissance survey (Phase I) is the first level of archeological investigation. It is performed prior to the completion of the Draft Environmental Document. The Consultant (approved archeologist) will conduct research and perform field reconnaissance work to identify all visible and potential sites with special attention to areas within the proposed right of way.

The archeologist will make a preliminary determination regarding overall extent and significance of archeological resources in the area. He will also prepare a report documenting his methods, findings, and recommendations including estimated time and costs for Phase II studies if they are required. Required coordination with the State Archeologist and the Maryland Historical Trust will be undertaken by Environmental Management of the Highway Administration.

Archeological specifications are available from the Project Development Division of the State Highway Administration.

Natural Environmental Inventory

The Consultant shall identify natural environmental factors and considerations in the Project corridor. This preliminary data will include, but not necessarily be limited to, the following:

1. Topography
2. Soils including prime farmland soils as specified in the Farmland Protection Policy Act
3. Threatened, endangered or rare species (flora & fauna)
4. Unique sensitive and aesthetic areas
5. Water impoundments, streams, etc. that will require a Section 404 Permit
6. Wetland, flood plains

Environmental Assessment Form

Utilizing the information and data gathered during the social, economic, cultural resource, and natural environmental inventory an Environmental Assessment Form (EAF) will be completed. This information will be summarized and presented at the Interdisciplinary Management Team Review/Scoping Meeting. The EAF will be included in the Draft Environmental Document.

1. The questions on the EAF are answered by checking the appropriate column "yes" or "no" provided on the form. Completion of the form will help indicate which areas of the environment will receive the most serious impacts and will require further analysis. The "comment attached" column of the EAF will be used to explain and clarify the yes and no responses. All responses to the questions must be thoroughly documented. A sample EAF is included as Attachment A.
2. The information gathered during the preparation of the EAF should be sufficient to determine if further analysis is required. The Highway Administration will make this determination.

If no further analysis is required a title page, provided by the Highway Administration, and a brief description of the Project will be attached to the front of the EAF (for State funded project only).

Study Maps

Utilizing the data gathered during the preliminary social, economic and natural environmental inventory the Consultant shall prepare maps of the Project corridor (overlays are often useful) identifying:

1. Ecological communities
2. Land use patterns
3. Water resources
4. 100 year flood plains
5. Parks, recreation areas or other 4(f) lands
6. Location of members of communities of minority groups (racial, handicapped, elderly)
7. Major employment areas
8. Known historic sites
9. Water impoundments, streams or navigable waters which may require a Section 404 Permit from the Corps of Engineers and other appropriate information

Alternate Development

On the basis of information and data gathered to this point, alignments are to be developed which help to solve the transportation problem and have the highest compatibility with natural environmental, social, and economic and engineering considerations. This will be done in cooperation with the engineering staff.

Prepare Preliminary Environmental Analysis

The Consultant shall prepare a preliminary quantification of the potential social, economic and natural impact of each alternate under consideration.

A quantification of the impact each alternate will have on the environment will include, but not necessarily be limited to, the following items:

Preliminary Social - Economic Analysis

- *a. Number and type of residential dwellings impacted
- *b. Number and type of commercial buildings impacted
- *c. Number of business enterprises impacted
- *d. Identification of minority communities and groups to be impacted
- e. Public parks or recreation area or 4(f) lands to be impacted

Preliminary Cultural Resource Analysis

- a. Number of historic sites impacted
- b. Number of archeological sites impacted

Preliminary Natural Environmental Analysis

- a. Number, and class of streams, rivers, impoundments, crossed
- b. Approximate acres of wetlands and flood plains required
- c. Approximate acres of natural habitat required (woodland)
- d. Approximate acres of prime farmland or unique soils required consistent with the Farmland Protection Policy Act
- e. Threatened or endangered species, unique habitat impacted

Alternates Meeting Brochure

The Consultant shall prepare a summary for inclusion in the subject brochure. He will also quantify the environmental impacts for each alignment analyzed in a manner that will facilitate comparing alternates.

*Information supplied by the Highway Administration -
Office of Real Estate

A/E #105 Verify Traffic

The Consultant will review the data furnished and verify that it is sufficient to develop the Stage I conceptual study alternates and can be the background for the more detailed engineering and environmental traffic requests to follow.

A/E #119 Initial Project Announcement

The Consultant may be required to provide a draft notice and suitable graphics to accompany the notice. The purpose of the notice is to inform the general public in the project area that the Project has been initiated and provides them with the opportunity to be placed on the project mailing list.

A/E #185/115 Interdisciplinary Management Team Review
(Scoping Meeting)

The Scoping Meeting generally chaired by the Deputy Director of the Office of Planning and Preliminary Engineering is the meeting which sets the tone for the study process for the project. The Consultant and the State Highway Administration's Project Manager will recommend to the team the design criteria they propose to utilize for the study. The Consultant will present the engineering and environmental considerations compiled in the inventories and identified on the base maps. The Consultant will then present the recommendations of the alternates to be pursued and presented at the Alternates Public Meeting. The Consultant will also present any alternates he has considered and rejected and the reasons for rejection. The Consultant is expected to compile a summary of this meeting and its conclusions in detail. That summary will be used after proper review and approval by the State Highway Administration to document the initial project planning process.

A/E #120 Develop Preliminary Concepts

The conceptual alternates agreed on at the scoping meeting shall be further developed and quantified at this time. The level of geometric detail required at this stage is judgemental. The Consultant must always present alternates that are workable and do enough work to ensure that right of way shown, costs and potential impacts will not change appreciably in the next stage as more detailed studies are developed. As an example, if a typical section will fit in a 200 ft. band for 80% of the project, do enough cross section and profile work to determine what band is required for the other 20%. The costs developed at this stage are generally cost per mile and will be coordinated and reviewed with the Project Development Division's Cost Unit.

A/E #127 Preliminary R/W and Relocation Costs

The Consultant will furnish 3 sets of the alternatives with the property pattern colored and the R/W required clearly defined. The acreage required from each property should be written on the plans or submitted on a separate list.

A/E #189 Director's Review

The Consultant and appropriate members of the Project Planning Team may be required to meet with the Director of the Office of Planning and Preliminary Engineering. The Consultant will present the results of the study, the impacts, and recommendations of which alternates should be presented at the Alternates Public Meeting. The Consultant and the Project Manager should also present and get approval on the format, displays, brochure and the presentation to be made.

A/E #153 Prepare for Alternates Public Meeting

The Consultant will be expected to prepare all material for the Alternates Public Meeting. The following is a list of items to be prepared:

Wall Displays - As agreed at the Director's Review, the Consultant will prepare sufficient sets (generally a maximum of 5) of displays for the meeting. In all cases, 2 sets should be available 30 days prior to the meeting for the Project Manager's use.

Script - A draft script should be submitted to the Project Manager 5 weeks prior to the meeting and a script review held 4 weeks prior to the meeting. The final script is then circulated to appropriate participants and coordinated with the A/V Presentation.

Brochure - The Consultant will submit a camera ready brochure to the Project Manager 6 weeks prior to the meeting for review and a decision on whether the State Highway Administration will print and distribute or the Consultant will do this task.

Graphics - The Consultant may be required to do the graphic art work for the A/V Presentation.

It is important to note that the times in this task are general and the specific schedule will be determined by the State Highway Administration's Project Manager and the Project Development Division's Support Section.

A/E #121 Request Detailed Engineering Traffic

The Consultant should submit a request for the traffic data necessary to do the Stage II studies on the alternates selected. This request should be submitted, if at all possible, 6-12 weeks prior to the needed date.

A/E #157 Hold Alternates Public Meeting

The Consultant will attend, be prepared to present (generally a State Highway Administration function) the alternates, answer questions, take notes and summarize the meeting. The State Highway Administration usually records the meeting and will make the tapes available for the Consultant's use.

A/E #138 Select Alternates for Detailed Study

The Consultant will attend any meetings associated with the selection of the alternates for Stage II. The Consultant will summarize the meeting(s) and if a preferred alternate is identified, assist the Project Manager in starting early design activities.

A/E #190 Complete and Circulate the Initial Project Planning Summary

Utilizing the scoping report, the Alternates Meeting Brochure and the Alternates Meetings Summary, the Consultant will prepare a Draft I.P.D. Summary and submit it to the Project Manager for his use in obtaining final Project Planning approval from the elected officials.

General Comments

1. For all project planning appendices, please refer to the flow chart and project schedule for the actual sequence of these activities/events.
2. For Stage I Engineering Activities where the concepts are being done on photographs, the Consultant should use any available material such as count photogrammetry of any scale, USGS quadrangles, etc. to make sure the horizontal and vertical geometry of the concepts is reasonable.

Definition of Terms

The Highway Administration has defined the following terms used in this Section of the Specifications.

Maryland Environmental Policy Act (MEPA) - Prepared by the Maryland State Department of Natural Resources and revised and adopted by the Maryland State Legislature. The Act requires all State Departments and Agencies to give serious consideration to the natural and human environment in their planning programs. (See Attachment D)

Environmental Assessment Form (EAF) - A requirement of the Maryland Environmental Policy Act. An EAF consists of 47 questions covering a broad scope of the environment (natural and socio-economic). The purpose of an EAF is to assess the effect, if any, that a proposed action will have on the environment. An EAF will be completed for all projects, regardless of fund source.

Environmental Effects Report (EER) - A requirement of the Maryland Environmental Policy Act. This is the State equivalent of the Federal Environmental Impact Statement. An EER will be prepared only when a Federal Environmental Document is not prepared, and when the results of the EAF indicate further analysis required. The EER will be prepared in a Draft and Final edition.

National Environmental Policy Act (NEPA) - A Federal Congressional Act requiring all Federal Agencies to give full consideration to environmental effects in planning their programs.

Council on Environmental Quality Regulations (CEQ) - Federal regulations which set forth the form and content of environmental documents as required by NEPA.

Environmental Impact Statement (EIS) - Required by the National Environmental Policy Act. The purpose of an EIS is to provide a detailed analysis of the potential significant human and natural environmental impact(s) of a specific Federal Project. An EIS will be prepared in a Draft and Final edition.

Environmental Assessment/Finding of No Significant Impact (EA/FONSI) - Required by the National Environmental Policy Act. The purpose of an Environmental Assessment/Finding of No Significant Impact is to factually prove that a project will not have any significant impacts on the human or natural environment of a magnitude to require the processing of an EIS. The contents of an EA/FONSI is discussed in Attachment C.

Section 4(f) - Required by the National Environmental Policy Act. The purpose of a 4(f) is to discuss use of land from a significant publicly owned park, recreation area, wildlife refuge or historic site for a highway project. (See Attachment C)

APPENDIX II

STAGE II - FINAL PROJECT PLANNING

A/E #125 Develop Detailed Alternates

The Consultant, as the first step in Stage II, will develop in detail those alternates selected for study in Stage II. The material to develop these studies will generally be 1"=100' scale photogrammetry or other scales as outlined in the project resume. The Consultant will analyze the horizontal alignment(s) that have been chosen and coordinate the centerline or baseline in order to take off the cross sections and profiles for each alternate. Cross sections will be taken at minimum intervals of 150' along the centerline and at severe contour breaks. Typical sections, intersections, or interchanges, right-of-way requirements, earthwork requirements, quantities, and cost estimates will be completed at this time.

A/E #128 Request Categorical Exclusion

The Consultant will provide engineering descriptions of the alternates selected for Stage II studies and summaries of associated environmental concerns to Environmental Management of the State Highway Administration (SHA). Based on the information provided, the Categorical Exclusion groups will be reviewed. If a Categorical Exclusion is applicable, appropriate documentation will be prepared by the State Highway Administration and forwarded to the Federal Highway Administration for concurrence.

A/E #126 Prepare Detailed Engineering Analysis

The Consultant will analyze and quantify, in a technical summary, the alternates he has completed in detail. It is understood that as the analysis warrants, refinements will be made to the alternates. Some items to be addressed are:

- a. Highway user benefits
- b. Economic and community developments
- c. Environmental considerations - It is expected that mitigation measures should be identified and the preliminary quantification of impacts refined, at this time. (Refer to appropriate A/E)
- d. Cost minimization
- e. Operational capacity analysis

- f. Stormwater management and hydraulic study - The hydraulic study should be done to a level of detail sufficient to identify outfalls and structure sizes and potential areas to utilize stormwater management techniques.
- g. Design criteria and exceptions - The technical summary will outline the design criteria for the project and the reason for any exceptions, and recommendations to minimize exceptions.

A/E #148 Prepare Detailed Natural Environmental Analysis

The Consultant shall supplement and update information gathered during the Natural Environmental Inventory. During this activity, the Consultant shall identify impacts and their probabilities and magnitude for altering ecosystem parameters such as succession structure, carrying capacity, food chain relationships, stability and regional factors. Also, as a result of this analysis, a determination will be made as to the types of permits required.

The Consultant shall investigate the following components, and others as necessary:

1. Natural Environment - Biotic Considerations

Determine stability and functional capacities of the ecosystem (minimum size watershed) from consideration of at least these factors:

- a. Community types - for example, deciduous forest, marsh, stream, old field, riparian, etc.
- b. Successional stages - past (site history), present, future
- c. Vegetation
 - 1) Composition - dominant species that exert major community control
 - 2) Structure
 - a) Stratification - vertical (include heights)
 - b) Dispersion - horizontal
 - 3) Abundance
 - 4) Ecological Indicators - implications of particularly sensitive or indicative species

d. Animals

- 1) Composition of trophic levels
- 2) Distribution
- 3) Abundance and use - estimate from documenting:
 - a) Signs - droppings, tracks, calls, nests, eggs, browsings, markings
 - b) Sightings
 - c) Trappings, sampling
- 4) Ecological Indicators
- 5) Stocking history, recruitment
- 6) Habitat Carrying Capacity - rare habitats as to amount, availability and interspersions of food, shelter, water, escape cover, rest and nest, areas for actual and probable inhabitants; consider seasonal factors

e. Other Site Quality Evaluation Factors

- 1) Diversity indices and others
- 2) Limiting factors for reproduction, dispersal (consider slope aspect)
- 3) Past atypical mortalities
- 4) Human influences
- 5) Economically important, rare or federally endangered species; record specimens
- 6) System capacity ratings - rate site as to ability for performing the following functions:
 - a) Flood buffer
 - b) Erosion control
 - c) Sediment entrapment
 - d) Toxicity (pollution) abatement
 - e) Water storage, recharge
 - f) Nutrient cycling

2. Natural Environment - Abiotic Considerations

a. Geology

1) Physiography

- a) Geomorphological features: faults, scarps, terraces, ravines, mountains, plateaus, depressions, etc.
- b) Mass - wasting features: creep, earthflows, landslides and slumps

2) Bedrock Units

- a) Formations (names, depths, age, thicknesses, rock types, extents, mineral composition, etc.)
- b) Foundation conditions
- c) Fossil deposits

3) Saprolite

- a) Existing condition (depth, thickness, parent material, extent, stability, etc.)
- b) Importance for groundwater recharge

4) Mineral Resources

- a) Unique or limited mineral formations
- b) Depth, thickness, extent and mineral composition
- c) Economic values of formations

b. Topography

1) Landforms

- a) Valleys and basins
- b) Hills, ridges, and cliffs

2) Relief

- a) Forms of hills
- b) Relationship of hilltops to depression and the relative steepness of slopes

c. Soils

- 1) Characteristics and types
 - a) Order and series
 - b) Porosity
 - c) Permeability
 - d) Mineral composition
 - e) Organic content
- 2) Soil Capabilities and Limitations
 - a) Highway projects
 - b) Agricultural
- 3) Erosion Susceptibilities
 - a) Erodability
 - b) Sedimentation

d. Climate

- 1) Ambient Conditions
 - a) Temperature, precipitation (amount and distribution)
 - b) Winds (speed and direction)
- 2) Hydrologic Cycle
 - a) Evaporation and transpiration
 - b) Infiltration and runoff
- 3) Tides
 - a) Normal and storm tides
 - b) Accidents due to tidal flooding

e. Hydrology - See SHA Drainage Manual

- 1) Surface Water - Streams and rivers
 - a) drainage intermittent, perennial, tributaries
 - b) maximum, minimum and mean discharges
 - c) runoff
 - d) flood plains (100 year)
 - e) erosion
 - f) sedimentation
 - g) water quality (physical, chemical and biological analysis)
 - h) present and future use
 - i) future activities, impacting channel regimens
 - j) velocity
 - k) average width and depth
 - l) dams and obstructions
- 2) Surface Water - Lakes, reservoirs, and estuaries
 - a) water quality
 - b) present use
 - c) erosion due to wave action
 - d) currents and/or tides
 - e) future activities, impacting future uses
- 3) Groundwater
 - a) water quality
 - b) groundwater movement
 - c) depth of water table

- d) depths, thicknesses or aquifer and extent and location of recharge areas
 - e) groundwater availability
 - f) present use
 - g) potential for contamination
 - h) potential for artificial recharge
- 4) The water quality parameters to be considered shall include but not necessarily be limited to:
- a) Temperature ($^{\circ}\text{C}$)
 - b) Dissolved oxygen (mg/l)
 - c) pH
 - d) BOD, 5-day (mg/l)
 - e) Nitrate and Nitrite (mg/l)
 - f) Total Phosphate (mg/l)
 - g) Turbidity
 - h) total Coliforms (MPN/100ml)
 - i) Fecal Coliforms (MPN/100ml)
 - j) Total residue (mg/l)
 - k) Heavy Metals
 - l) Suspended Sediment

3. Aesthetic Resources

- a. Biotic
- b. Abiotic

4. Natural Environmental Report Format

The Natural Environmental Technical Report shall include but not necessarily be limited to the following information with appropriate supporting graphics.

I. Affected Environment

- A. Geology, Topography, and Soils
- B. Water Resources
 - 1. Surface Water
 - 2. Ground Water
 - 3. Flood plains
- C. Ecology
 - 1. Terrestrial Habitat
 - 2. Aquatic Habitat
 - 3. Wildlife
 - 4. Threatened, Endangered or Rare Species
 - 5. Unique or Sensitive Areas

II. Natural Environmental Effects

- A. Effects on Geology, Topography and Soils
(Should include impacts to farmland in accordance with Soil Conservation Service regulations)
- B. Effects on Water Resources
 - 1. Surface Water
 - a. Stream Impacts
 - b. Short term and long term effects
 - 2. Groundwater
 - 3. Effects on Flood plains
Flood plain impacts shall be evaluated in accordance with applicable regulations. (A flood plain finding will be included in the Final Environmental Document)

C. Ecology

1. Effects on Terrestrial Habitat
2. Effects on Aquatic Habitat
(Include wetland finding in the Final Environmental Document)
3. Effects on Wildlife
4. Effects on Endangered or Rare Species
5. Effect on Unique or Sensitive Areas

A/E #147 Prepare Detailed Social and Economic Analysis

During this study, the Consultant will concentrate on the significant, beneficial and adverse social, economic land use and cultural resources impacts anticipated for each alternate under consideration, including the no-build alternate. This information will include, but not necessarily be limited to, the following community and corridor neighborhood characteristics:

1. Description of study area communities and neighborhoods
 - a. Population characteristics
 - 1) Size and decade growth rate, projections
 - 2) Social descriptions: age, income, education, race, ethnicity
 - 3) Migration patterns
 - b. Community taxes and expenditures
 - c. Land Use Patterns - Refer to area land use plans
 - d. Community facilities and services
 - 1) Educational Facilities - private and public
 - a) Location of schools and district boundaries
 - b) Ancillary facilities and related neighborhood services (clinics, playgrounds, community center, etc.)

- 2) Religious Facilities
 - a) Number of churches
 - b) Membership - location of members
 - c) Dependency, if any, on ethnic membership
- 3) Health Care Facilities
 - a) Hospitals
 - b) General health facilities
- 4) Recreational Facilities (Agency with jurisdiction for the facility must be consulted)
 - a) Amount of open space
 - b) Number and location of existing facilities; outdoor, indoor, community center
- 5) Civic and Quasi-Public Facilities
 - a) Public buildings (emergency services, post offices)
 - b) Agencies or centers
 - c) Libraries
 - d) Water and sewage
- 6) Commercial Facilities including farms

2. Description of Structures and Population to be Displaced

a. Structures Displaced

- 1) Number and types of housing
 - a) Age and condition
 - b) Type of occupancy (owner-renter, permanent-summer, type of family, tenure)
- 2) Number and types of commercial and public buildings
 - a) Level of usage or business
 - b) Service area

- b. Residents or families displaced
 - 1) Income and occupational groups
 - 2) Family Size
 - 3) Race and ethnicity
 - 4) If minority groups are affected, requirements of the Federal Highway Administration's Title VI must be addressed.
 - c. Businesses or offices displaced
 - 1) Types of businesses or offices
 - 2) Number of persons employed, any minorities
 - 3) Location and space requirements
 - d. Farms displaced or impacted
 - e. Replacement housing and facilities
 - 1) Availability and suitability
 - 2) Location
 - 3) Cost
 - 4) Time required to accomplish relocations
 - 5) The Highway Administration has prepared a "Summary of the Relocation Assistance Program of the State Highway Administration of Maryland" which will be inserted in every Environmental Document. A copy of that report is available from Environmental Management.
 - f. Parks, recreation areas, 4(f) lands, etc.
 - g. Community cohesion and access
3. Socio-Economic Report Format

The Socio-Economic Report shall include but not be limited to the following information including appropriate graphics.

I. Affected Environment

A. Social Environment

1. Population

a. County

b. Study area

c. Census tract, election district or other appropriate category

2. Ethnic Characteristics

3. Neighborhoods

4. Community Facilities

B. Economic Environment

1. Employment Characteristics

2. Commercial and industrial facilities

C. Land Use

1. Existing

2. Future

II. Environmental Impacts

A. Social

1. Residential Displacement

2. Include the Title VI Statement as provided by the Highway Administration

3. Effects on Minorities, Handicapped, Elderly, etc.

4. Effects on Community Facilities

5. Disruption of Neighborhoods and Communities

6. Effects on Access to Services and Facilities

B. Economic

1. Effects on Existing Businesses (may include farms)

2. Effect on Regional Business Activities

3. Effect on Tax Base

C. Land Use Effects

4. Detailed Cultural Resources Analysis

a. Historic Sites (detailed procedures are available from the Highway Administration)

The Consultant will consider impacts and effects of the proposed alternates including the No-Build upon historic resources identified during the Cultural Resources Inventory. The following activities will be undertaken:

- 1) In consultation with Environmental Management, the potential for impact upon significant historic resources (those listed in the National Register, eligible for listing or considered possibly eligible) shall be identified. The Consultant shall be aware of any Federal, State, County, or local historic preservation regulations in effect in the project area.
- 2) When a proposed action requires the acquisition of land from a significant historic site (as identified above) the Consultant shall supply the following information which will be included in the Environmental Document:
 - a) Documentation regarding the significance of the site
 - b) Written description of the property including boundary delineation with justification for its historically significant boundaries
 - c) Discussion of all potential impacts by alternate with clear graphics of the 4(f) involvement
 - d) Copies of all letters relating to historic sites coordination
- 3) In consultation with the Highway Administration, avoidance alternates and/or mitigation measures to minimize harm will be developed as part of the 4(f) requirements and included in the Draft Environmental Document.
- 4) In accordance with Section 106 of the National Historic Preservation Act, the Consultant in coordination with Environmental Management will (for sites listed in or eligible for the National Register):

- a) Determine whether there is an effect (using criteria of effect outlined in 36 CFR 800.3) of the proposed alternates on those aspects of the significant historic resource(s) which qualify it for inclusion in the National Register.
- b) The Highway Administration (the Consultant, if requested) will seek the State Historic Preservation Officer's concurrence (at least preliminary) with these determinations of effect early enough in the project development process to include it in the Environmental Document (preferably the Draft Document).
 - i. In the case of a determination of no adverse effect, the Consultant will describe the nature of the effect(s) on the historic significance of the site and discuss why these effects are not adverse. Coordination with appropriate agencies including the Advisory Council on Historic Preservation will be handled by the Highway Administration.
 - ii. In the case of a determination of adverse effect, the Consultant may be required to provide documentation and/or develop mitigation plans. The Highway Administration will undertake coordination with the appropriate agencies.

b. Archaeological Sites (Detailed procedures are available from the Highway Administration)

This stage of archeological investigation is to be conducted after the selection of a final alternate and when the preliminary archeological survey (Phase I) has revealed potential impacts to known or potentially significant archeological resources. The Consultant archeologist will as part of this Intensive Survey (Phase II):

- 1) Determine the number, extent and importance of potentially affected resources
- 2) Determine the cost and time factors involved in preserving or otherwise mitigating possible adverse impacts to affected archeological resources.
- 3) Prepare a report documenting these findings

The Highway Administration will submit the report to the State Archeologist and the Maryland Historical Trust for their review and concurrence with the findings.

Salvage/Mitigation (Phase III) archeological analysis will be undertaken (prior to construction) when significant archeological resources identified in the Intensive Survey (Phase II) would be adversely impacted by a proposed highway project. All mitigation and/or salvage measures are to be agreed upon by the Federal Highway Administration, the State Highway Administration, the State Archeologist and the State Historic Preservation Officer.

A/E #144-145 Prepare Detailed R/W & Relocation Estimates & Report

The Consultant will furnish prints of the alternates in sufficient number to the Project Manager in order for him to acquire right of way and relocation estimates. The Consultant should be prepared to color the individual properties and planimeter the individual properties and takings so that parcel by parcel estimate can be done.

A/E #143 Prepare Environmental Traffic

The Consultant will furnish to the Project Manager sufficient information and maps to prepare the environmental traffic request.

A/E #174 Detailed Design Review and Comment

The Consultant will furnish alternate maps and background information to the Project Manager, in order for him to acquire the review from the various design bureaus. The Consultant should be prepared to attend any meeting(s) that may result from the review.

A/E #151 Prepare Environmental Analysis

1. The Consultant shall submit technical reports to the Highway Administration of all analysis undertaken for review. The documents will be suitable for inclusion in the Draft Environmental Document.
2. The Highway Administration will review the reports and return appropriate comments to the Consultant. The Consultant shall make all corrections as directed by the Highway Administration.

A/E #170 Value Engineering

The Consultant may be required to furnish maps, provide background data, and attend meeting(s) of the Value Engineering Team for his project.

A/E #149 Perform Noise Analysis and Complete Draft Report

The noise impact analysis shall be performed in accordance with Federal Aid Highway Program Manual Volume 7, Chapter 7, Section 3 and other

applicable federal criteria. The Consultant will prepare a technical noise report for review by the State Highway Administration prior to inclusion in the Environmental Document.

The Consultant shall perform the following activities when preparing the noise analysis.

1. Inspect the proposed highway site and the surrounding areas to identify acoustically significant topographical features and potential sensitive noise receptors. Sensitive receptors (4 to 5 receptors per mile) will be identified in consultation with the State Highway Administration.
2. Measure A-weighted daytime ambient sound levels at noise-sensitive locations along alternates selected for detailed study. These measurements will represent Leq levels as determined by a sound level meter, using a Federal Highway Administration approved measurement method. Ambient noise conditions will be monitored during the non-rush hour period based on the diurnal traffic curve.
3. Tabulate and process levels and document results in a form suitable for inclusion in the Environmental Document.
4. Analyze projected traffic volume data supplied by the Highway Administration.
5. Predict design year noise levels at sensitive receptors using the most recent Federal Highway Administration Traffic Noise Prediction Model. The Highway Administration recommends that the FHWA Model, Stamina 2.0 Optima be utilized. Others models must be approved by the State Highway Administration.
6. Generate design year noise levels contours by accounting for:
 - a. Roadway alignment and profile
 - b. Topographic features
 - c. Natural or man-made barriers
 - d. Truck percentage of the ADT
 - e. Vehicle mix
7. Determine increase in levels above the ambient levels of noise-sensitive areas.
8. Compare noise levels with the Federal Highway Administration Noise Abatement Criteria and Land Use Relationships as specified in FHPM 7-7-3 and identify areas that would experience predicted levels exceeding criteria. Areas which will experience a 10 dba increase over ambient levels in the design year will also be identified.

9. Identify impact at specific noise sensitive areas, taking into account number of residences affected.
10. Where necessary, analyze and discuss mitigation methods to reduce roadway noise levels in specific areas. (In areas exceeding criteria or where a 10 dba increase over ambient levels in design year).
11. Tabulate data including ambient levels, predicted Leq level.
12. Noise Analysis Report Format

Three copies of a preliminary Draft Noise Report will be submitted to the Highway Administration for review. Seven (7) copies of the Draft Report shall be submitted after revisions are made, for distribution by the Highway Administration. If necessary, seven copies of a Final Noise Report shall be submitted to the Highway Administration. Technical Report distribution will be made by the Highway Administration.

The format should include the following information and supporting graphics:

I. Introduction

- A. Project Description
- B. Summary of Impacts
- C. Noise Abatement Criteria
 1. Highway noise fundamentals
 2. Identification of abatement criteria and land use relationships

II. Existing Noise Environment

- A. Study Area Description
- B. Noise Sensitive Area Description
- C. Ambient Noise Level Measurements

III. Predicted Noise Levels from Proposed Improvements

- A. Prediction Methodology
- B. Summary of Traffic Parameters
- C. Prediction Results for Each Alternate

IV. Impact Assessment

- A. Impact Analysis and Feasibility of Noise Control
- B. Construction Impacts
- C. Coordination with Local Officials

V. Appendix

- A. Traffic Data
- B. Noise Contours (if requested)

A/E #150 Perform Air Analysis and Complete Draft Report

The air quality analysis shall be performed in accordance with all applicable federal criteria pertaining to air quality analysis including but not limited to Federal Aid Highway Program Manual Volume 7, Chapter 7, Section 9 and DOT Order 5610.1c. The Consultant will prepare a technical air quality analysis report for review by the Highway Administration prior to inclusion in the Environmental Document.

The Consultant shall perform the following activities when preparing the air analysis.

1. Microscale Analysis

This analysis is concerned with the area near the existing or proposed highway which is directly affected by the highway.

The analysis will include:

- a. Analysis of "worse case" one-hour and eight-hour carbon monoxide concentrations. This analysis will include a study of all "build" alternates and the "no-build". Study years should address the Estimated Time of Completion (ETC) and the design year.
- b. The resulting data should be presented so that it can be compared to State and National Ambient Air Quality Standards. Pollutant levels should be shown for each alternate, including the No-Build Alternate and study years.
- c. Sensitive Receptors

It will be necessary to compute the carbon monoxide concentration which will be present at sensitive receptor locations. The level of analysis necessary and the number of receptors to be considered will depend on the specific

project. Sensitive receptors (4 to 5 per mile) will be identified in consultation with the State Highway Administration. Sensitive receptors include schools, hospitals, playgrounds, convalescent homes, outdoor camps, residential areas and other places where people tend to congregate. In those cases where no suitable sensitive receptors exist, an edge-of-right-of-way (E ROW) receptor should be located at the appropriate actual/proposed right-of-way line. When modeling carbon monoxide concentrations at receptor locations, the following factors should be considered:

- 1) The concentration of carbon monoxide at sensitive receptors (schools, hospitals, churches, etc.) should be determined when the receptor is located such that the roadway being analyzed will affect the ambient air quality at the receptor.
- 2) The analysis of sensitive receptors should use a wind angle which maximizes the concentration at each receptor.

2. Microscale Analysis Parameters

When performing the microscale analysis, the following parameters must be considered:

a. Facility Design Data:

The effect of design features (number of lanes, median width, cut, fill or at grade sections and interchanges) should be considered when alternates are studied.

b. Traffic Data:

The study should be sensitive to ADT, diurnal traffic curves, trucks percentage, the mix and age of vehicles using the facility, and the peak and off peak traffic speeds. In addition, for signalized intersections, a determination of whether a queueing analysis is required should be made. The specific traffic required will be supplied by the Highway Administration.

c. "Background" Carbon Monoxide Levels:

The ambient levels of carbon monoxide will be determined on a project by project basis. The Highway Administration will determine if the data will be obtained by use of existing data, by estimation, or by monitoring.

d. Emission Factors:

Emission factors will be sensitive to study year, vehicle mix, vehicle age, travel speeds, ambient temperature and operation mode. The Highway Administration will specify the appropriate emission factor model and input factors to be used. Should revised emission factors be adopted during the study, the Consultant shall be responsible to update the analysis based on the new data.

e. Meteorological Data:

All analyses should be done for "worst possible case" conditions specified by the Highway Administration. Except in unusual situations, it is felt that investigation of meteorological data from area weather stations will not be necessary as this may not provide data indicative of the micro-climate adjacent to a facility. Should meteorological analyses be necessary, this will be specified by the Highway Administration. The "worst case" conditions are as follows:

1) One-Hour

- a) Wind Speed = 1m/sec
- b) Stability Class - F
- c) Wind Direction - that which will produce maximum concentration at receptor of concern
- d) Mixing Ht. = 350m
(from Holzworth, 1972)

2) Eight-Hour

- a) Wind Speed = 2m/sec before 17:00
1m/sec after 17:00
- b) Stability Class-D before 12:00
F after 17:00
- c) Wind Direction - same as one-hour
- d) Mixing Ht. - same as one-hour

To calculate the eight-hour maximum; model the hourly concentrations resulting from the meteorological factors listed above and the hourly traffic volume indicated in the diurnal traffic curve, then selected the highest eight consecutive hourly concentration to arrive at an eight-hour average.

f. Line Source Dispersion Model:

The Caline 3 Model or the Environmental Protection Agency HIWAY 2 model may be used for microscale analysis. The use of any other model should be cleared with the Highway Administration prior to analysis.

g. Ambient Air Quality Standards:

All data related to pollutant concentrations should be in units and averaging times which allow direct comparison to State and National Ambient Air Quality Standards.

3. Air Analysis - Format

The Highway Administration recommends that air quality analysis follow a standard format. The format is as follows:

Section I Summary

- A. Description of Project
- B. Objectives and Type of Analysis
- C. Conclusions
- D. Conformity with Regional Air Quality Planning
- E. Construction Impacts
- F. Agency Coordination

Section II Analysis

- A. Receptor Sites Description
- B. Results of Microscale Analysis

Section III Technical Analysis

- A. Traffic Data
- B. Emissions Factors
- C. Meteorological Factors
- D. Caline 3 Analysis
- E. Background Levels

Section I should contain a brief (several pages) summary of the project and its impact on air quality in relation to the Ambient Air Quality Standards. Study area and alignment maps should be included with the project description. In addition, a brief discussion of the project's conformity with Regional Air Quality Planning, construction impacts and coordination of the technical report with appropriate review agencies should be included and contain a brief description of the results.

Section II should contain the body of the analysis. Results should be presented in a tabular format to allow comparison of all alternates with the ambient air quality standards. This section should also include a brief description of each receptors site and mapping showing the location of the sites with respect to the proposed improvements.

Section III should contain the technical supporting material. This would include traffic data, meteorological factors, emission data, background air quality data, model information and references.

Two preliminary copies of the technical report should be submitted to the Highway Administration, Project Development Division, for review and comment. Five (5) copies of the Draft Technical Report shall be submitted to the Highway Administration. If necessary, eight (8) copies of a Final Technical Report shall be submitted to the Highway Administration. The Highway Administration will distribute the technical reports to appropriate agencies.

A/E #142 Determination of Environmental Significance

Based on the results of the project activities thus far, the Highway Administration will determine whether a Draft Environmental Effects Report, Draft Environmental Impact Statement, or Environmental Assessment will be prepared. The Highway Administration will submit appropriate documentation based on information supplied by the Consultant (detailed alternates and associated environmental impacts) to the Federal Highway Administration requesting their concurrence with the preparation of a particular environmental document.

A/E #152 Team Review and Recommend Alternate

The Consultant will provide all maps and information necessary to conduct a team review of the alternates and recommendation of the alternate(s) to be included in the Environmental Document. It is possible that a single preferred alternate could be identified at this time.

A/E #161 Revise Alternates and Environmental Analysis (if necessary)

The Consultant will make any revisions to the alternate(s) and analyze these revisions from an engineering and environmental standpoint. It may be necessary to reconvene the team and review the new alternate(s).

A/E #155 Prepare Environmental Document

In accordance with DOT Order 5610.1c (Attachment B), the Consultant shall evaluate the comments received at the Alternates Public Meeting, and incorporate any substantive comments and all to date into the composition of the Preliminary Draft Environmental Document.

The 4(f) evaluation of a Draft Environmental Document will describe the specific impact each alternate will have on 4 (f) resources and discuss avoidance alternates as necessary. Every Draft Environmental Document will include an Environmental Assessment Form.

A/E #146 Begin Design Preliminaries

If a single preferred alternate has been identified in the process, it may be possible to begin early Phase IV Final Design Activities. The Consultant could then be called on to furnish maps, description of the alternate, typical sections survey set-up, coordinate values of the base lines, and any other information that is available.

A/E #168 Hold Informational Meeting (if necessary)

The Consultant may be called on to furnish all material needed to put on an Informational Public Meeting such as:

Script

Brochure

Wall Displays

Graphic Displays

Photographic Slides

The Consultant will participate in all Public Meetings with the level of participation being determined by the State Highway Administration.

A/E #156 Review Draft Environmental Document

Upon completion of the designated preliminary Draft Environmental Document, the Consultant will submit fifteen (15) mockup copies of the document to the Highway Administration for review by the Highway Administration and the Federal Highway Administration. If necessary, the Consultant shall attend an in-house meeting to review this document.

Representatives from the following agencies and bureaus will participate in the review:

- a. Federal Highway Administration
- b. Project Development Division
- c. Other Highway Administration Bureaus as appropriate

A/E #176 Update Noise Report (if necessary)

Guidelines described in A/E #149 will be utilized to update and revise the noise analysis if required by the Highway Administration.

A/E #177 Update Air Quality Report (if necessary)

Guidelines described in A/E #150 will be utilized to update and revise the air analysis if required by the Highway Administration.

A/E #162 Finalize Draft Environmental Document

1. Upon receiving review comments, the Consultant shall make appropriate changes, prepare the final edition of the Draft Environmental Document and will submit three (3) photocopies to the Highway Administration, for final review and submission to the Federal Highway Administration.
2. After the final review is completed by the Highway Administration, and approval by the FHWA, the following number of the final edition of each draft document will be required, unless otherwise specified:

Draft Environmental Impact Statement	150
Environmental Assessment	75
Section 4(f) Evaluation	35
Draft Environmental Effects Report	35
Environmental Assessment Form	15

A/E #165 Circulate Draft Environmental Document

The Highway Administration will perform the actual distribution to appropriate agencies.

A/E #163 Prepare Hearing Presentation Material

The Consultant may be called on to furnish all material needed to put on a Public Hearing such as:

Script

Brochure

Wall Displays

Graphic Displays

Photographic Slides

A/E #167 Review Hearing Presentation Material

The Consultant will submit all hearing material in draft form for State Highway Administration review and approval. The Consultant should also be prepared to print any hearing material necessary.

A/E #169 Public Hearing

The Consultant will attend all public hearings and summarize the comments made at the public hearing. As in all public meetings, the level of the Consultant's participation will be determined by the State Highway Administration.

A/E #172 Analyze Comments on Draft Environmental Document

The Consultant in consultation with the Project Development Division will address comments received at the Public Hearing and any agency comments regarding the Draft Environmental Document.

A/E #194 Perform Supplemental Studies (if necessary)

The Consultant should be prepared to perform Supplemental Engineering and Environmental studies in order to respond to comments from the hearing and environmental document.

A/E #191 Team Recommendation Meeting

The Consultant will attend and participate in the team recommendation meeting. The Consultant and the State Highway Administration's Project Manager will put together a Team Recommendation package to include the following:

- Background History
- Alternate(s) Description
- Engineering Factors
- Environmental Factors

- Agency Comments
- County or City Comments
- Elected Official Comments
- Public Citizen and Business Comments
- Recommendation

A/E #173 Recommend Alternate to Administrator

After completion of the team recommendation package, the Consultant will attend and participate in the recommendation to the Administrator. As a result of this meeting, the Consultant will make any revisions necessary to the studies prior to beginning Stage III.

General Comment:

The Consultant should be prepared to do all report maps and graphics, and on projects where there is a separate engineering and environmental Consultant, this task will be the responsibility of the engineering Consultant.

STAGE III - FINAL PROJECT PLANNING

A/E #175 Begin Final Environmental Document

In accordance with DOT Order 5610.1c, the Consultant shall document impacts associated with the selected alternate incorporating results of any updated analyses. Factual justification for the selected alternates, as well as a summary of substantive comments made at the public hearing, and appropriate responses, will be included in the Final Environmental Document. A Section 4(f) Statement, if necessary, will document that there is no feasible and prudent alternative to the taking of 4(f) lands.

A/E #178 Complete Final Environmental Document

Ten (10) copies of the preliminary Final Environmental Document will be submitted to the Highway Administration for review. If necessary, the Consultant shall attend an in-house meeting to review this document. The Consultant shall make all corrections as designated by the Highway Administration. Two (2) photocopies of the final edition of the Final Environmental Document will be submitted to the Highway Administration for final review. After final review by the Highway Administration, the Consultant will submit ten (10) good, bound copies of the Final Environmental Document to the Highway Administration. The Highway Administration will submit the document to the Federal Highway Administration for final review and approval.

A/E #181 Submit Final Environmental Document

Upon receiving Federal Highway Administration approval, the Consultant shall bind and submit the following number of each Final Environmental Document, unless otherwise specified:

Final Environmental Impact Statement	-	150
Finding of No Significant Impact	-	75
Section 4(f) Statement	-	35
Final Environmental Effects Report	-	35

The Highway Administration will circulate the document to Federal, State, and local agencies and interested citizens.

A/E #183 Obtain Location and Design Approval

The Consultant will furnish, as needed, material necessary to obtain location and design approval such as: maps, draft ad, technical summaries or any other material required.

Since this task ends the project planning phase, the State Highway Administration's Project Manager and the Consultant shall meet and review all project materials. The purpose of this meeting will be to transfer material from the Consultant to State Highway Administration files or design bureaus in order to facilitate an orderly transition to Phase IV, Final Design and close out Phase II and Phase III.

The following Environmental Assessment Form is a requirement of the Maryland Environmental Policy Act and Maryland Department of Transportation Order 11.01.06.02. Its use is in keeping with the provisions of 1500.4(k) and 1506.2 and .6 of the Council of Environmental Quality Regulations, effective July 31, 1979, which recommend that duplication of Federal, State, and Local procedures be integrated into a single process.

The checklist identifies specific areas of the natural and social-economic environment which have been considered while preparing this environmental assessment. The reviewer can refer to the appropriate sections of the document, as indicated in the "Comment" column of the form, for a description of specific characteristics of the natural or social-economic environment within the proposed project area. It will also highlight any potential impacts, beneficial or adverse, that the action may incur. The "No" column indicates that during the scoping and early coordination processes, that specific area of the environment was not identified to be within the project area or would not be impacted by the proposed action.

ENVIRONMENTAL ASSESSMENT FORM

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
A. Land Use Considerations			
1. Will the action be within the 100 year flood plain?	_____	_____	_____
2. Will the action require a permit for construction or alternation within the 50 year flood plain?	_____	_____	_____
3. Will the action require a permit for dredging, filling, draining or alternation of a wetland?	_____	_____	_____
4. Will the action require a permit for the construction or operation of facilities for solid waste disposal including dredge and excavation spoil?	_____	_____	_____
5. Will the action occur on slopes exceeding 15%?	_____	_____	_____
6. Will the action require a grading plan or a sediment control permit?	_____	_____	_____
7. Will the action require a mining permit for deep or surface mining?	_____	_____	_____
8. Will the action require a permit for drilling a gas or oil well?	_____	_____	_____
9. Will the action require a permit for airport construction?	_____	_____	_____
10. Will the action require a permit for the crossing of the Potomac River by conduits, cables or other like devices?	_____	_____	_____
11. Will the action affect the use of a public recreation area, park, forest, wildlife management area, scenic river or wildland?	_____	_____	_____
12. Will the action affect the use of any natural or manmade features that are unique to the county, state, or nation?	_____	_____	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
13. Will the action affect the use of an archeological or historical site or structure?	---	---	_____
B. Water Use Considerations			
14. Will the action require a permit for the change of the course, current, or cross-section of a stream or other body of water?	---	---	_____
15. Will the action require the construction, alteration, or removal of a dam, reservoir, or waterway obstruction?	---	---	_____
16. Will the action change the overland flow of storm water or reduce the absorption capacity of the ground?	---	---	_____
17. Will the action require a permit for the drilling of a water well?	---	---	_____
18. Will the action require a permit for water appropriation?	---	---	_____
19. Will the action require a permit for the construction and operation of facilities for treatment or distribution of water?	---	---	_____
20. Will the project require a permit for the construction and operation of facilities for sewage treatment and/or land disposal of liquid waste derivatives?	---	---	_____
21. Will the action result in any discharge into surface or sub-surface water?	---	---	_____
22. If so, will the discharge affect ambient water quality parameters and/or require a discharge permit?	---	---	_____
C. Air Use Considerations			
23. Will the action result in any discharge into the air?	---	---	_____
24. If so, will the discharge affect ambient air quality parameters or produce a disagreeable odor?	---	---	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
25. Will the action generate additional noise which differs in character or level from present conditions?	—	—	_____
26. Will the action preclude future use of related air space?	—	—	_____
27. Will the action generate any radiological, electrical, magnetic, or light influences?	—	—	_____
D. Plants and Animals			
28. Will the action cause the disturbance, reduction or loss of any rare, unique or valuable plant or animal?	—	—	_____
29. Will the action result in the significant reduction or loss of any fish or wildlife habitats?	—	—	_____
30. Will the action require a permit for the use of pesticides, herbicides or other biological, chemical or radiological control agents?	—	—	_____
E. Socio-Economic			
31. Will the action result in a pre-emption or division of properties or impair their economic use?	—	—	_____
32. Will the action cause relocation of activities, structures, or result in a change in the population density or distribution?	—	—	_____
33. Will the action alter land values?	—	—	_____
34. Will the action affect traffic flow and volume?	—	—	_____
35. Will the action affect the production, extraction, harvest or potential use of a scarce or economically important resource?	—	—	_____
36. Will the action require a license to construct a sawmill or other plant for the manufacture of forest products?	—	—	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
37. Is the action in accord with federal, state, regional and local comprehensive or functional plans—including zoning?	_____	_____	_____
38. Will the action affect the employment opportunities for persons in the area?	_____	_____	_____
39. Will the action affect the ability of the area to attract new sources of tax revenue?	_____	_____	_____
40. Will the action discourage present sources of tax revenue from remaining in the area, or affirmatively encourage them to relocate elsewhere?	_____	_____	_____
41. Will the action affect the ability of the area to attract tourism?	_____	_____	_____
F. Other Considerations			
42. Could the action endanger the public health, safety or welfare?	_____	_____	_____
43. Could the action be eliminated without deleterious affects to the public health, safety, welfare or the natural environment?	_____	_____	_____
44. Will the action be of statewide significance?	_____	_____	_____
45. Are there any other plans or actions (federal, state, county or private) that, in conjunction with the subject action could result in a cumulative or synergistic impact on the public health, safety, welfare, or envirnment?	_____	_____	_____
46. Will the action require additional power generation or transmission capacity?	_____	_____	_____
47. This agency will develop a complete environmental effects report on the proposed action.	_____	_____	_____

FORMAT AND CONTENT OF ENVIRONMENTAL IMPACT STATEMENTS

1. Format.

- a. The format recommended in CEQ 1502.10 should be used for DOT EISs:
- (a) Cover Sheet
 - (b) Summary
 - (c) Table of Contents
 - (d) Purpose and Need for the Action
 - (e) Alternatives Including the Proposed Action
 - (f) Affected Environment
 - (g) Environmental Consequences
 - (h) List of Preparers
 - (i) List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent
 - (j) Index
 - (k) Appendices (if any)
- b. The cover sheet for each environmental impact statement will include the information identified in CEQ 1502.11 and will be headed as follows:

Department of Transportation

(operating administration)

(Draft/Final) Environmental Impact Statement
Pursuant to Section 102(2)(C), P.L. 91-190

As appropriate, the heading will indicate that the EIS also covers the requirements of section 4(f) of the DOT Act, section 14 of the Mass Transportation Act, and/or sections 16 and 18(a)(4) of the Airport Act.

2. Guidance as to Content of Statements.

- a. Environmental impact statements shall include the information specified in CEQ 1502.11 through 1502.18. The following paragraphs of Attachments B are intended to be considered, where relevant, as guidance regarding the content of environmental statements.
- b. Additional information contained in research reports, guidance on methodology, and other materials relating to consideration of environmental factors should be employed as appropriate in the preparation of EISs and environmental assessments. Examples of such materials include:

U.S. Department of Transportation, Environmental Assessment Notebook Series: Highways, 1975, Report No. DOT P 5600.4, available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock Number 050-000-00109-1;

U.S. DOT, Environmental Assessment Notebook Series: Airports, 1978, Report Number DOT P 5600.5, available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock Number 050-000-00138-5;

U.S. DOT, FAA, Environmental Assessment of Airport Development Actions, 1977, available from the National Technical Information Service, 5284 Port Royal Road, Springfield, Virginia 22161, NTIS Catalog Number AD A-039274; and

U.S. DOT, Guidelines for Assessing the Environmental Impact of Public Mass Transportation Projects, 1979, Report Number DOT P 79 001, available from the National Technical Information Service, Springfield, Virginia 22161.

3. General Content. The following points are to be covered.

- a. A description of the proposed Federal action (e.g. "The proposed Federal Action is approval of location of highway..." or "The proposed Federal action is approval of a grant application to construct..."), and a statement of its purpose.
- b. Alternatives, including the proposed action, and including, where relevant, those alternatives not within the existing authority of the responsible preparing office. Section 102(2)(E) of NEPA requires the responsible agency to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning

alternative uses of available resources". A rigorous exploration and an objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid some or all of the adverse environmental effects, are essential. Sufficient analysis of such alternatives and their environmental benefits, costs, and risks should accompany the proposed action through the review process in order not to foreclose prematurely options which might enhance environmental quality or have less detrimental effects. Examples of such alternatives include: the alternative of not taking any action or of postponing action pending further study; alternatives requiring actions of a significantly different nature which would provide similar benefits with different environmental impacts, e.g. low capital intensive improvements, mass transit alternatives to highway construction; alternatives related to different locations or design or details of the proposed action which would present different environmental impacts. In each case, the analysis should be sufficiently detailed to reveal comparative evaluation of the environmental benefits, costs, and risks of each reasonable alternative, including the proposed action. Where an existing impact statement already contains such an analysis, its treatment of alternatives may be incorporated, provided such treatment is current and relevant to the precise purpose of the proposed action.

c. Affected environment.

- (1) The statement should succinctly describe the environment of the area affected as it exists prior to a proposed action, including other related Federal activities in the area, their interrelationships, and cumulative environmental impact. The amount of detail provided in such descriptions should be commensurate with the extent and expected impact of the action, and with the amount of information required at the particular level of decision making (planning, feasibility, design, etc.).
- (2) The statement should identify, as appropriate, population and growth characteristics of the affected area and any population and growth assumptions used to justify the project or program or to determine secondary population and growth impacts resulting from the proposed action and its alternatives (see paragraph 3e(2)). In discussing these population aspects, the statement should give consideration to using the rates of growth in the region of the project contained in the projections compiled for the Water Resources Council by the Bureau of Economic Analysis of the Department of Commerce and the Economic Research Service of the Department of Agriculture (the OBERS projection).

- d. The relationship of the proposed action and how it may conform to or conflict with adopted or proposed land use plans, policies, controls, and goals and objectives as have been promulgated by affected communities. Where a conflict or inconsistency exists, the statement should describe the extent of reconciliation and the reasons for proceeding notwithstanding the absence of full reconciliation.
- e. The probable impact of the proposed action on the environment.
- (1) This requires assessment of the positive and negative effects of the proposed action as it affects both national and international human environment. The attention given to different environmental factors will vary according to the nature, scale, and location of proposed actions. Primary attention should be given in the statement to discussing those factors most evidently impacted by the proposed action.
 - (2) Secondary and other foreseeable effects, as well as primary consequences for the environment, should be included in the analysis. Secondary effects, such as impacts on existing community facilities and activities inducing new facilities and activities, may often be even more substantial than the primary effects of the original action itself. For example, the effects of the proposed action on population and growth may be among the more significant secondary effects. Such population and growth impacts should be estimated and an assessment made on their effects upon the resource base, including land use, water, and public services, of the area in question.
- f. Any probable adverse environmental effects which cannot be avoided (such as water or air pollution, noise, undesirable land use patterns, or impacts on public parks and recreation areas, wildlife and waterfowl refuges, or on historic sites, damage to life systems, traffic congestion, threats to health, or other consequences adverse to the environmental goals set out in section 101(b) of NEPA). This should be a brief summary of those effects discussed in paragraph 3c that are adverse and unavoidable under the proposed action. Included for purposes of contrast should be a clear statement of how all adverse effects will be mitigated.

- g. The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. This discussion should cover the extent to which the proposed action involves tradeoffs between short-term environmental gains at the expense of long-term losses, or vice versa, and a discussion of the extent to which the proposed action forecloses future options.
- h. Any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented. This requires identification of unavoidable impacts and the extent to which the action irreversibly curtails the range of potential uses of the environment. "Resources" means not only the labor and materials devoted to an action but also the natural and cultural resources lost or destroyed.
- i. An indication of what other interests and considerations of Federal policy are thought to offset the adverse environmental effects of the proposed action identified pursuant to subparagraphs (e) and (f) of this paragraph. The statement should also indicate the extent to which these stated countervailing benefits could be realized by following reasonable alternatives to the proposed action (as identified in subparagraph (b) of this paragraph) that would avoid some or all of the adverse environmental effects. In this connection, cost-benefit analyses of proposed actions, if prepared, should be attached, or summaries thereof, to the environmental impact statement, and should clearly indicate the extent to which environmental costs have not been reflected in such analyses.
- j. A discussion of problems and objections raised by other Federal agencies, State and local entities, and citizens in the review process, and the disposition of the issues involved and the reasons therefore. (This section may be added to the final environmental statement at the end of the review process.)
 - (1) The draft and final statements should document issues raised through consultations with Federal, State, and local agencies with jurisdiction or special expertise and with citizens, of actions taken in response to comments, public hearings, and other citizen involvement proceedings.
 - (2) Any unresolved environmental issues and efforts to resolve them, through further consultations or otherwise, should be identified in the final statement. For instance, where

an agency comments that the statement has inadequate analysis or that the agency has reservations concerning the impacts, or believes that the impacts are too adverse for approval, either the issue should be resolved or the final statement should reflect efforts to resolve the issue and set forth any action that will result.

- (3) The statement should reflect that every effort was made to discover and discuss all major points of view on the environmental effects of the proposed action and alternatives in the draft statement. However, where opposing professional views and responsible opinion have been overlooked in the draft statement and are raised through the commenting process, the environmental effects of the action should be reviewed in light of those views. A meaningful reference should be made in the final statement to the existence of any responsible opposing view not adequately discussed in the draft statement indicating responses to the issues raised.
 - (4) All substantive comments received on the draft (or summaries of responses from the public which have been exceptionally voluminous) should be attached to the final statement, whether or not each such comment is thought to merit individual discussion in the text of the statement.
- k. Draft statements should indicate at appropriate points in the text any underlying studies, reports, and other information obtained and considered in preparing the statement, including any cost-benefit analyses prepared. In the case of documents not likely to be easily accessible (such as internal studies or reports), the statement should indicate how such information may be obtained. If such information is attached to the statement, care should be taken to insure that the statement remains an essentially self-contained instrument, capable of being understood by the reader without the need for undue cross reference.
4. Publicly Owned Parklands, Recreational Areas, Wildlife and Waterfowl Refuges and Historic Sites. The following points are to be covered:
- a. Description of "any publicly owned land from a public park, recreational area or wildlife and waterfowl refuge" or "any land from an historic site" affected or taken by the project. This includes its size, available activities, use, patronage, unique or irreplaceable qualities, relationship to other similarly used lands in the vicinity of the project, maps, plans, slides,

photographs, and drawings showing in sufficient scale and detail the project. This also includes its impact on park, recreation, wildlife, or historic areas, and changes in vehicular or pedestrian access.

- b. Statement of the "national, State or local significance" of the entire park, recreation area, refuge, or historic site "as determined by the Federal, State or local officials having jurisdiction thereof".
- (1) In the absence of such a statement, lands will be presumed to be significant. Any statement of "insignificance" by the official having jurisdiction is subject to review by the Department as to whether such statement is capricious.
 - (2) Where Federal lands are administered for multiple uses, the Federal official having jurisdiction over the lands shall determine whether the subject lands are in fact being used for park, recreation, wildlife, waterfowl, or historic purposes.
- c. Similar data, as appropriate, for alternative designs and locations, including detailed cost estimates (with figures showing percentage differences in total project costs) and technical feasibility, and appropriate analysis of the alternatives, including any unique problems present and evidence that the cost or community disruptions resulting from alternative routes reach extraordinary magnitudes. This portion of the statement should demonstrate compliance with the Supreme Court's statement in the Overton Park case, as follows:
- "The very existence of the statute indicates that the protection of parklands was to be given paramount importance. The few green havens that are public parks were not to be lost unless there were truly unusual factors present in a particular case or the cost or community disruption resulting from alternative routes reached extraordinary magnitudes. If the statutes are to have any meaning, the Secretary cannot approve the destruction of parkland unless he finds that the alternative routes present unique problems."
- d. If there is no feasible and prudent alternative, description of all planning undertaken to minimize harm to the protected area and statement of actions taken or to be taken to implement this planning, including measures to maintain or enhance the natural beauty of the lands traversed.

- (1) Measures to minimize harm may include replacement of land and facilities, providing land or facilities, or provision for functional replacement of the facility (see 49 C.F.R. 25.267).
 - (2) Design measures to minimize harm; e.g. tunneling, cut and cover, cut and fill, treatment of embankments, planting, screening, maintenance of pedestrian or bicycle paths and noise mitigation measures, all reflecting utilization of appropriate interdisciplinary design personnel.
- e. Evidence of concurrence or description of efforts to obtain concurrence of Federal, State or local officials having jurisdiction over the section 4(f) property regarding the action proposed and the measures planned to minimize harm.
 - f. If Federally-owned properties are involved in highway projects, the final statement shall include the action taken or an indication of the expected action after filing a map of the proposed use of the land or other appropriate documentation with the Secretary of the Department supervising the land (23 U.S.C. 317).
 - g. If land acquired with Federal grant money (Department of Housing and Urban Development open space or Heritage Conservation and Recreation Service land and water conservation funds) is involved, the final statement shall include appropriate communications with the grantor agency.
 - h. The General Counsel will determine application of section 4(f) to public interests in lands, such as easements, reversions, etc.
 - i. A specific statement that there is no feasible and prudent alternative and that the proposal includes all possible planning to minimize harm to the "section 4(f) area" involved.
5. Properties and Sites of Historic and Cultural Significance. The statement should document actions taken to preserve and enhance districts, sites, buildings, structures, and objects of historical, architectural, archaeological, or cultural significance affected by the action.
- a. Draft environmental statements should include identification, though consulting the State Historic Preservation Officer and the National Register and applying the National Register Criteria (36 C.F.R. Part 800), of properties that are included in or eligible

for inclusion in the National Register of Historic Places that may be affected by the project. The Secretary of the Interior will advise whether properties not listed are eligible for the National Register (36 C.F.R. Part 63).

- b. If application of the Advisory Council on Historic Preservation's (ACHP) Criteria of Effect (36 C.F.R. Part 800) indicates that the project will have an effect upon a property included in or eligible for inclusion in the National Register of Historic Places, the draft environmental statement should document the effect. Evaluation of the effect should be made in consultation with the State Historic Preservation Officer (SHPO) and in accordance with the ACHP's Criteria of Adverse Effect (36 C.F.R. Part 800).
- c. Determinations of no adverse effect should be documented in the draft statement with evidence of the application of the ACHP's Criteria of Adverse Effect, the views of the appropriate State Historic Preservation Officer, and submission of the determination to the ACHP for review.
- d. If the project will have an adverse effect upon a property included in or eligible for inclusion in the National Register of Historic Places, the final environmental statement should include either an executed Memorandum of Agreement or comments from the Council after consideration of the project at a meeting of the ACHP and an account of actions to be taken in response to the comments of the ACHP. Procedures for obtaining a Memorandum of Agreement and the comments of the Council are found in 36 C.F.R. Part 800.
- e. To determine whether the project will have an effect on properties of State or local historical, architectural, archaeological, or cultural significance not included in or eligible for inclusion in the National Register, the responsible official should consult with the State Historic Preservation Officer, with the local official having jurisdiction of the property, and, where appropriate, with historical societies, museums, or academic institutions having expertise with regard to the property. Use of land from historic properties of Federal, State and local significance as determined by the official having jurisdiction thereof involves section 4(f) of the DOT Act and documentation should include information necessary to consider a section 4(f) determination (see paragraph 4).

6. Impacts of the Proposed Action on the Human Environment Involving Community Disruption and Relocation.

- a. The statement should include a description of probable impact sufficient to enable an understanding of the extent of the environmental and social impact of the project alternatives and to consider whether relocation problems can be properly handled. This would include the following information obtainable by visual inspection of the proposed affected area and from secondary sources and community sources when available.
- (1) An estimate of the households to be displaced including the family characteristics (e.g. minorities, and income levels, tenure, the elderly, large families).
 - (2) Impact on the human environment of an action which divides or disrupts an established community, including, where pertinent, the effect of displacement on types of families and individuals affected, effect of streets cut off, separation of residences from community facilities, separation of residential areas.
 - (3) Impact on the neighborhood and housing to which relocation is likely to take place (e.g. lack of sufficient housing for large families, doublings up).
 - (4) An estimate of the businesses to be displaced, and the general effect of business dislocation on the economy of the community.
 - (5) A discussion of relocation housing in the area and the ability to provide adequate relocation housing for the types of families to be displaced. If the resources are insufficient to meet the estimated displacement needs, a description of the actions proposed to remedy this situation including, if necessary, use of housing of last resort.
 - (6) Results of consultation with local officials and community groups regarding the impacts to the community affected. Relocation agencies and staff and other social agencies can help to describe probable social impacts of this proposed action.
 - (7) Where necessary, special relocation advisory services to be provided the elderly, handicapped and illiterate regarding interpretations of benefits, assistance in selecting

replacement housing, and consultation with respect to acquiring, leasing, and occupying replacement housing.

- b. This data should provide the preliminary basis for assurance of the availability of relocation housing as required by DOT 5620.1, Replacement Housing Policy, dated 6-24-70, and 49 C.F.R. 25.57.
7. Considerations Relating to Pedestrians and Bicyclists. Where appropriate, the statement should discuss impacts on and consideration to be given in the development of the project to pedestrian and bicycle access, movement and safety within the affected area, particularly in medium and high density commercial and residential areas.
8. Other Social Impacts. The general social groups specially benefitted or harmed by the proposed action should be identified in the statement, including the following:
 - a. Particular effects of a proposal on the elderly, handicapped, non-drivers, transit dependent, or minorities should be described to the extent reasonably predictable.
 - b. How the proposal will facilitate or inhibit their access to jobs, educational facilities, religious institutions, health and welfare services, recreational facilities, social and cultural facilities, pedestrian movement facilities, and public transit services.
9. Standards as to Noise, Air, and Water Pollution. The statement shall reflect sufficient analysis of the effects of the proposed action on attainment and maintenance of any environmental standards established by law or administrative determination (e.g. noise, ambient air quality, water quality), including the following documentation:
 - a. With respect to water quality, there should be consultation with the agency responsible for the State water pollution control program as to conformity with standards and regulations regarding storm sewer discharge, sedimentation control, and other non-point source discharges.
 - b. The comments or determinations of the offices charged with administration of the State's implementation plan for air quality as to the consistency of the project with State plans for the implementation of ambient air quality standards.
 - c. Conformity to adopted noise standards, compatible, if appropriate, with different land uses.

10. Energy Supply and Natural Resources Development. Where applicable, the statement should reflect consideration of whether the project or program will have any effect on either the production or consumption of energy and other natural resources, and discuss such effects if they are significant.
11. Floodplain Management Evaluation. When an alternative under consideration encroaches on a base (100-year) floodplain, the statement should describe the anticipated impacts on natural and beneficial floodplain values, any risk to or resulting from the transportation action, and the degree to which the action facilitates additional development in the base floodplain. The necessary measures to address floodplain impacts, including an evaluation of alternatives to avoid the encroachment in appropriate cases, should be described in compliance with Executive Order 11988, "Floodplain Management", and DOT Order 5650.2, "Floodplain Management and Protection".
12. Considerations Relating to Wetlands or Coastal Zones. Where wetlands or coastal zones are involved, the statement should reflect compliance with Executive Order 11990, Protection of Wetlands, and DOT 5660.1A and should include:
 - a. Information on location, types, and extent of wetlands areas which might be affected by the proposed action.
 - b. An assessment of the impacts resulting from both construction and operation of the project on the wetlands and associated wildlife, and measures to minimize adverse impacts.
 - c. A statement by the local representative of the Department of the Interior, and any other responsible officials with special expertise, setting forth his views on the impacts of the project on the wetlands, the worth of the particular wetlands areas involved to the community and to the Nation, and recommendations as to whether the proposed action should proceed, and, if applicable, along what alternative route.
 - d. Where applicable, a discussion of how the proposed project relates to the State coastal zone management program for the particular State in which the project is to take place.

13. Construction Impacts. In general, adverse impacts during construction will be of less importance than long-term impacts of a proposal. Nonetheless, statements should appropriately address such matters as the following, identifying any special problem areas:
 - a. Noise impacts from construction and any specifications setting maximum noise levels.
 - b. Disposal of spoil and effect on borrow areas and disposal sites (include specifications where special problems are involved).
 - c. Measures to minimize effects on traffic and pedestrians.
14. Land Use and Urban Growth. The statement should include, to the extent relevant and predictable:
 - a. The effect of the project on land use, development patterns, and urban growth.
 - b. Where significant land use and development impacts are anticipated, identify public facilities needed to serve the new development and any problems or issues which would arise in connection with these facilities, and the comments of agencies that would provide these facilities.
15. (Deleted)
16. Projects under Section 14 of the Mass Transportation Act: Mass Transit Projects with a Significant Impact on the Quality of the Human Environment: The statement should include:
 - a. Evidence of the opportunity that was afforded for the presentation of views by all parties with a significant economic, social or environmental interest.
 - b. Evidence that fair consideration has been given to the preservation and enhancement of the environment and to the interests of the community in which the project is located.
 - c. If there is an adverse environmental effect and there is no feasible and prudent alternative, description of all planning undertaken to minimize such adverse environmental effect and statement of actions taken or to be taken to implement the planning; or a specific statement that there is no adverse environmental effect.

1. ENVIRONMENTAL ASSESSMENT (EA)

title 23, Code of Federal Regulations, Part 771, Environmental Impact and Related Procedures, describes those circumstances where the preparation of an EA is appropriate. The CEQ regulations require that an EA is to include the information listed in 40 CFR Part 1508.9. The following format, which assures this coverage, is suggested:

- a. Cover Sheet. There is no required format for the EA. However, it is recommended the EIS cover sheet format, as shown on page 5, be followed where appropriate. Since the EA is not formally circulated, there is no need to include the "comments due" paragraph.
- b. Description of the Proposed Action. Describe the locations, length, termini, proposed improvements, etc.
- c. Need. Identify and describe the problem which the proposed action is designed to correct. Any of the items discussed under the "Need" section in Section 3 (EIS - Format and Content) may be appropriate.
- d. Alternatives Considered. Discuss all reasonable alternatives to the proposed action which were considered. The EA may either discuss (1) the preferred alternative and the alternatives considered or (2) if the applicant has not identified a preferred alternative, the alternatives under consideration.
- e. Impacts. Discuss the social, economic and environmental impacts of the alternatives considered and describe why these impacts are considered not significant.
- f. Comments and Coordination. Describe coordination efforts and comments received from government agencies and the public. If the EA includes a Section 4(f) evaluation, the EA and the Section 4(f) evaluation may be circulated to the appropriate agencies for Section 4(f) coordination, or the Section 4(f) evaluation may be supplemented by any additional information necessary to properly explain the project and circulated as a separate document.
- g. Appendices (if any). Include only analytical information that substantiates an analysis which is important to the document. Other information should be incorporated by reference only.

Section 4(f) Discussion in Final Document

When the selected alternative involves the use of Section 4(f) land, a Section 4(f) evaluation may be included as a separate section in the final EIS or FONSI or for projects processed as categorical exclusions, in a separate final Section 4(f) evaluation. The final evaluation should contain:

- a. All information required above for a draft evaluation.
- b. A discussion of the basis for the determination that there are no feasible and prudent alternatives to the use of the Section 4(f) land. The supporting information must demonstrate that there are unique problems or unusual factors involved in the use of alternatives and that the cost, environmental impact, or community disruption resulting from such alternatives reaches extraordinary magnitudes.
- c. A discussion of the basis for the determination that the proposed action includes all possible planning to minimize harm to the Section 4(f) property.
- d. A summary of the appropriate formal coordination with the Headquarters Offices of DOI, and as appropriate, the Headquarters Offices of USDA and HUD.
- e. Copies of all formal coordination comments received and an analysis and response to any questions raised.
- f. Concluding statement as follows: "Based upon the above considerations, it is determined that there is no feasible and prudent alternative to the use of land from the (Section 4(f) property) and that the proposed action includes all possible planning to minimize harm to the (Section 4(f) property) resulting from such use."

A Section 4(f) approval is the written administrative record which documents the approval required by 23 U.S.C. 138. The Section 4(f) approval will be incorporated into either the final EIS or the ROD. When the Section 4(f) approval is contained in the ROD, the information noted in items (a) through (e) above may be incorporated by reference to the EIS. For a project processed as a categorical exclusion, any required Section 4(f) approval will normally be prepared as a separate document.

6. SECTION 4(f) EVALUATIONS—FORMAT AND CONTENT

Draft Evaluation—Format

- a. Describe proposed action (if separate document).
- b. Describe Section 4(f) resource.
- c. Impacts on resource (by alternative).
- d. Avoidance alternatives and their impacts.
- e. Measures to minimize harm.
- f. Coordination with appropriate agencies.
- g. Concluding statement (final document only).

In the case of a complex Section 4(f) involvement, it is desirable to include the analysis in a separate section of the draft EIS, EA, or for projects processed as categorical exclusions, in a separate document. A Section 4(f) evaluation should be prepared for each location within the project where the use of Section 4(f) land is being considered.

Draft Evaluation—Content

The following information should be included in the Section 4(f) evaluation, as appropriate:

- a. A brief description of the project and the need for the project (when the Section 4(f) evaluation is circulated separately).
- b. A detailed map or drawing of sufficient scale to identify essential elements of the highway/Section 4(f) land involvement.
- c. Size (acres or square feet) and location (maps or other exhibits such as photographs, sketches, etc.) of involvement.
- d. Type of property (recreation, historic, etc.).
- e. Available activities at the property (fishing, swimming, golfing, etc.).
- f. Description and location of all existing and planned facilities (ball diamonds, tennis courts, etc.).

- g. Usage (approximate number of users/visitors, etc.).
- h. Relationship to other similarly used lands in the vicinity.
- i. Access (pedestrian and vehicular).
- j. Ownership (city, county, State, etc.).
- k. Applicable clauses affecting the title, such as covenants, restrictions, or conditions, including forfeiture.
- l. Unusual characteristics of the Section 4(f) land (flooding problems, terrain conditions, or other features that either reduce or enhance the value of portions of the area).
- m. The locations (using maps or other exhibits such as photographs or sketches) and the amount of land (acres or square feet) to be used by the proposed project including permanent and temporary easements.
- n. The probable increase or decrease in environmental impacts (noise, air pollution, visual, etc.) of the alternative locations and designs considered on the Section 4(f) land users.
- o. A description of all reasonable and practicable measures which are available to minimize the impacts of the proposed action on the Section 4(f) property. Discussions of alternatives in the draft EIS or EA may be referenced rather than repeated.
- p. Sufficient information to evaluate all alternatives which would avoid the Section 4(f) property. Discussions of alternatives in the draft EIS or EA may be referenced rather than repeated. However, this section should include discussions of design alternatives (to avoid Section 4(f) use) in the immediate area of the Section 4(f) property.
- q. The determination that there are no feasible and prudent alternatives is not normally addressed at the draft EIS, EA, or preliminary document stage until the results of the formal coordination have been completed.
- r. The results of preliminary coordination with the public official having jurisdiction over the Section 4(f) property and with regional (or local) offices of DOI and, as appropriate, the regional (or local) office of USDA and HUD.

TITLE II - DEPARTMENT OF TRANSPORTATION

(This is an exact re-typing of the original Title II by the SHA)

11.01.06.02 Implementation of the Maryland Environmental Policy Act.

A. Policy

It is the policy of the Department of Transportation that the Department, and each of its Administrations, Agencies, Boards, Commissions, and other units, conduct its affairs with an awareness of its responsibility for the protection of the environment for the present and future. The Maryland Environmental Policy Act (ACT). Chapter 703 of the Laws of 1973, as codified in 1-301 through 1-305, Natural Resources article, Annotated Code of Maryland, mandates that State Agencies in balancing economic development and environmental quality, must engage in thoughtful consideration of the environmental effects of their proposed actions, including: ecological, socio-economic, developmental, recreational, historic, architectural, aesthetic, and other values, environmental assessment forms (EAF) and environmental effects reports (EER), as defined in the guidelines of the Department of Natural Resources adopted pursuant to the act, will be utilized by the Department to accomplish this purpose, as well as to increase public participation in the planning of Departmental projects and to provide the general assembly with additional social, economic, and natural environmental information to assist it in deciding upon legislative appropriations for projects in the annual capital budget.

The requirements of the act are consistent with and, in many respects, covered by the Maryland Action Plan adopted by the Department as regulation 11.01.06.01 to document departmental policy for the planning and development of all transportation improvements.

B. Statutory Requirements

"Proposed State Action"- is defined in 1-301(c) of the act as "Requests for legislative appropriations or other legislative actions that will alter the quality of the air, land or water resources. It does not include a request for an appropriation of other action with respect to the rehabilitation or maintenance of existing secondary roads".

The Act requires environmental effects reports only in connection with requests for legislative appropriations or legislative actions, which significantly affect the environment, natural as well as socio-economic.

C. Environmental Assessment Form and Environmental Effects Report

- (1) Environmental Assessment Form (EAF). An EAF will be completed for each of the proposed actions identified by the act and described in these guidelines.

The EAF (an example of which appears in Appendix A which is a part hereof) consists of a list of questions which can be answered "Yes" or "No" or "Comments Attached". The answers to the questions on the Environmental Assessment Form will assist in determining whether or not an environmental effects report will be prepared. An answer of "Yes" will generate a presumption in favor of preparation of an environmental effects report. However, this presumption may be overcome by the official preparing the assessment form by checking "Comments Attached" and explaining why an action in his opinion needs no environmental report even though some of the questions of the EAF are answered affirmatively.

It is anticipated that the use of the EAF early in the decision-making process will promote the objectives of the act by stimulating consideration by the Department of Environmental and Socio-Economic effects of the proposed action.

- (2) Environmental Effects Report (EER), an Environmental Effects Report (EER) will consist of an Environmental Assessment Form (See Appendix A) which will be attached to the front of every EER, and the body of the EER Report. The amount of detail provided in the report will be commensurate with the extent of the expected impact of the action. In general, the greater the magnitude of impact, the more detailed will be the discussion, for a particular action, some sections will be given more attention than others. Sections which are especially relevant to a particular action will be treated extensively. Nevertheless, each section will be given at least summary treatment. The body of every report shall contain the following sections:

A. Summary of Environmental Effects Report. The summary, the purpose of which is to enable the General Assembly and the public to determine quickly the nature, location, alternatives to, and effects of, any particular agency action, shall:

- (1) Identify Administration, Agency, Board, Commission or other unit of the Department, issuing the report and responsible official, and;
- (2) Provide a short summary (1 to 2 pages) of the information contained in the Environmental Effects Report (See Appendix B).

- B. A description of the proposed action. This shall include a concise statement of the ecological, socio-economic, and other objectives that the proposed action intends to fulfill, e.g. numerical expression, where appropriate of the increase in employment opportunities, new office facilities, and increase in per capita income where appropriate. The objectives will be discussed in the context of "State Plans," regional demand studies," or other broad frameworks. It shall also include:
- (1) The proposal by name;
 - (2) The specific locations of the proposed action shown on a map, and;
 - (3) A description of the extent (i.e., square feet, acres, miles of right-of-ways and other pertinent physical characteristics) of the project. The project description will contain a discussion of development associated with the proposed site and the secondary developments required by the proposed action including the need for utilities, other services, and transportation systems necessary to support the primary development of the site. Public facilities and public investments that might result if the proposed action is taken will be discussed. If the action is a portion of a larger action, then the relationship of the action under consideration to the larger action will be discussed. This historical background and current status of the proposed action in regard to engineering, construction, and activation schedule will be summarized. The cost of the action and the proposed method of financing will be identified.
- C. Alternatives to the proposed action. This section will include a description of the alternatives considered for meeting the objectives of the proposed action, alternatives may include:
- (1) No action;
 - (2) Deferring action, or;
 - (3) Other approaches to meeting the main objectives including:
 - A. Other locations for the proposal;

- B. Other ways to accomplish the objective;
- C. Different scaling of the development of the proposal (e.g., to provide greater coordination with community development plans and presently existing planned usage patterns);
- D. Other scheduling or timing of the proposal (e.g., to avoid potential disruptive effect on the local economy, or to assure adequate revenues to finance the proposal);

A comparison of environmental and socio-economic effects associated with the alternatives will be undertaken. Specific reasons for rejecting each alternative in favor of the present proposal will be stated.

- D. Environmental (ecological and socio-economic) setting without the action. This section will include both the regional and local setting of the project and address applicable considerations in the EAF and the environmental checklist provided in the following Section E.

- E. Adverse and beneficial environmental effects

- (1) The Environmental Considerations Checklist. The following list of environmental considerations will guide the development of the "Setting without the Action" and the adverse and beneficial environmental effects section. These factors, some of which may not be applicable to specific projects, may include, but are not limited to:

- A. Hydrology
- B. Geology
- C. Physiography and Geomorphology
- D. Climatology
- E. Soils
- F. Biotic consideration - plants/animals
- G. Aesthetic considerations

- H. Employment pattern considerations
 - I. Tax Revenue considerations
 - J. Impact on retention of current industry
 - K. Impact on attraction of new industry
 - L. Impact on attractiveness of area for tourism
 - M. Cultural and Socio-Economic considerations
 - N. Historical Considerations
 - O. Archeological Considerations
 - P. Land Uses
 - Q. Water Uses
 - R. Energy and Utilities
- (2) Adverse environmental effects include discussion of the reduction, conversion, loss, or other adverse effect on the quality or quantity of applicable environmental considerations.
- (3) Beneficial environmental effects address the renewal, conservation, preservation, enhancement, or other beneficial effect on the quality or quantity of the applicable environmental considerations.
- (4) Depth of analysis. The adverse environmental effects section and the beneficial environmental effects section will examine and discuss only those considerations of the environmental considerations checklist that the project or action significantly effects. Several factors may be considered in deciding how extensively a particular natural and socio-economic environmental consideration should be treated.
- A. The magnitude of the project (geographic extent and duration);
 - B. The extent to which the particular environmental consideration will be affected;

- C. The extent of which alternatives may result in different effects upon the particular consideration;
- D. The cost of the action (ecologic and socio-economic), both short-term and long-term). Assessment form covering each of these grant programs in a general manner will be prepared and submitted prior to the request for capital appropriations.
- F. Positive and negative environmental effects to be weighed against technical aspects. This section will include a consideration of the positive and negative environmental effects of the proposed action in light of the technical and economic aspects of completing the project.
- G. Measures taken to minimize adverse environmental effects and maximize beneficial environmental effects.
 - (1) Wherever appropriate, remedial, protective, or mitigating considerations such as monitoring, alternate employment opportunities, alternate sources of lost revenues, maintenance, replacement operations, and follow-up activities which could or will be undertaken as a part of the proposed action will be included.
 - (2) Also, wherever appropriate, measures which could or will be undertaken to maximize potential beneficial environmental effects will be included.
 - (3) Any legal requirements for mitigation, the cost of the design and construction of each mitigation measure, alternative mitigation techniques, and the basis for the choice of one mitigation technique over other possible approaches, will be discussed.
- H. Unavoidable adverse environmental effects. This section will include the following:
 - (1) A statement of the unavoidable detrimental aspects of the proposed action, which identifies the nature, extent, and the cost of the adverse effects;
 - (2) The objections to adverse effects raised by individuals or groups;

- (3) Assessment of the cumulative and long-term effects of the proposed action with particular attention given to aspects of the project that would narrow the range or versatility of the beneficial use of the natural socio-economic environment or pose long-term risks to health, safety, welfare or the economic or social betterment of the locality or the state;
- (4) An analysis of the effects of the proposal, as indicated in the EAF (Appendix A), and the Environmental Checklist (.02C(2)E).

I. Coordination with other interested parties. A description of the coordination and liaison relationship established in developing the proposal and the environmental effects report will be included. This section may include: participation of the business community, public and citizen groups, government agencies, and academic institutions.

D. Development of EAF and EER

(1) Legislation. Regardless of whether a request for legislative action is initiated by the Department, the Department is responsible for the preparation of an EAF and, where appropriate and practicable, an EER for any request which will ultimately require action by the Department. The Administration, Agency, Board, Commission, or other unit in the Department affected by the proposed legislation will prepare at least an EAF for submission through the Department of Fiscal Services to the appropriate Legislative Committee. The procedure is contemplated to be similar to the one now utilized in completing a Fiscal Report on proposed Legislation.

(2) Capital Projects.

A. The Activities of the Department involve many areas including:

- (1) Planning, Design and Construction of rapid transit, highway, airport, port, and bus facilities in the State;
- (2) Programs of Transportation assistance to local and regional bodies, and;
- (3) Regulation of transportation operations, mainly through licensing and registration requirements.

- B. An EAF will be prepared early in the decision-making process to assist in determining whether actions related to any of these areas significantly affect the environment. After completion of the EAF, the Department will determine whether an EER will be prepared. The actual writing of the report may not begin until the proposal has some defined scope and general characteristics; but environmental impacts analysis will be an integral part of developing the proposal.
- C. The timing and type of community and public agency involvement in this analysis will be determined on a case by case basis in conformance with the policies outlined in the Department's action plan, as adopted by 11.01.06.01.

- (1) State system projects. The Department's capital budget request asks for program rather than specific project appropriations. Therefore, the forms and reports will be related to phases of project development as defined in the action plan and the Consolidated Transportation

Program which supplements the budget request. The form and, when necessary, report will be developed for State projects during the planning phase which is the first phase of the project development. The scope and general characteristics of the project are defined during this phase. The reports will be available to the public and submitted to the State Clearinghouse and Department of Fiscal Services prior to next phase of project development, i.e., final design, in which the detailed specifications of the project are defined. The design phase precedes the time a state project is scheduled for right-of-way acquisition and construction in the Department's Consolidated Transportation Program. Thus, the reports will be on file prior to the request to fund the budget year of the Consolidated Transportation Program in which the right-of-way or construction phases of the project are scheduled to start.

- (2) State-aided local projects Capital budget appropriations for the Department's Programs of Transportation Assistance to local jurisdictions are requested, prior to the time, detailed information on specific projects is available. Therefore, an Environmental Assessment Form covering each of these grant programs in a general manner will be prepared and submitted prior to the request for capital appropriations.

E. Circulation

A major aim of the Maryland Environmental Policy Act is to provide notice of actions, which have environmental effects, prior to legislative action. To that end, the following procedures are established:

- (1) All environmental assessment forms and environmental effects reports shall be available for inspection by the public at the operating administration within the Department which prepared the reports, and copies will be available from the Department upon written request free of charge to the fullest extent possible. All forms and reports will also be submitted to the Department of Fiscal Services for the information of the General Assembly.
- (2) The Department shall file copies with the State Clearinghouse which will prepare a list by title of every environmental effects report or environmental assessment form filed in the preceding month, naming the Department and including a short description of the locale affected and the amount of funds requested. Monthly, the list will be distributed by State Clearinghouse to:
 - A. All members of the State General Assembly;
 - B. Selected State Agencies;
 - C. All newspapers, private citizens, and citizen groups who request such listing and pay a subscription fee.

F. Related Federal requirements

- (1) Many programs and projects of the Department use Federal Funds and are therefore subject to National Environmental Requirements. Most of these projects, for example, come within the coverage of the National Environmental Policy Act (NEPA), passed by the congress in 1960 and effective as of January 1, 1970. In many respects, the Environmental Impact Statement and the Environmental Effects Report required under the Maryland Environmental Policy Act (ACT) are similar both in purpose and in content.
- (2) The Federal law and the State law clearly overlap in many respects. The Maryland Department of Transportation feels it would be inefficient to duplicate the effort involved in preparing a separate State Environmental Effects Report on any program or project for which a Federal Environmental Impact Statement is also required. Therefore, one report will be developed covering the requirements under both laws.

- (3) When a program or project of the Maryland Department of Transportation comes under the National Environmental Policy Act and the responsible Federal official issues a negative declaration's statement which says that in his view the proposal does not significantly affect the quality of the human environment nor is it a major federal action and therefore an Environmental Impact Statement is not required). That negative declaration will be included with the Environmental Assessment Form, and no Environmental Effects Report will be developed.

G. Unaffected Projects

The following types of capital improvements are not subject to the reporting requirements of these procedures either because they do not significantly affect the environment or because they are not the subject of "Proposed State Action" (i.e., there is no specific request for legislative appropriation of other legislative action for such improvements).

- (1) Installation, modification, or renewal of navigational, traffic control, and safety equipment such as signing, signalization, lighting, fencing, freeway surveillance and control systems, railroad protective devices, roadway grooving, glare screens, safety barriers and energy attenuators;
- (2) Interior or exterior renovation of transportation facilities which does not significantly increase capacity;
- (3) Overlay or resurfacing of existing taxiway, runway, ramp, roadway, and parking lot surfaces;
- (4) Modernization and improvement of existing highways by resurfacing, reconstruction of roadbeds, widening less than single lane width, adding shoulders, adding auxiliary lanes for localized purposes, correcting substandard curves and intersections, spot improvements, drainage improvements, erosion control, and channelizations;
- (5) Addition of scenic lands, rest areas, and scenic overlooks without sewage discharge;
- (6) Junkyard and outdoor advertising control projects;
- (7) Traffic noise attenuation projects;
- (8) Reconstruction of grade separations.

APPENDIX A

ENVIRONMENTAL ASSESSMENT FORM (EAF)

This form is to assist the reviewers in determining whether a proposed action could cause significant natural and socio-economic environmental effects and thus require an environmental effects report.

Department _____ Division _____
 Other _____ Project Title _____
 Predicted dates: Commencement _____
 Completion _____ Projected Cost _____

I. Background

- A. Give a brief description of the proposed action/project(s).
- B. Describe the geographical area(s) which will be affected by the action/project(s); specifically locate the project by using the Maryland Coordinate Grid System; include distinguishing natural, and man-made features and a brief description of the present use of the area(s). Include a suitable location map (sketch map or copy of U.S. Geological Survey Map, etc.).

II. Assessment of Significant Environmental Effects

The following questions should be answered by placing a check in the appropriate column(s). If desirable, the "Comments Attached" column can be checked by itself or in combination with an answer of "Yes" or "No" to provide additional information or to overcome an affirmative presumption.

In answering the questions, the significant beneficial and adverse, short and long term effects of the proposed action, on-site and off-site, during construction and operation should be considered.

All questions should be answered as if the agency is subject to the same requirements as a private person requesting a license or permit from the State or Federal government.

YES NO COMMENTS
ATTACHED

A. Land Use Considerations

1. Will the action be within the 100 year flood plain?

Attachment D

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u> <u>ATTACHED</u>
2. Will the action require a permit for construction or alteration within the 50 year flood plain?	_____	_____	_____
3. Will the action require a permit for dredging, filling, draining, or alternation of a wetland?	_____	_____	_____
4. Will the action require a permit for the construction or operation of facilities for solid waste disposal including dredge and excavation spoil?	_____	_____	_____
5. Will the action occur on slopes exceeding 15%?	_____	_____	_____
6. Will the action require a grading plan or a sediment control permit?	_____	_____	_____
7. Will the action require a mining permit for deep or surface mining?	_____	_____	_____
8. Will the action require a permit for drilling a gas or oil well?	_____	_____	_____
9. Will the action require a permit for airport construction?	_____	_____	_____
10. Will the action require a permit for the crossing of the Potomac River by conduits, cables or other like devices?	_____	_____	_____
11. Will the action affect the use of a public recreation area, park, forest, wildlife management area, scenic river or wildland?	_____	_____	_____
12. Will the action affect the use of any natural or man-made features that are unique to the County, State, or Nation?	_____	_____	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u> <u>ATTACHED</u>
13. Will the action affect the use of an archeological or historical site or structure?	---	---	_____
B. Water Use Considerations			
14. Will the action require a permit for the change of the course, current, or cross-section of a stream or other body of water?	---	---	_____
15. Will the action require the construction, alteration, or removal of a dam, reservoir, or waterway obstruction?	---	---	_____
16. Will the action change the overland flow of storm water or reduce the absorption capacity of the ground?	---	---	_____
17. Will the action require a permit for the drilling of a water well?	---	---	_____
18. Will the action require a permit for water appropriation?	---	---	_____
19. Will the action require a permit for the construction and operation of facilities for treatment or distribution of water?	---	---	_____
20. Will the project require a permit for the construction and operation of facilities for sewage treatment and/or land disposal of liquid waste derivatives?	---	---	_____
21. Will the action result in any discharge into surface or sub-surface water?	---	---	_____
22. If so, will the discharge affect ambient water quality limits or require a discharge permit?	---	---	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u> <u>ATTACHED</u>
C. Air Use Considerations			
23. Will the action result in any discharge into the air?	_____	_____	_____
24. If so, will the discharge affect ambient air quality limits or produce a disagreeable odor?	_____	_____	_____
25. Will the action generate additional noise which differs in character or level from present conditions?	_____	_____	_____
26. Will the action preclude future use of related air space?	_____	_____	_____
27. Will the action generate any radiological, electrical, magnetic, or light influences?	_____	_____	_____
D. Plants and Animals			
28. Will the action cause the disturbance, reduction, or loss of any rare, unique or valuable plant or animal?	_____	_____	_____
29. Will the action result in the significant reduction or loss of any fish or wildlife habitats?	_____	_____	_____
30. Will the action require a permit for the use of pesticides, herbicides or other biological, chemical, or radiological control agents?	_____	_____	_____
E. Socio-Economic			
31. Will the action result in a pre-emption or division of properties or impair their economic use?	_____	_____	_____
32. Will the action cause relocation of activities or structures, or result in a change in the population density of distribution?	_____	_____	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u> <u>ATTACHED</u>
33. Will the action alter land values?	___	___	_____
34. Will the action affect traffic flow and volume?	___	___	_____
35. Will the action affect the production, extraction, harvest or potential use of a scarce or economically important resource?	___	___	_____
36. Will the action require a license to construct a sawmill or other plant for the manufacture of forest products?	___	___	_____
37. Is the action in accord with federal, state, regional and local comprehensive or functional plans-including zoning?	___	___	_____
38. Will the action affect the employment opportunities for persons in the area?	___	___	_____
39. Will the action affect the ability of the area to attract new sources of tax revenue?	___	___	_____
40. Will the action discourage present sources of tax revenue from remaining in the area, or affirmatively encourage them to relocate elsewhere?	___	___	_____
41. Will the action affect the ability of the area to attract tourism?	___	___	_____
F. Other Considerations			
42. Could the action endanger the public health, safety, or welfare?	___	___	_____

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u> <u>ATTACHED</u>
43. Could the action be eliminated without deleterious affects to the public health, safety, welfare, or the natural environment?	---	---	_____
44. Will the action be of statewide significance?	---	---	_____
45. Are there any other plans or actions (Federal, State, County or Private) that, in conjunction with the subject action, could result in a cumulative or synergistic impact on the public health, safety, welfare, or environment?	---	---	_____
46. Will the action require additional power generation or transmission capacity?	---	---	_____
G. Conclusion			
47. This agency will develop a complete environmental effects report on the proposed action.	---	---	_____

APPENDIX B

SUMMARY OF ENVIRONMENTAL EFFECTS REPORT

Attached to the front of every Environmental Effects Report should be 1 to 2 page summary in substantially the following form:

Letterhead of issuing agency (or: "This Statement has been issued by (name of agency).").

1. Kind of action: _____ request for legislative appropriation, i.e., requests for capital budget items, requests for encumbrances upon special funds for trusts, and bond issues.

_____ Other legislative action, i.e., requests for proposed legislative acts and/or expansion of existing acts or agency authority, or passage of laws which will require legislative appropriation.

2. Official responsible for issuance of this statement (name, address, telephone).
3. Official responsible as a contact for questions in regard to the Environmental Effects Report.
4. Name, location, and brief description of the action.
5. Summary of Environmental Effects for the following:

Comments	None	Adverse	Beneficial
A. Land _____ _____	—	—	—
B. Water _____ _____	—	—	—
C. Air _____ _____	—	—	—
D. Plants _____ _____	—	—	—
E. Animals _____ _____	—	—	—

F. Socio-Economic _____

G. Other _____

6. List of Alternatives considered.
7. List all Federal, State, and local agencies and other sources from which written comments have been requested.
8. Date statement was sent to clearinghouse.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
Section V
HIGHWAY DESIGN
FINAL DESIGN
PHASE IV**

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section V

HIGHWAY DESIGN

FINAL DESIGN

PHASE IV

A. PURPOSE

The purpose of this Section of the Specifications is to describe the scope of work required of a Consultant for Phase IV final design services, which begin after combined location/design approval and conclude with the advertisement of the project for bids, unless otherwise directed by the Highway Administration. Refer to the "CRITICAL PATH NETWORK" (C.P.N.) contained elsewhere herein for Highway Design functions.

B. GENERAL

1. Objective of Final Design

The objective of Final Design is to provide the complete engineering design for the project, including all necessary supporting documents, computations, metes and bounds right-of-way plats, right-of-way property plans (if a Federal-Aid Project), special provisions, estimates, detailed roadway plans and structure plans complete and approved ready for advertisement for bids.

Included in the roadway design shall be the preparation of plans and metes and bounds plats for and participation in, the preliminary field investigation, semi-final and final review, as directed by the Highway Administration. At the direction of the Highway Administration, the Consultant shall provide the necessary contacts, professional advice, public relations, field and office work required in the performance of these services.

The Consultant shall make as many contacts and field trips as deemed necessary by the Highway Administration to resolve problems that occur during design.

Before publishing any document, brochures, etc., concerning Highway Administration projects, the Consultant shall obtain written approval from the Highway Administration.

2. Refinement in Phase IV

The Consultant, upon receiving notice to proceed for final design services, shall make an inventory of available data and information required to complete final documents. Using the approved location/design alignment, the Consultant shall further refine the design, including minor shifts in the alignment which take into consideration hydraulic/hydrologic impact, adjacent property impact, revised traffic volumes and further improvement of horizontal and vertical geometrics. Additionally, when directed by the Administration the Consultant will perform major design studies (MDS) including major alignment shift studies, interchange alternates, intersection alternates, access studies, etc. These studies shall be completed using mandays allotted in the contract agreement and whose times and percentages shall be kept separately and not included in the normal design activities of the contract design.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

1. General

The Consultant shall provide all services as set forth in this Section of the Specifications and as referenced and/or described in Section I of the Specifications for Consulting Engineers' Services. The Consultant shall provide the necessary contacts, professional advice, public relations, field and office work required in the performance of this service as directed by the Highway Administration.

2. Governing Geometric Design Regulations

The scope of work performed by the Consultant for Phase IV services for a project shall be in compliance with the current approved State of Maryland Action Plan describing the Transportation Planning Process, Highway Development Manual, and in conformance with all current applicable Federal Highway Administration guidelines published in the Federal Aid Highway Program Manual and these Specifications.

The standards referred to and recommended in the American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration's publication relative to highway safety will be used to the extent applicable as determined by the Highway Administration. The horizontal and vertical alignments developed by the Consultant will be the best engineering and environmental solution to a given problem and not merely an adherence to the minimum American Association of State Highway and Transportation Officials (AASHTO) and State Highway Administration Standards.

3. Liaison Office

The Highway Administration will designate a Liaison Office and Project Engineer, who shall be the representative of the Highway Administration for the project. It is expected that the Consultant shall seek and receive advice from various state, regional, and local agencies, however, the final direction on all matters of the project remains with the State Highway Administration Project Engineer.

4. Meetings and Presentations

The Consultant and his staff shall be available with no more than a five (5) workday notice to attend meetings or make presentations at the request of the Highway Administration. Such meetings and presentations may be held at any hour between 8:00 A.M. and 12:00 midnight on any day of the week. The Consultant may be called upon to provide maps, press releases, advertisements, audio-visual displays and similar material for such meetings.

The Consultant shall be responsible for preparation and reproduction of minutes and other records of all such meetings.

5. Correspondence

Copies of all written correspondence between the Consultant and any party pertaining specifically to the engineering design of this project shall be provided to the Highway Administration for its records within one (1) week of the receipt or sending of such correspondence.

6. Schedule

Within ten (10) days of the Notice to Proceed, the Consultant shall provide a schedule of calendar deadlines by task and sub-task, based on the schedule in Section I of these Specifications, for approval by the Highway Administration and inclusion in its automated project management and scheduling system. The format for the schedule shall be compatible with this system. Deadlines for specific tasks and sub-tasks as set forth in the schedule shall be met promptly according to the terms set forth in subsequent paragraphs hereof.

7. Progress Reports

The Consultant shall provide to the Highway Administration, on a monthly basis, progress reports, which describe the work performed on each task, problems encountered, man-hours expended by each member of the Consultant firm, and the total dollar expenditure on the project by task during the reporting period. Progress reports shall be delivered to the Highway Administration within two (2) weeks of the monthly reporting period concurrent with the monthly invoice.

Progress against the project schedule shall be reported monthly by task in a format compatible with the Highway Administration's automated project management and scheduling system.

Judgement on whether work of sufficient quality and quantity has been accomplished will be made by the Highway Administration Project Engineer by comparing the progress reported by task against the amounts expended by task. Payment will not be made for work on tasks done in a different sequence than shown on the schedule unless approved in writing by the Bureau of Highway Design in advance of the task being performed.

8. Key Personnel

The Consultant's work shall be under the direction and control of the key personnel submitted in the Technical Proposal. Any changes in the indicated personnel shall be subject to review and approval by the Highway Administration.

9. Sub-contractors

Sub-contractors and key personnel thereof shall be as identified in the Technical Proposal. Any changes in sub-contractors or key personnel thereof shall be subject to review and approval by the Highway Administration.

10. Design Services

As directed by the Highway Administration, the Consultant shall:

- a. Refine and analyze the "Approved Design Study" from the standpoint of projected traffic data and in accordance with State Highway Administration and American Association of State Highway and Transportation Officials (AASHTO) design criteria and practices. The analysis shall include traffic capacity, level of service (LOS), weave analysis, and number of lanes on the mainline, interchanges and intersections. The Consultant will make necessary revisions to the "Approved Design Study", make additional design studies as required, prepare the necessary cost estimates, and submit a report of his findings. All layouts submitted for review and/or presentations shall include the aforementioned data.
- b. Indicate all the utility information obtained by the Administration on the detailed contract drawings. The necessary plans for changes to the utilities as prepared by the utility owners, as well as agreements and work schedules, shall be coordinated by the Consultant through the District Utility Engineer and included in the plans and special provisions.
- c. Participate in periodic visits to the project site, meetings, conferences, pre-bidding sessions, hearings, etc.

- d. Submit activity report forms in accordance with Critical Path Method (CPM) or other project monitoring system.
- e. Prepare request(s) for survey(s).
- f. Prepare various estimates per Highway Administration directive as required to support studies, reports, and Maryland Highway Programs to accompany plan submissions.
- g. Develop, at the time of the Preliminary Field Investigation services, an earthwork analysis and updated construction cost estimate. Dependent upon the analysis, the Consultant shall be required to adjust the grades to balance the total cuts and fills of the project.
- h. Prepare various supporting documents per Highway Administration directives.
- i. Establish pavement control elevations using Highway Administration computer program or by a method approved by the Highway Administration.
- j. Prepare exhibits for agreements, permit applications, road closings, etc. and participation in hearings, and community meetings, when applicable.
- k. Prepare data and reports and regulatory permit applications required by various governmental authorities. To fully evaluate impacts from activities located in the base floodplain and to determine what practical mitigating measures are feasible (see Part II, Chapter 1 of the State Highway Administration (S.H.A.) Drainage Manual).
- l. Design Stormwater Management basins and/or related impoundments, as required.
- m. Design erosion and sediment control facilities in accordance with latest Water Resources Administration criteria.
- n. Perform a review to establish right-of-way requirements for the project and establish impacts to adjacent properties (i.e. denial of access, impacted-entrances, extra land parcels, etc.).
- o. The Consultant will mark development plats, individual property owner requests, etc., regarding the effects of the project on the properties in question.
- p. Review proposed utilities and relocations of existing utilities.

- q. Coordinate work with local developers, political subdivisions and officials.
- r. Provide data for the preparation of Federal-Aid program data for construction.
- s. The Consultant shall prepare the contents of letters from Highway Administration personnel to other agencies, public officials, concerned citizens, etc.
- t. The Consultant shall make the maximum use of existing information available from State, regional, local agencies, private sources, and his own files.
- u. Other services required by State Highway Administration Drainage Manual.

11. Engineering Standards

Roadways are to be designed in accordance with policies and other publications issued by the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration, and the State Highway Administration. State Highway Administration projects will use desirable or preferred criteria for its projects. Hydraulics structures must conform to State and Federal Regulatory requirements.

The Consultant shall perform all engineering services in accordance with the standards, (including standard plates for design), directives, Highway Development Manual, State Highway Administration (S.H.A.) Drainage Manual and instructions of the Highway Administration.

12. General Drafting Practices

a. Plotting of Survey

The survey will be plotted on a continuous roll map of linen or plastic drafting film. The map will show the plan and profile in ink to the scale of 1"=50' horizontal and 1"=10' vertical, or to another scale as may be directed by the Highway Administration.

If not furnished by the Highway Administration, the Consultant shall plot all cross sections referenced and normal to the "Base Line of Construction" for the mainline, and on all spur lines, for the entire length of the Project.

The cross sections shall be plotted and clearly designated by station and datum.

Plotting of the original ground line shall be in ink on standard cross section sheets, to the horizontal and vertical scale established by the Highway Administration.

All utilities involved shall be located both horizontally and vertically on every pertinent cross section.

Each cross section sheet shall be identified by contract number, Project description, and sheet number.

If the Consultant receives a roll of computer-plotted cross sections from the Highway Administration, he shall process it as follows:

1. Cut the roll into individual cross section sheets, 22" x 36", or 22" x multiples of 36" pasted together and folded to 22" x 36" size.
2. Affix completed title block to each sheet.
3. Add other data to sheets as required, including the proposed template(s), profile grade, and earthwork figures, or as directed by the Highway Administration.

b. Tracings

Tracings are required for all construction drawings. All roadway tracings shall be made in ink on standard sheets furnished by the Highway Administration. If the horizontal scale of 1"=50' is adopted, an average of 12 stations of plan and profile shall be shown on each sheet and adjusted accordingly should a lesser or greater scale be authorized by the Highway Administration. Other means of producing the base plan sheets shall first be submitted to the Administration for approval.

c. Lettering

1. Highway Plans

The size of all lettering and dimensioning shall be a minimum height of 1/8", and the spacing between lines shall be a minimum of 1/16". All lettering shall be such that it may be reduced 50% without loss of legibility.

d. Utilities

Plans shall show, in both plan and elevation views, existing and proposed utilities both above and below ground (with identifying number and name of owner), such as poles,

transmission towers, water, oil, electric, gas, sanitary sewers, pipe lines or conduits, meters, fire hydrants, manholes, valves, and all other appurtenances connected therewith. Plans to identify test pits required to perform utility design shall be prepared by the Consultant.

13. Contract Limits

It shall be the Consultant's responsibility to make recommendations regarding the Limit of Work. The actual limits of the project shall be determined by the Highway Administration. The Consultant will be informed of these limits after approval of preliminary plans.

Division of the project into separate roadway and/or structure contracts shall also be determined by the Highway Administration and shall not itself constitute the basis of a claim for additional compensation.

14. Preliminary Field Investigation and Report

Prior to the Preliminary Field Investigation (for line, grade, drainage, etc.), surveys, design, plans, and metes and bounds plats shall be completed only to the extent directed by and to the satisfaction of the Highway Administration.

As the need for design exceptions to American Association of State Highway and Transportation Officials (AASHTO) are identified, the Consultant shall prepare the necessary backup data to support the design exception request. All design exceptions are to be recognized and requested by the Preliminary Field Investigation.

As a minimum, preliminary plans shall contain complete topographic and cultural details (including utilities) and a comprehensive design recommendation for initial and ultimate construction, including traffic data, title sheet, typical cross sections noting the Highway Development plates used for improvement (to be removed after Preliminary Inspection), survey references, pavement and shoulders or curbs, slope ratios and limits, hydraulic data, preliminary locations of detention, retention or wet ponds, road closings, conceptual traffic control plan (including detours), right of way requirements, etc. The title sheet shall include concise pencilled data presenting estimated construction cost and earthwork analysis. Following the submission of the preliminary inspection plans no highway work shall be performed unless otherwise directed in writing or verbally instructed for which the Consultant shall document in writing, to the Highway Administration.

The Consultant shall prepare a preliminary drainage report, calculations and plans for the subject project. The preliminary report shall address the following:

- a. An analysis of the existing culverts or ditches for the existing and proposed headwater pools shall be performed. Culverts shall be designed to carry the ultimate functional classification storm under the highway.
- b. Determine the Right of Way requirements for stormwater management. These requirements are preliminary and subject to refinement in final design. For guidance, see "Highway Drainage Manual".
- c. Review the project for infiltration practices/water quality. Determine the locations unsuitable for infiltration by reviewing the existing soil maps. In all remaining areas water quality information should be addressed. This includes side ditches, SWM ponds and retention ponds. The latest manuals including "Standards and Specifications for Infiltration Practices" should be used for the design criteria.
- d. Prepare recommendations for stormwater management waivers. This should be based upon the latest SHA/WRA guidelines for State and Federal Projects. All waiver requests shall provide the appropriate back-up data. The discussion should reference the specific guidelines and note what effects may occur downstream. Sensitive downstream areas should be noted.
- e. Prepare the preliminary Hydrologic/Hydraulic report. The report's format shall be in accordance with the latest SHA/WRA directives.

Consultant shall submit good quality sepias (or equivalent) of preliminary plans, right of way plats and right of way property plans for printing and distribution by the Highway Administration.

The Consultant shall participate in the Preliminary Field Investigation and Preliminary Review Conference and prepare minutes for each of the meetings.

The Consultant, having temporarily halted productive design work, shall not resume his effort until in receipt of Highway Administration approval in writing in the form of a comprehensive Preliminary Field Investigation Report recommending corrections and revisions to be accomplished to advance the project to Semi-Final or Final Review. Verbal approval, to be documented by the Consultant, may be given to proceed with certain phases of the work.

15. Metes and Bounds Right of Way Plats (and Right of Way Property Plans if Federal-Aid Project)

This activity is described in a separate section of the Specifications.

When final design is sufficiently completed, final right of way requirements are established. Thereupon, metes and bounds plats (and right of way property plans if a Federal-Aid Project) will be issued for recordation.

16. Semi-Final Reviews

A "Semi-Final Review Meeting" will be conducted between the Bureau of Highway Design and District Office personnel shortly after the Right of Way Plats are issued, or at 50% stage of completion when no Right of Way is required.

The plans submitted for the Semi-Final Review shall incorporate all corrections and revisions resulting from the Preliminary Field Investigation.

The purpose of the meeting is to allow District input in the design prior to the project reaching Final Review stage, when design revisions are likely to affect the advertisement schedule.

The meeting will be attended by the Bureau of Highway Design, the Consultant, District Traffic Engineer and the District Engineer (D.E.) or his representative.

A "Semi-Final Review Report" shall be prepared by the State Highway Administration using the same format as Preliminary Investigation (P.I.) and Final Review (F.R.) Reports. The report shall specify any increases in construction cost and any effects the revisions would have on the advertisement schedule. The Consultant shall prepare minutes of this meeting.

17. Final Design and Final Review and Report

a. Content of Plans

Final review plans are those which have been corrected in accordance with the Preliminary Review Report, Semi-Final Review and developed to the extent described hereinafter.

At this stage, design and computations are essentially complete. As a minimum, final review plans shall contain, in addition to the information required for preliminary plans, the following design elements inked accurately, neatly, and properly on tracings:

- (1) Complete design of incidental details, such as but not limited to erosion and sediment control devices, roadside appurtenances, superelevation graphics, ditch sections, guard rail explanatory notes and references, etc.
- (2) Complete design of grading, including variable slopes and contour grading.
- (3) Complete design of all pavements in both plan and profile, including intersections, channelizations, interchanges, speed change and turning lanes.
- (4) Complete design of shoulders, curbs, sidewalk, guardrail and other roadside appurtenances.
- (5) Traffic Control Plan to appropriate scale.
- (6) Complete construction notes on plan sheets. The disposition of each existing utility shall be explained by appropriate note. All curve, spiral, and super-elevation data shall be clearly shown, together with all reference points, ties and offsets to survey points.

Soils report data shall be incorporated on both plan and profile. Right of way and access control lines and all slope line limits shall be shown on all plans. Sight distance shall be shown on profile.

- (7) All plan view drawings shall include coordinated values of horizontal control points, directional arrows, bench marks, north (meridian) arrow, scale, etc.
- (8) Geometric layout and/or survey set up sheet(s) showing the control traverse and ties to all centerline control points.
- (9) Semi-final summation of all contract items and their corresponding quantities in categories in accordance with the Highway Administration's "Construction Items by Category and Code" book. All contract items and their corresponding quantities shown on the Contract Summary of Quantities sheet and in the Engineer's Estimate shall be identical.
- (10) Complete analysis of earthwork in accordance with Highway Administration practice.
- (11) Breakdown of quantities as required for Federal-Aid participation and breakdown of all lump sum items.

b. Final Hydrologic/Hydraulic Design

Upon receipt of State Highway Administration (SHA) and Water Resources Administration (WRA) comments on the preliminary drainage report, final stormdrain, side ditch, culvert and Stormwater Management (SWM) facilities design shall commence.

- (1) All stormdrain systems shall meet the criteria set forth in the "Highway Drainage Manual" and its revisions. All appropriate State Highway Administration (SHA) design charts from this manual shall be used.
- (2) Culverts shall be designed to pass the highway's functional classification storm under ultimate development. The proposed 100 year storm discharges shall be checked such that the headwater elevation is less than or equal to the existing/ pre-highway water surface elevation. See Highway Drainage Manual for details. Energy dissipating structures shall be investigated at all outfalls.
- (3) All outfalls shall be investigated beyond the limits of construction. This investigation shall consist of a visual inspection of the outfall (take photographs where necessary) and shall consider the impacts that State Highway Administration's (SHA's) runoff will have upon stream channels, undersized pipes, ditches, and adjacent properties. Recommendations shall be prepared concerning the impact so that any problems can be properly addressed prior to construction.
- (4) Final stormwater management design shall be completed. The stormwater management (SWM) plan shall consider both water quality and quantity as a total management system. Water quantity controls for the appropriate year storms shall be provided through retention/detention ponds. Water quality control, through retention, infiltration trenches, and swales with check dams and other means shall be investigated and provided where feasible throughout the project's length. The quality control effects of these systems shall not be accounted for in peak control, unless a peak control infiltration system is proposed.

- (5) The final stormwater management report shall follow the same guidelines as the preliminary stormwater management (SWM) report. The Consultant shall address all comments made by the Water Resources Administration, Corps of Engineers and State Highway Administration.

All incorrect or voided computations shall be excluded from this report. This report shall also address final headwater elevations at all culverts. Under the summary section of this report, a table or tables with the following information shall be provided: existing and proposed headwater elevations, discharges, velocities and Froude numbers for the 2, 10, and 100 year storms, existing development. Three copies of the final SWM report shall be forwarded to the SHA.

- (6) Final Drainage Report shall include all supporting computations for ditches, stormdrains inlets, hydraulic gradients, drainage area maps, zoning information and back-up data not submitted with the stormwater management (SWM) report. This document shall be organized and clearly labeled. Three copies shall be forwarded to the State Highway Administration (SHA).
- (7) All Erosion and Sediment Control design shall conform to the Water Resources Administration regulations (COMAR 08.05.01) titled "Erosion and Sediment Control" and be in conformance with the latest State Highway Administration directives concerning erosion and sediment control.

Erosion and Sediment Control Design shall include all design computations for traps, ponds, temporary diversions for pipes, ditches, stream crossings, and stormdrains, as well as any construction procedures which are required for a proper sediment control plan. A Sediment Control report for all design computations shall be included with the stormwater management (SWM) submission to Department of Natural Resources (DNR).

- c. Draft of Special Provisions, see paragraph C-19, "Special Provisions", for content.
- d. At the Final Review stage, the Consultant shall prepare a detailed Final Review Engineer's Estimate, including all items, a breakdown of structure quantities (Lump Sum Breakdown) to be used for programming and the establishment of working days.
- e. No more of the Consultant's Phase IV services shall be performed prior to Final Review unless otherwise directed in writing by the Highway Administration. Verbal approval may be given to proceed with final plan with the exception of unresolved issues.
- f. The Consultant shall submit all original plan sheets, a copy of the "Final Review Engineer's Estimate" and a copy of the draft Special Provisions for printing and distribution by the Highway Administration.
- g. The Consultant shall attend and participate in the Final Review meeting and prepare minutes.
- h. The Consultant, having temporarily halted productive design work, shall not resume his effort until in receipt of Highway Administration approval in writing in the form of a Final Review Report recommending corrections and revisions to be accomplished to complete the plans, special provisions and estimates for advertisement.

18. Final Roadway Plans

a. Content of Plans

Final roadway plans are those which have been corrected in accordance with the Final Review and report and are complete and ready for advertisement for bids, that is 100% complete. As a minimum, completed plan shall contain, in addition to the information required for final review plans, the following:

- (1) The Title Sheet, 22" x 36", which shall show the complete layout of the Project, including stations identifying the limits of work, to a scale of 1" = 1 mile or 1" = 2,000 feet, whichever is most appropriate to the project. The Title Sheet shall also include contract numbers and descriptions, an index of sheets, the design speed of the highway, conventional symbols,

soil legend, scale, type and extent of access control, appropriate metes and bounds right of way plat numbers, appropriate notes, and design traffic data. Numbers of all survey books pertaining to and within the limits of a specified contract shall be shown on the Title Sheet as follows:

Book Number

Centerline _____

Traverse _____

Cross Sections _____

The Title Sheet shall contain the endorsement and recommendation of the Professional Engineer, registered in the State of Maryland, who supervised the preparation of the plans.

For additional requirements for Bureau of Bridge Design Title Sheets, see Bureau of Bridge Design Policy and Procedure Memorandum.

The Title Sheet shall provide the necessary State Highway Administration and Federal Highway Administration signature blocks.

- (2) Typical cross sections of improvement sheets which shall contain in complete detail the normal and super-elevated roadway sections, location, type, and thickness of paving and shoulders or curbing and sidewalk, as well as similar data for all frontage roads, detours, intersecting roads, entrances, channelizations, interchanges, etc.

These typical cross sections shall generally conform to the "Typical" standards of the Highway Administration and shall clearly define pavement and shoulder cross slopes, the profile grade line, the profile ground line, the point of crown or rotation and the point of application of the profile grade elevation. These sheets shall also show widths of grading, slopes to be used in cuts and fills, extent of rounding at tops of fill slopes and tops of cuts, guard rail, landscaping, the "Base Line of Right of Way", the limits of right of way, the ultimate section(s), "Base Line of Construction", erosion and sediment control details, miscellaneous details (including non-standard details), explanatory notes and references, etc.

- (3) Complete summation of all contract items and their corresponding quantities.

19. Special Provisions

The Consultant shall prepare all special provisions required in addition to the Highway Administration's "Specifications for Materials, Highways, Bridges, and Incidental Structures", as amended, for the proper and efficient construction of the project.

The Consultant shall be responsible for a thorough knowledge of the Specifications and any and all amendments thereto, as well as Interim Specifications Addenda (I.S.A.) approved for inclusion in contract documents.

The Consultant shall prepare Special Provisions only for those items not satisfactorily detailed in the Specifications or those unique to the project and shall not rewrite or repeat information contained in the Specifications, amendments thereto or Interim Specifications Addenda (I.S.A.). The Consultant shall submit for approval with final review plans and/or structure review plans a reasonable draft of the Special Provisions, in number required by the Highway Administration, which shall contain separate sections for general, roadway, structures, utilities, lighting, signing, etc. in self-contained formats. Structure portion shall be submitted for Bureau of Bridge Design comments prior to final review so that final review draft reflects that Bureau's recommendations. Following review and approval of the draft by the Highway Administration, the Consultant shall prepare a corrected master copy on 8 1/2" x 11" white bond paper, with offset to the text of 3/4" on the top and sides and 2" on the bottom; conforming in every respect to the approved draft, and ready for advertisement for bids, and shall submit same with the completed contract drawings and Final Engineer's Estimate.

Each sheet shall state the subject of the Special Provisions, that section numbered, as well as the pertinent contract number(s).

20. Final Engineer's Estimate

The Final Engineer's Estimate shall be prepared by the Consultant on forms and in accordance with the procedures of the Highway Administration, including the publication entitled "Procedure for Preparing the Contract Estimate and Proposal Quantity Booklet". The completed computer input forms which were previously submitted and satisfactorily run (2 weeks prior to P.S & E. submittal), shall be submitted with the completed contract documents and the Special Provisions ready for advertisement. The Consultant shall carefully check the output estimate form against the items (wording must be the same) and quantities of the plan "Summary of Quantities".

21. Prints, Reproductions, etc.

When requested by the Highway Administration, the Consultant shall furnish white prints, photocopies, photographs, reproductions, sepia prints, etc.

22. Pavement Control Elevations

a. Highway

The Consultant shall provide pavement edge tabulation sheets (in duplicate) at the time of advertisement. They will include all the mainline and any road spurs, ramps, loops or connections for which a profile grade line has been established. Points along the typical section will include the profile grade line, pavement edges, breaks in template and elevations on the extended cross slope at a distance of two feet beyond the edge of pavement, base course, or subbase (whichever is farthest out). The distance between two points should not exceed two lane widths.

The above information should be applied to the following:

- (1) All whole number stations at 25-foot distance intervals.
- (2) P.V.C., P.V.I. and P.V.T. stations.
- (3) Breaks in profile grade line.
- (4) P.C., P.T., T.S., S.C., C.S., S.T. stations and all surveyed spiral points.
- (5) Begin transition, plane incline, half level, level and end transition stations.
- (6) Stations where a lane starts or stops.
- (7) Stations where lane width tapers begin and end.
- (8) Mainline stations for tie-in of road spurs, ramps, loops, and connecting roads.
- (9) Equalities (where both back and ahead stations should be shown) and other special odd stations.
- (10) Stations where an inlet will be installed in a sump on a closed section.

D. ADDITIONAL MAJOR DESIGN STUDIES (MDS) DIRECTED BY THE ADMINISTRATION

1. Interchanges

Utilizing traffic data developed by the Administration, the Consultant when directed by the Administration, shall develop single line drawings (approx. 200 scale) indicating the direction of traffic, number of lanes, traffic volumes, weave analysis and levels of service (LOS). The Consultant shall present the various alternatives to the Administration, after which he will further develop viable alternatives on two hundred scale contour mapping. (Roadway will be colored.) Included at this stage shall also be the following:

- a. Profiles
- b. Roadway cost
- c. Bridge cost
- d. Impact to each property affected including areas
- e. Potential mitigating measures
- f. Prepare drawings of sensitive areas at approved scale

The Consultant will make a presentation of the alternates to the Administration. The Consultant will be prepared to make a recommendation to those alternates being presented. Following a decision by the State Highway Administration, the Consultant shall prepare refined drawings at a scale approved by the State Highway Administration.

2. Intersections

Intersections shall be developed when directed by the Administration using traffic data provided by the Administration. The Consultant is to prepare 50 scale topographic drawings taking into consideration the following:

- a. DHV traffic volumes
- b. SU, WB-40 and WB-50 vehicles
- c. Channelization (left turn storage)
- d. Sight distances
- e. Speed change lanes
- f. Other factors which would influence the design of the intersection
- g. Weave analysis

Study plans will clearly show lanes (colored yellow), direction of traffic, traffic data, approximate right of way lines, impacts to adjacent properties and levels of service (LOS).

3. Entrances/Access Studies

When directed by the Administration, the Consultant shall develop access studies within established guidelines. Of prime importance in the development of entrances is a comparative cost of each study. The following shall be prepared for each alternate.

- a. Horizontal alignment
- b. Vertical alignment
- c. Road cost
- d. Structures cost
- e. Fee taking and excess land. The Consultant will be provided a cost per acre, cost of improvement and resale cost of excess land for his use in completing all the considered alternates.

Upon completion of the studies, the Consultant shall submit the alternates, including a comparative summary and recommendations for use by the Administration in arriving at a decision.

E. EXTRA WORK

General

Unless specifically provided for in Section I of these Specifications, the services enumerated below are examples of services to be performed only when requested of the Consultant in writing for submission of a proposal and shall be the subject of an extra work authorization. The work shall commence only upon issuance by the Highway Administration of a written Notice to Proceed.

1. Supplemental Environmental Impact Statement

As directed by the Highway Administration, the Consultant shall provide all supplemental environmental services, including but not limited to studies and assessment of the social, economic and environmental impact of the selected alternate to furnish additional data relating to an existing adopted Final Environmental Impact Statement, and to circulate both a draft and a final Supplemental Environmental Impact Statement in response to requirements of State and Federal laws and regulations.

2. Surveys

Surveys, if required, shall be performed in accordance with Section VII of the Specifications.

3. Additional Hydrologic/Hydraulic related unanticipated services as required by State and Federal Regulatory Agencies empowered with authority to issue permits for construction within the base floodplain.

F. STATE HIGHWAY ADMINISTRATION SERVICES

The Highway Administration will provide those services and materials for which it is responsible as set forth in paragraph "C" above and Section I of the Specifications. In addition thereto, the Highway Administration will perform or provide the following:

1. Engineering management, approval and/or comments through the Bureau of Highway Design, Bureau of Bridge Design for structures and construction activities in floodplains for watersheds greater than 400 acres.
2. All information presently prepared and assembled by the Highway Administration for the Project, including photogrammetry, tax maps, studies, plans, mapping and Design Study Report as available.
3. All available information in the possession of the Highway Administration pertaining to utility companies whose facilities may be affected by the proposed construction.

4. Necessary final arrangements with utility companies for changes in their facilities.
5. Plastic or linen (roll) for original plotting of survey, blank cross section sheets, standard plan sheets (linen or equal), title and right of way tracing sheets, quantity sheets, miscellaneous standard sheets, Book of Standards, Category Code Book, Interim Hydraulic Criteria for Design of Highways, Specifications and standard special provisions inserts, and other forms and documents as necessary.
6. All traffic and accident data as may be deemed necessary by the Highway Administration.
7. All surveys necessary to the prosecution of the work unless otherwise provided.
8. Soils surveys, subsurface investigations, structure borings, and reports of same.
9. A general location plan of the project, together with sample plans, sample right of way plats, sample right of way property plans and documents applicable to the project, to be used as general guides in the prosecution of the work.
10. Title information for right of way, including title lead data, deed descriptions, and title reports.
11. Copies of present right of way plats, for existing state and or county roads on the project, including railroad valuation plats and county plats, showing existing right of way, or, if none are available, a statement as to the extent of the existing right of way claimed.
12. All available information in the possession of the Highway Administration pertaining to subdivision plats, reservations and dedications of land for highway purposes.
13. Review by Bureau of Highway Design of preliminary metes and bounds plats and property plans before final completion by the Consultant, to assure completion thereof in accordance with the Highway Administration's current standards and procedures.
14. Distribution of prints for preliminary field investigation, semi-final review and final review and reports and recommendations of same.
15. Description of Highway Administration computer programs and instructions.
16. Public notices and advertisements.

17. All future information which may come to the Highway Administration during the term of the Consultant's Agreement and which, in the opinion of the Highway Administration, is necessary to the prosecution of the work.
18. The Highway Administration is to contract for all required special tests, research, and mill and shop inspection of materials and equipment.
19. The Highway Administration may furnish photogrammetry to the Consultant to be utilized in the performance of the firm's contractual obligations. There may be instances where the Highway Administration will specifically require the Consultant to perform tasks utilizing photogrammetry and require the Consultant to obtain same. If photogrammetry is to be furnished by the Highway Administration or obtained by the Consultant, the specifics therefore, will be set forth in Section I of the Specifications.

Before the preparation of base plan sheets, the Consultant shall request from the Highway Administration approval to utilize planametric or photogrammetric base plans.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section VI

STRUCTURE DESIGN

SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES

Section VI

PART I

FINAL STRUCTURE DESIGN

Phase IV

A. PURPOSE

The purpose of this part of the Specifications is to describe the "Scope of Work" required of a Consultant for Phase IV final structure design services, which unless otherwise directed by the Highway Administration, begin after combined "Location/Design Approval" and conclude with the advertisement of the Project for bids. The work covered by this part of the Specifications starts with Task 308 (Pre-T.S. & L.) and concludes with Task 236 (Complete bridge plans, special provisions, and estimate).

B. GENERAL

1. Objective of Final Structure Design

The objective of Final Structure Design is to provide the complete structural engineering design for the Project, including all necessary supporting documents, computations, special provisions, estimates, detailed structure plans, complete, checked and approved, ready for advertisement for bids.

The structure design shall include preparation of contract documents in conformance with the Division of Bridge Development's Policy and Procedure Memorandum OP-76-10(G), Formal Review Stages of Projects. Formal approval of each stage must be obtained before proceeding to each succeeding stage:

- a. Preliminary Type, Size and Location (Pre-T.S. & L.)
- b. Preliminary Investigation (P.I.)
- c. Type, Size and Location (T.S. & L.)
- d. Foundation Review
- e. Structural Review
- f. Final Review
- g. Plans, Specifications and Estimate (P.S. & E.)

During the performance of Final Design services covered by this part of the Specifications for Consulting Engineer's Services, the general statements set forth in Section V "HIGHWAY DESIGN", shall govern and be applicable.

2. Design Criteria

- a. The geometrics of the structure shall be designed in accordance with the latest edition of the following: A Policy on Geometric Design of Highways and Streets (A.A.S.H.T.O.); Division of Bridge Development Standards and Policy and Procedure Memoranda (P.P.M.'s); Division of Highway Development Manual.
- b. Stormwater Management, Sediment and Erosion Control, Maintenance of Stream Flow and the opening for a structure over or carrying a waterway shall be designed in accordance with the latest edition of the S.H.A. Drainage Manual and Division of Bridge Development Policy and Procedure Memoranda (P.P.M.'s). Hydraulic structures must conform to State and Federal requirements.
- c. The structural design shall be in accordance with the latest edition of the following: Standard Specifications for Highway Bridges (A.A.S.H.T.O.) including all Interim Specifications; other applicable A.A.S.H.T.O. publications; Division of Bridge Development Standards and Policy and Procedure Memoranda (P.P.M.'s).
- d. For bridges carrying railroads over highways refer to the guidelines of the pertinent railroad and the latest edition of A.R.E.A. Specifications for Steel Railway Bridges.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

The Consultant shall provide all services as directed by the Highway Administration, as noted in the Division of Bridge Development P.P.M.'s and as listed below.

1. Services required prior to or during Review Stages
 - a. Preliminary Type, Size and Location (Pre-T.S. & L.)
 - (1) Prepare request(s) for survey(s).
 - (2) At the direction of the Highway Administration the Consultant shall inspect any existing structure within the limits of the project according to guidelines established in Policy and Procedure Memorandum D-84-28(4), to determine additional work necessary because of the condition of the structure, e.g. substructure work. This inspection shall be outlined in a written report with recommendations for corrective work deemed necessary and will be subject to approval by the Highway Administration. The corrective work established by the Highway Administration as being needed, shall be incorporated in finished contract documents, and if applicable, may result in an EWO to the Consultant's contract.

- (3) Submit Pre-T.S. & L. plans showing at least two (2) alternate span configurations where practical, for each new or replacement bridge. The alternate selected by the Highway Administration shall be the basis for T.S. & L. development. Box culverts, bridge rehabilitations and/or widenings will not require alternate configuration submittals. However, the Consultant is still required to present a cost analysis, in the hydraulic report, for different types of culverts. Alternates for retaining walls will be in accordance with P.P.M. D-82-25(4). At the direction of the Highway Administration, the Consultant shall provide all contacts, professional advice, field and office work necessary in the performance of these services.

b. Preliminary Investigation (P.I.)

- (1) One of the first issues that must be resolved by the Consultant is the identification of all utilities present, their locations, and the extent of their involvement with the proposed structure. The Consultant shall initiate contact with all utilities through the District Utility Engineer. Public Utility Service will be maintained at all times during construction of the project.

The Consultant shall incorporate and make provisions in his design for all existing utilities including new replacement elements. This shall include for the proposed structure, maintaining of all existing utilities and providing design details, special provisions articles and engineer's estimate, when required.

In addition thereto, it is expressly understood that the Consultant is to include provisions in the contract documents for possible inclusion of new utilities. This shall include making provisions for establishing that portion of the construction bid which is attributable to each new utility installation on the structure and also designing the structure for the extra loads. Additional design details, such as support diaphragms, special provisions articles and engineer's estimate for these new utilities will be the responsibility of the utility owner. The Consultant may enter into separate agreements with said utility owners for design services and payment for the above areas of responsibility.

- (2) Prepare a preliminary Traffic Control Plan and Sequence of Construction.

c. Type, Size and Location (T.S. & L.)

- (1) Correct and/or modify plans in accordance with Pre-T.S. & L. comments and approved P.I. Report.
- (2) Upon approval of T.S. & L. submission, immediately prepare structure borings request.
See P.P.M. D-79-17 (4).

d. Foundation Review

See applicable P.P.M.'s.

e. Structural Review

- (1) The Consultant is not permitted to use the Highway Administration computer for any structure designs.
- (2) The Division of Bridge Development maintains a book of Standards, portions of which will be utilized and incorporated into the contract plans. It is the responsibility of the Consultant to check the design of those standards he plans to utilize to insure that they will be applicable for use on the project before requesting mylar reproductions. Where Bridge Development standard details are not applicable on a project, it shall be the Consultant's responsibility to provide acceptable details in lieu of these Standards. See P.P.M. P-75-5(4).
- (3) Refer to applicable P.P.M.'s for information on preparation and format of special provisions, especially P.P.M. PB-82-12(G) and P.P.M. PB-83-16(G).

f. Final Review

- (1) Prepare final Traffic Control Plan.
- (2) Prepare the final Engineer's Estimate on input forms and in accordance with the Highway Administration publication, "Procedure for Preparing and Processing the Contract Estimate and Proposal Quantity Booklet".

g. Plans, Specifications and Estimate (P.S. & E.)

Upon completion of a Project involving one or more structures, furnish a complete set of final structure design computations. If a computer was used, each print-out shall indicate program used, date of program, type of computer, and any other documentation, such as stresses, necessary to allow a reviewer to reference the output to the particular member being designed, and the material used for design. One copy of all pertinent computer input sheets shall be included.

2. Incidental Services

- a. Prepare progress reports (normally monthly) per Highway Administration directive.
- b. Submit activity report forms in accordance with Critical Path Method (CPM) or other Project monitoring system as directed by the Highway Administration.
- c. Make as many contacts and field trips as deemed necessary by the Highway Administration to resolve problems that occur during design.
- d. Prepare written minutes of all meetings, conferences, etc.
- e. Participate in periodic visits to the Project site, meetings, conferences, pre-bidding sessions, hearings, etc.
- f. Prepare all construction permits required for the project. The Highway Administration shall apply for and obtain all permit approvals.
- g. Prepare all plans, special provisions, estimates, etc. required for Stormwater Management, Sediment and Erosion Control and Maintenance of Stream Flow. See Section V, "HIGHWAY DESIGN".
- h. Prepare supporting documentation, estimates, etc. per Highway Administration directive as required to support studies and reports, and to accompany plan submissions.
- i. Obtain written approval from the Highway Administration before publishing any document, brochures, etc., concerning Highway Administration projects.
- j. Furnish white prints, photostats, photographs, reproductions, sepia prints, etc. when requested by the Highway Administration.
- k. Prepare "Addenda" to advertised contract documents to correct any errors or omissions deemed necessary by the Highway Administration. The Consultant will not be paid for the correction of any errors or omissions in the Consultant's services.

D. STATE HIGHWAY ADMINISTRATION SERVICES AND MATERIALS

1. Engineering management, review and approval services through the Division of Bridge Development.
2. All pertinent information presently prepared and assembled by the Highway Administration, including photogrammetry, tax maps, studies, plans, mapping and Design Study Report as available.

3. All available information in the possession of the Highway Administration pertaining to utility companies whose facilities may be affected by the proposed construction.
4. Necessary final arrangements with utility companies for changes in their facilities.
5. Blank title sheets, hydraulic sheets and plan sheets (linen or equal), mylar reproductions of pertinent standard drawings, blank computer input forms for applicable Highway Administration programs, standard Special Provisions guides.
6. Division of Bridge Development Policy and Procedure Memoranda and Structural Standards Manual, S.H.A. Drainage Manual, Procedure for Preparing and Processing the Contract Estimate and Proposal Quantity Booklet, Geometric Solution of Highway Bridges Computer Program FORTRAN IV, Standard Specifications for Construction and Materials, and the Category Code Book.
7. All traffic and accident data as may be deemed necessary by the Highway Administration.
8. All surveys necessary.
9. All structure boring and drive test data.
10. Sample plans and contract documents, when available, to be used as general guides.
11. Copies of existing right of way plats, including railroad valuation plats, showing existing right of way, or, if no such plats are available, a statement as to the extent of the existing right of way claimed.
12. Apply for and obtain all construction permit approvals and railroad, utility and government agreements.
13. Process completed computer input forms for applicable Highway Administration programs.
14. Distribute prints for preliminary field investigation and final review, conduct preliminary field review and final review, and distribute and prepare reports and recommendations of same.
15. Provide computer plotted bridge deck elevation sheets.
16. Public notices and advertisements.
17. All future information which may come to the Highway Administration during the term of the Consultant's Agreement and which, in the opinion of the Highway Administration, is necessary to the prosecution of the work.

18. The Highway Administration is to contract for all required special tests, research, and mill and shop inspection of materials and equipment.

**SPECIFICATIONS FOR
CONSULTING ENGINEER'S SERVICES**

**PART II
CONSTRUCTION SERVICES**

Phase V

SHOP DRAWINGS

A. PURPOSE

The purpose of this part of the Specifications is to describe the "Scope of Work" required of a Consultant when checking of shop drawings is required for a Project after the construction contract(s) has been awarded. Checking of shop drawing services are considered Phase V services in the Transportation Planning Process for the State Highway Administration.

B. SERVICES TO BE PROVIDED BY THE CONSULTANT

The Consultant will check and recommend for approval to the appropriate design bureau of the Highway Administration all shop and working drawings. This work shall be carried out as set forth in Division of Bridge Development's Policy and Procedure Memorandum No. OP-82-34(G), "Checking of Working Drawings, Form Plans, and/or Erection Plans".

C. RECORD KEEPING

The Consultant shall keep time and cost records for the services provided as incurred in connection with each separate construction contract of the Project, in those instances when more than one construction contract is included within the Project. One monthly invoice may be submitted for the total shop drawing services. However, the cost incurred and invoiced for each individual construction contract shall be clearly identified and indicated on the invoice.

SPECIFICATIONS FOR
CONSULTING ENGINEER'S SERVICES

PART III

CONSTRUCTION SERVICES

Phase V

REDESIGN UNDER CONSTRUCTION

A. PURPOSE

The purpose of this part of the Specifications is to describe the "Scope of Work" required of a Consultant when it becomes necessary for the Consultant to redesign portions of the Project during construction of the Project because of unforeseen problems occurring due to changes in anticipated field conditions, either surface or subsurface. Redesign under construction services are considered Phase V services in the Transportation Planning Process for the State Highway Administration.

B. GENERAL

Requested redesign under construction services, which exceed the original contract Agreement amount, shall be the subject of an extra work authorization(s) to the original contract Agreement covering design services. However, the Consultant will not be paid for correction of any errors or omissions that are attributable to his work effort.

The Consultant shall only perform redesign under construction services and prepare "Red Line Revisions" to correct any errors or omissions when in receipt of a specific written request from the appropriate design bureau of the Highway Administration. Each event where redesign under construction services are to be performed will require a separate authorization. The work performed will be as designated by the design bureau.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

The Consultant shall provide a representative to accompany and assist the Highway Administration in a field review, if necessary, of the construction problem. The solution to the construction problem, if possible, shall be tentatively determined in the field. Subsequent thereto, the Consultant shall make all calculations necessary to incorporate the field revision into and protect the integrity of the original design, as concurred in by the Highway Administration. The Consultant's final recommendations shall be verbally given to the Highway Administration at the earliest possible time and confirmed in writing. The written report shall include a summary of all personnel time and any other charges which have been mutually agreed upon, due to the particular field construction problem.

D. RECORD KEEPING

Each event or occasion where the redesign under construction services, exceeding the original contract Agreement amount, are required shall be the subject of a separate extra work authorization to the Agreement. However, due to the exigency of the situation requiring these services, the prior approval of extra work authorizations as indicated elsewhere herein shall be waived. The extra work authorization for each problem or occasion will be effected after the fact. Normally, and unless specific or unique conditions dictate otherwise, the basis of payment for redesign under construction services performed shall be in accordance with the "Specific Rates of Pay" set forth in the "Specifications for Consulting Engineer's Services".

Cost, invoiced for redesign under construction, may be included within the normal monthly invoice for a Project; however, all costs invoiced for each occasion when redesign under construction is authorized shall be kept separate and clearly identified thereon.

**SPECIFICATIONS FOR
CONSULTING ENGINEER'S SERVICES**

Section VII

SURVEYS AND STAKEOUTS

AND

**PREPARATION OF METES AND BOUNDS RIGHT OF WAY PLATS,
SPECIAL PLATS, AND RIGHT OF WAY PROPERTY PLANS**

SPECIFICATIONS FOR
CONSULTING ENGINEER'S SERVICES

Section VII

PART I

SURVEYS AND STAKEOUTS

PHASE IV

A. PURPOSE

The purpose of this Section of the Specifications is to describe the "Scope of Work" required of a Consultant for Surveys and Stakeouts. These are design and metes and bounds surveys, test boring and sounding, normal-right of way, board of property review, and condemnation stakeouts. Surveys and stakeouts are normally performed during Phase IV operation; however, surveys and stakeouts may be required and performed for any of the various phases of work.

B. OBJECTIVE

The objective of performing the surveys set forth herein is to gather and supply field information and data necessary for the preparation of preliminary and final design plans and right of way plats to effect the complete design of a highway improvement.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

1. General

The Consultant shall provide all surveys and stakeouts required for engineering design, preparation of metes and bounds right of way plats, special plats, right of way property plans (if a Federal-Aid Project), appraisals and acquisition of rights of way for the Project. The Consultant shall furnish all personnel, equipment, and vehicles necessary for the completion of the required surveys and stakeouts.

2. Review & Control of Field Work

- a. A representative of the Highway Administration will meet with the Consultant to discuss the scope of the project and to answer questions as to field work requirements.
- b. The Highway Administration will perform periodic field and office reviews to check the Consultant's work for conformance with standards, directives, and instructions of the Highway Administration. However, the Consultant has full responsibility for accuracy and completeness of surveys.

3. Design Surveys

a. General

The design surveys performed by the Consultant shall furnish all alignments, topography, differential level, and cross section data for the engineering design of the Project, and such surveys shall be performed as hereinafter described.

b. Field Notes

(1) General

Design surveys as defined in this Section of the Specifications are divided into two major categories: baseline/centerline survey and cross sections. Each shall be recorded in separate official State Highway Administration survey books, using Administration standards and procedures. All field notes are to be recorded in the field as the information is obtained. In no instance are field notes to be copied at a later time. All books shall be fully indexed, and returned to the Highway Administration as its property. Index will contain at minimum the State contract number and job description, name of Consultant, name of party chief and date work was performed. All field surveys will coincide with survey notes.

(2) Centerline Survey Notes

The centerline survey book notes shall show the complete centerline, including all P.C.'s, P.T.'s, and P.I. stations, and all curve and spiral data, deflection angles, bearings, references, and topography as hereinafter described, i.e., all data necessary to reproduce the survey.

(3) Cross-Section Notes

The cross section survey book shall show all cross sections, elevations, and profile data obtained as hereinafter described. In order to provide a terrain edit check in connection with the reduction of survey notes by electronic data processing, an Elevation Difference, designated ED, shall be noted under stations listing. This Elevation Difference, expressed in even feet, represents the maximum elevation difference between consecutive rod readings and is the rod differential which, if exceeded, would definitely represent an erroneous reading. A quick glance at the completed notes for each station listing should be sufficient to estimate this difference.

All H.I.'s shall be verified by the Consultant before cross section books are submitted for note reduction by the Highway Administration.

c. Centerline Survey

(1) Stakes and Hubs

- (a) Re-bars or hub stakes (2" x 2" hardwood) with hub points designated by standard survey tack will be placed at all centerline control points, such as P.O.T., P.O.S.T., P.I., External, P.C., P.T., P.C.C., P.R.C., T.S., S.C., C.S., and S.T. These control points shall be referenced to at least two (2) permanent objects, or other reference hubs or re-bars which will not be disturbed prior to, during, or after construction. All control points must be intervisible.
- (b) Flat stakes (1" x 2" x 18" hardwood) shall be used at all other survey stations and as hub guards.
- (c) Crayon or weather proof marking on all stakes shall conform to the Highway Administrations' standard procedure.
- (d) Stakes shall be driven flush with ground in any area subject to mowing.

(2) Controls and Accuracy

- (a) The arc definition for highway circular curves shall be used in all instances.
- (b) All tangent lines shall be extended by the Double Centering method.
- (c) Horizontal angles shall be measured by the repetition method (at least four (4) times) or directional method if using theodolite and entered in the centerline survey book.
- (d) Chaining shall be corrected for temperature.
- (e) Stations along the survey line shall be at 50 foot intervals and at all abrupt breaks in the terrain.
- (f) In streets, sidewalks, bridges, etc., where stakes cannot be used, cross-cuts or roofing nails shall be used and painted for normal stations and cross-cuts or masonry nails shall be used and painted for control points.

- (g) The survey shall be referenced to the Maryland State Coordinate System unless otherwise directed by the Highway Administration.
- (h) When no control monuments exist, a magnetic bearing shall be observed on the first course, and notation thereof made in the survey book. The Consultant shall not correct the bearing for declinations.
- (i) The bearings of all lines of the survey shall be computed based upon the bearing of the first course and observed angles. In addition, the observed bearings of all lines shall be noted for angular check.
- (j) The angular error, and angular closure of all polygons, shall not exceed the square root of the number of angles multiplied by the least reading of the vernier.
- (k) The minimum horizontal accuracy for centerline surveys shall be 1:15,000. Adjustments shall be by the compass method.
- (l) The Consultant shall submit the centerline survey data to the Highway Administration and the Consultant shall be responsible for attainment of the required control and accuracies prior to the initiation of engineering design work.

(3) Topography

- (a) All topography shall be located for at least twice the proposed right of way width. However, design and terrain requirements may dictate broader topography coverage. In general, all topography which may in any way affect the design and construction of the highway and the acquisition of the necessary right of way shall be located.
- (b) Topography shall be primarily taken by right angle offsets from the baseline (plus and distance) or by angle and distance when not feasible by right angle offset method, and shall include:
 1. All buildings and structures, including description, type, use and whether with or without basements.
 2. Poles and utility structures, including underground pipe, water and gas lines, manholes, water meters and conduits, giving ownership and identification numbers; wells, springs, ditches (showing direction of flow), hedges, walls, fences, curbs, trees (showing

species and trunk diameters), pipes and culverts (including size, type and direction of flow), edges of existing pavement, and any and all other objects of any nature that may affect final design.

3. Nature of land use, whether pasture, cultivated, woods, etc. (if woods, specify whether hard, soft, or mixed).
4. Location of State, county, city and town boundaries, by angles and distances to hundredths only.
5. Property corners located by angles and distances (to hundredths) to the baseline with the names of the owners indicated.

Apparent property lines and other boundaries shall also be located.

(4) Spur Lines

- (a) Spur lines shall be run on all intersecting roads, private roads, railroads, streams, and all natural drainage courses.
- (b) Spur lines shall be run from tangent lines, (not from curved lines).
- (c) All spur lines are to be staked and referenced and contain all detail pertaining to the centerline/baseline survey. Approximate lengths of spurs are listed below, but can differ as conditions dictate with respect to the width of proposed improvement and proposed change in alignment of intersecting roads and streams.
 1. Spur lines on main and secondary roads to extend 1,000 feet or farther on each side of centerline.
 2. Spur lines on private roads to extend as conditions indicate.
 3. Spur lines along large streams (20 feet or more in width) to extend at least 1,000 feet on each side of centerline, farther if relocation may be necessary.
 4. Spur lines for small streams (less than 20 feet) to extend at least 500 feet on each side of centerline.

5. Spur lines for railroads to extend a minimum of 1,000 feet on each side of centerline.

(5) Subdivision Ties

Where a recorded subdivision is encountered, sufficient survey information shall be obtained so that all parts of the subdivision affected by, or which lie adjacent to, the new right of way lines may be accurately shown on the right of way plats. Railroad valuation plats shall be treated in the same manner.

(6) Interchange Surveys

- (a) Intersection of centerlines and/or centerline curve tangents determining the point of origin (intersection) of the interchange shall be established clearly.
- (b) Control points shall be established along each intersecting line at the outer limits of interchange.
- (c) Intersection angles at the point of origin and other control points shall be measured by the repetition method or directional method.
- (d) Measurements along intersecting lines forming the point of origin shall be double measured beginning at the point of origin and recorded in such a manner that distances to all control points within or at the outer limit of the interchange can be readily referenced to the point of origin.
- (e) No distance equalities will be allowed within the interchange between control points at the outer interchange limits.
- (f) Centerlines shall be established as described above and verified prior to beginning surveys on any ramp(s).
- (g) Ramp control points shall be referenced to centerlines and/or centerline curve tangents.

d. Levels and Cross Sections

(1) Controls and Accuracy

- (a) The survey is to be referenced to the nearest available U.S. Coast and Geodetic Mean Sea Level Datum of 1929 (NGVD), unless otherwise directed by the Highway Administration.

- (b) Bench marks shall be established at the rate of not less than five (5) to the mile. If permanent structures, such as stone or concrete foundations, are available, squares approximating the size of the base of the standard leveling rod shall be cut. Otherwise, bench marks consisting of 3/8" x 4 1/2" galvanized boat spikes shall be driven approximately 3" into trees 12" to 18" above ground level or in poles at ground level. Bench marks shall be set outside the proposed construction limits whenever possible.
- (c) Bench marks shall always be incorporated into the level line, and bench mark elevations shall never be established from "side shots". All elevations shall be established by differential leveling. Give clear and concise description and location of all bench marks (plus and distance location from traverse or centerline).
- (d) Check levels shall be run throughout the length of the Project before taking cross sections.
- (e) The minimum vertical accuracy of these surveys shall be third order; i.e., 0.05' times the square root of the distance in miles.
- (f) No cross sections shall be obtained using the stadia method without specific permission of the Highway Administration in advance.

(2) Required Cross Sections, Elevations, and Profiles

- (a) Cross sections shall be taken at all stations where a centerline stake has been set. The maximum distance between consecutive rods is not to exceed twenty (20) feet. Elevations shall be taken at all breaks in terrain.
- (b) Normally, the width of centerline cross sections shall be twice the proposed right of way width.
- (c) Cross sections under 200 ft. width shall be taken at right angles to traverse lines and centerline tangents and radial to centerline curves. These can be established by use of a standard right angle mirror. Cross sections with widths greater than 200 feet must have more accurate horizontal control. This is to be achieved by setting offset lines or by turning right angle and/or radials with a survey transit. Vertical accuracy on wide cross

sections shall be verified by hand level checks on elevation differential at the end of cross section between the previous station. These checks should not vary more than three tenths (0.3) foot of a true cross section between succeeding stations.

Cross sections are to be obtained with a standard level (or its equivalent), cloth tapes, level rod and hand levels unless otherwise directed by State Highway Administration. In mountainous or other exceptionally steep terrain the Rhodes Reducing Arc is permissible. Cross sections taken by vertical angles and distances shall be by Highway Administration permission only.

- (d) Rod readings of elevations on cross sections shall be taken to hundredths on hub, rebars, stake points, nails, top of rail on railroads, and hard road surfaces, and to tenths for all other elevations. Both top of stake and ground elevations shall be shown for centerline stations.
- (e) Cross sections on spur lines shall be taken as indicated by field conditions and design requirements.
- (f) Entrances along the route of survey shall be profiled for a distance of twice the limits of sections. For all buildings within or immediately adjacent to the proposed right of way line, first floor elevations shall be shown.
- (g) The crown of existing roads shall be defined by taking rods at the centerline, road and shoulder edge, and bottom of ditch. It is important that the distance shown to the edge of road in the cross section notes coincide with the distance as shown in the topography notes.
- (h) Elevations on all utilities shall be obtained where possible, including overhead wires and other clearance, and inverts of inlets, storm, and sewer lines.
- (i) Where the centerline/baseline survey crosses roads, railroads, rivers and streams, a profile shall be taken. On proposed dual lane roads, a profile shall also be taken along the profile grade line of each lane parallel to the centerline survey.
- (j) Where drainage may be a problem, elevation of high water marks shall be noted.

(k) Soundings and water elevations as well as bridge and box culvert inverts shall be shown. Culvert size and type and waterway openings of structures shall be obtained.

(l) Judgment is to be exercised in clearing for obtaining cross sections. Care is to be used to preserve shrubs, plants and trees in or adjacent to lawn areas. Trees of significant size (12" in diameter or greater), are not to be felled.

4. Metes and Bounds Surveys

a. Standards and Qualifications

The metes and bounds surveys shall be made in accordance with accepted land surveying practices and Highway Administration standards and shall be performed under the supervision of a Professional Land Surveyor or Property Line Surveyor registered in the State of Maryland.

b. Accuracy

The accuracy of the metes and bounds survey shall be 1:10,000 or better.

c. Scope of Survey

Survey of all properties subject to purchase of right of way and/or easement shall be made sufficient for the correct preparation of metes and bounds plats for all such properties. These surveys shall be tied to centerline, base line of right of way, or controlled traverse lines.

d. Spur Lines

Spur lines shall be tied by use of the angular ties from the control.

e. Methods

When performing Metes and Bounds Surveys the following practice should be adhered to in order to make the work and books of a uniform nature:

- (1) Angles of traverse should be at least doubled or quadrupled.
- (2) Angles to corners of property should be doubled.
- (3) All distances in chaining must be entered in book. Do not rely solely on totals by calculator.
- (4) Distances on traverse should be double taped.

- (5) No distances should be assumed as correct unless checked by taping or electronic distance meters.
- (6) If called for corners of property are not found, please note "Not Found". An example of an extreme case is no corners or existing evidence found, property should be sketched in book on correct side of base line and corners marked "Not Found".
- (7) If no corners are found, locate existing evidence such as Fence line, Hedge row, etc.
- (8) Evidence presented by property owner should be located even though deed may state otherwise and name of identifier recorded. The property owner usually is your best source of information. You are on his or her property, act accordingly.
- (9) All loops of traverse should be checked in field for angular closure.
- (10) Name of property and item number should be listed on separate lines in index and correspondence page or pages.
- (11) When performing Right of Way stakeouts from Right of Way Plats, list Plat numbers in index. Such as staked Right of Way STA. 0+00 to 50+05 as per Plats 12345, 12346, 12347, 12348, 12349. In the event of a revised Plat latest revision date shall be noted such as plat 12345 rev. 8/10/75.

5. Test Boring and Sounding Stakeouts

- a. Test boring and sounding stakeouts shall be performed to the standards and accuracy specified by the Highway Administration.
- b. Unless instructed otherwise, the Consultant shall mark test borings and soundings in the field by a standard survey stake on land and by a weighted float on water. The field marker shall show the boring or sounding number and the ground elevation at the stake or bottom and surface elevation at the float to the nearest tenth of a foot. Each test boring and sounding shall be recorded in centerline survey books at its proper centerline station. The boring (or sounding) number, offset distance and ground elevation at the boring (bottom and surface elevation at the float) shall be recorded. Test boring and sounding stakeouts shall also be shown in the index of the survey book.
- c. The Highway Administration shall be notified following completion of the stakeout.

6. Normal Right of Way Stakeouts

- a. All right of way and easement lines shall be staked in accordance with the metes and bounds plats prepared for the Project.
- b. Following the recovery or re-establishment of centerline or base line of right of way, whichever applies, hub stakes or re-bars shall be set opposite all P.C.'s and P.T.'s, at all "breaks" in the right of way lines, and at the intersection of right of way and property lines.
- c. All other points along the right of way line shall be staked with flat stakes opposite the survey stations. In rural areas, such stakes shall be set at 100 foot intervals unless directed otherwise by the Highway Administration. In urban areas, stakes shall be set opposite all survey stations shown on the plat.
- d. Easement lines shall be staked with flat stakes as described above.
- e. All hub and flat stakes shall be marked by wooden laths or wire with plastic flagging. Red flags shall be used for existing and proposed right of way lines. Wood laths will be used in cultivated fields and pastures. Wire flagging will be used in all other locations. Yellow flags shall be used for easement lines.
- f. Markings on all stakes shall conform with the Highway Administration's standard procedure.
- g. Right of way stakeouts shall be recorded in centerline/base line survey notebooks and indexed. The index shall show plat numbers used for stakeout.

7. Condemnation Stakeouts

- a. All right of way, title lines and/or lines of division, both existing and proposed, shall be staked according to the metes and bounds plats which will have been prepared. All right of way, easement and lines of division will be staked at 50 foot intervals between dimensioned breaks.
- b. Following the recovery or re-establishment of the base line of right of way, whichever applies, hub stakes shall be set at the points of intersection of the title lines and/or lines of division with the existing and proposed right of way lines. Hub stakes shall also be set at all "breaks" in the above mentioned lines.

- c. Flat stakes shall be set on the existing and proposed right of way lines opposite all survey stations appearing on the plat. In cases of skew title lines falling within the proposed right of way, flat stakes shall be set along the title line at intervals not to exceed approximately 50 feet and placed in such manner as to be intervisible.
- d. Easement lines shall be staked by use of flat stakes and placed opposite all survey stations where easements are dimensioned on the plat.
- e. The manner of marking and flagging stakes shall be as described in "Normal Right of Way Stakeouts" above. In addition, blue flags shall be used for title lines and/or lines of division.
- f. Condemnation stakeouts shall be recorded in centerline/base line survey notebooks and indexed. The index shall show plat numbers used for stakeout.

8. Board of Property Review Stakeouts

- a. If metes and bounds plats are available, the stakeout shall be performed as described under "Condemnation Stakeouts" above.
- b. If metes and bounds plats are not available, the stakeout shall be performed using strip plats. The stakeout is performed the same as a normal right of way stakeout except the lines of division are staked using scaled pluses and distances from the base line of right of way. Where construction is in progress and the roadway has been removed, the existing right of way line shall be staked using scaled distances from the base line of right of way.
- c. The manner of marking and flagging stakes and stake intervals shall be as described in "Condemnation Stakeouts" above.

D. ENTRY ONTO PRIVATE PROPERTY BY CONSULTANTS

Entry upon private property shall not be undertaken without prior notification to the owner or occupant. Notification to property owner shall be accomplished by policy as established under State Highway Administration Directive 56.52.1.1. Normally it will be the responsibility of the State Highway Administration's Bureau of Plats and Surveys to contact property owners. On certain contracts, however, it will become the responsibility of the Consultant to make the notification.

If it is necessary for Consultants to enter private property, every effort shall be made to establish and maintain friendly relations with the owner or occupant. If damage occurs, the Consultant will assure reasonable restitution by restoration of the property to its original

condition or by other means. The Administration will reimburse the property owner or occupant for unavoidable damage. The Consultant will confer with State Highway Administration official prior to causing unavoidable damage.

E. STATE HIGHWAY ADMINISTRATION SERVICES

The Highway Administration will provide those services and materials for which it is responsible as set forth in paragraph "C" above and Section I of these Specifications. In addition thereto, the Highway Administration will perform or provide the following:

1. Survey and stakeout standards, management, and review services through the Bureau of Plats and Surveys.
2. All information presently prepared and assembled by the Highway Administration for the Project.
3. All information in the possession of the Highway Administration respecting utilities which will be affected by the Project.
4. All available information in the possession of the Highway Administration respecting subdivision plats which may be affected by the Project.
5. Blank field notebooks for surveys.
6. A general location plan of the Project, together with sample materials, to be used as a general guide in the prosecution of the work.

SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES

PART II

PREPARATION OF METES AND BOUNDS RIGHT OF WAY PLATS

SPECIAL PLATS, AND RIGHT OF WAY PROPERTY PLANS

PHASE IV

A. PURPOSE

The purpose of this Section of the Specifications is to describe the "Scope of Work" required of a Consultant with respect to the Office Reduction of Survey Notes and Computations and the Preparation of Metes and Bounds Right of Way Plats, Special Plats, and Right of Way Property Plans (if a Federal-Aid Project). These activities normally follow the preliminary field investigation and precede the final review.

B. OBJECTIVE

The objective of preparing the various right of way plats and plans is to enable the Highway Administration to identify, and subsequently acquire, the necessary lands to accommodate proposed highway improvements.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

1. General

The Consultant shall furnish all technical and/or drafting services required for the reduction of survey notes and computations and the preparation of right of way plats. The Consultant shall provide all contacts with private, local, State, national property owners, groups, authorities, departments and commissions, and all professional advice, field and office work required in the performance of these services. Accordingly, the Consultant shall make as many field trips as deemed necessary by the Highway Administration to resolve problems involving the work described herein.

2. Standards

The Consultant shall perform all services described herein in accordance with the standards, directives, and instructions of the Highway Administration.

3. Preparation of Property Mosaic

The Consultant may be required to prepare a property mosaic showing existing rights of way and all properties to be affected by the proposed construction; with the metes and bounds description of each property drawn in ink on a sepia copy of the mosaic. The mosaic must show all calls for property corners; all bearings and distances from the deeds; the name of the owner; and the liber and folio of each deed. A copy of the mosaic will be used as a guide for the metes and bounds survey work. The base map for mosaic preparation may be photogrammetry; or a plot of the existing topography; on a scale to be determined by the S.H.A. The lettering may be "free-hand", but must be legible on copies made from the sepia. When the sepia copy is completed, one (1) paper print of the sepia will be furnished to the S.H.A., with the individual properties shaded in contrasting colors. On completion of the mosaic, the sepia copy and print; all existing R/W plats, all subdivision plats, and all deeds and title information will be sent to the Bureau of Plats and Surveys, unless otherwise instructed by the S.H.A.

4. Office Reduction of Survey Notes and Computations

- a. The field traverse and metes and bounds survey shall be checked for closure with an accuracy of 1:10,000 or better.
- b. The survey shall be coordinated based upon State Grid coordinate values furnished by the Highway Administration. Whenever State Grid values are not furnished, the survey shall be coordinated based upon assumed coordinates as a starting value with the assumption sufficient to confine the survey to the northeast quadrant.
- c. The base line of right of way, intersections of property lines with right of way lines, spur lines, traverse lines, and all physical features used in determining the limits of the property taking shall be computed.
- d. All computations shall be performed utilizing a modern electronic computer.

5. Preparation of Plats

a. Lettering

All lettering and dimensioning shall be a minimum of 1/8" in height, and the spacing between lines shall be a minimum of 1/16". All lettering shall be capable of 50% reduction without loss of legibility.

b. Working Map

- (1) The Consultant shall first determine if a Working Map has already been prepared by the Highway Administration or another Consultant. If so, he shall not repeat this activity.
- (2) A complete map of the survey shall be drawn and the coordinated points of the survey plotted thereon. The map shall show the traverse(s) and spurs used for the location of all culture, stones, monuments, pipes, fences, and other physical features. Topography and drainage information shall also be shown.
- (3) The map shall further show the existing right of way along any existing roads, the proposed right of way lines as they affect each property, and the numerical area of the taking and remainder expressed in acres or square feet.
- (4) The map shall be drawn to the scale of one (1) inch equals fifty (50) feet, unless another scale is authorized by the Highway Administration, and shall be completed in accordance with the standards of the Highway Administration.

c. Metes and Bounds Right of Way Plats

(1) Preparation

- (a) Preparation of plats, including symbols, legends, coordinate data, and drainage data shall be in conformance with Highway Administration standards.
- (b) Metes and bounds right of way plats, drawn in ink on linens or plastic drafting film (22" x 36"), shall be prepared from, and at the same scale as, the working map described above unless otherwise authorized by the Highway Administration. The plats shall be prepared for the ultimate future road improvement.
- (c) The use of "glue-ons", vari-typing and any drafting procedure that require a "spray on protective coating" are unacceptable for final Metes and Bounds Plats.

Mylar type reproductions are unacceptable as original Metes and Bounds Plats.

- (d) Each plat shall set forth the beginning point at the intersection of property line and right of way line for each description, referenced to an existing marker, call, monument, or point outside the area to be acquired, to a deed or plat of record identified by liber and folio. (Such deed or plat shall contain a metes and bounds description.) It shall be in the chain of title to the property to be acquired, unless no such marker, call, monument, or point can be found in such chain of title, in which case reference shall be made to the chain of title of adjoining property.
- (e) The base line of right of way, which shall be labelled, shall be referenced to the survey base line, which must be actually established in the field. All dimensions necessary to stake out or establish right of way lines, including existing and proposed right of way, dedication and property lines; shall be measured from or to said base line of right of way.
- (f) The bearing of all tangent portions of the base line of right of way and all curve data relating thereto shall be shown.
- (g) The right of way line radii at all street and road intersections shall be shown, as well as any other radii not concentric with the base line of right of way.
- (h) Base line stations and dimensions to all breaks in the new right of way line shall be shown, including all P.C.'s, P.T.'s, T.S.'s, S.C.'s, C.S.'s, S.T.'s, offsets, etc.
- (i) Each plat shall show a meridian arrow in relation to the bearings shown on the plat.
- (j) State Grid coordinates shall be shown for all control points.
- (k) At both ends of each plat, direction arrows to the nearest towns shall be shown for orientation.

- (l) Each plat shall show the fee right of way and perpetual easement taking by courses and distances in a clockwise direction.
- (m) The area of taking from individual properties, computed in acres (carried to 3 decimals) and square feet (to the nearest square foot), shall be shown, along with the remaining areas outlined where possible. Very small areas need be shown in square feet only. The name(s) of the owner(s) and the item number assigned shall be shown within the outline of each property.
- (n) Metes and bounds plats are to be continuous without overlapping of taking on adjacent plats, and, where match marks are required, they shall be shown in accordance with instructions furnished by the Highway Administration.

(2) Revertible Easements

Revertible easements shall be dimensioned and referenced to the base line of right of way and need not be described by courses and distances. The amount of acreage or square feet of revertible easement is not to be shown on the plats.

When acquiring a temporary easement during the period of construction for supporting slopes, a detour road, or any other such right that would terminate at the time construction is completed, the following language shall be used:

"Temporary easement to be used only during the period of construction for the purpose of _____

_____ and at the termination of the construction all rights hereby acquired by the State Highway Administration - State Roads Commission shall then terminate and revert to the property owners."

(3) Culture and Topography

Each metes and bounds plat shall show all existing culture and topography, such as buildings, structures, property markers, pipes, monuments, fences, hedges, major trees and shrubbery, pavements, curbs, islands, walks, steps, entrances, signs of any nature, route numbers, names of streets, etc., as may be pertinent to the right of way taking and/or as may be deemed necessary by the Highway Administration.

(4) Utilities

Each metes and bounds plat shall show all existing utilities both above and below ground (with identifying number and name of owner), such as poles, transmission towers, water, oil, electric, gas, sanitation or street sewers, pipe lines or conduits, meters, fire hydrants, manholes, valves, and all other appurtenances connected therewith.

(5) Subdivisions

The outline of all recorded subdivisions which are affected by, lie adjacent to, or abut the new right of way line shall be shown on the metes and bounds plats, with the appropriate subdivision name, recording references, lot, and block numbers, and referenced to the survey base line or base line of right of way.

(6) Area Tabulation Box - (appended hereto as Exhibit C)

In order to identify on the plat the deed for each property to be acquired, the area tabulation box for each property will provide the secretary file number, liber, folio and date of recording. It will be the responsibility of the Records, Research and Plat Coordination Section to obtain the necessary recording information and complete the plats.

(7) Tabulation Area Sheets - (appended hereto as Exhibit A)

All plats prepared shall be accompanied by a property tabulation area sheet showing the following information:

- (a) index number, property name and item number
- (b) fee area of take
- (c) breakdown on all easement areas
- (d) all easement areas are to be included as part of the remaining areas
- (e) on Federally funded projects, the remaining area lying right and left of the right of way, and total area
- (f) the tabulation area sheets shall be titled with the right of way contract number, Federal-Aid project number, right of way termini, and plat number(s).

Tabulation area sheets shall be supplied by the Highway Administration and are to be filled out in ink (printed) or typewritten (preferred).

(8) Materials Returned to the Highway Administration

Upon completion of metes and bounds plats, the following shall be returned to the Highway Administration as its property:

- (a) working map completed as described above
- (b) title abstracts, descriptions, subdivision plats
- (c) all office computations used in the preparation of plats and maps
- (d) all survey field books

d. Special Plats

- (1) The Consultant shall also prepare such other special plat or plats as may be requested by the Highway Administration. Special Plats, if requested, shall be justification for an "Extra Work" authorization.
- (2) All special plats shall be prepared in accordance with instructions and current standards furnished by the Highway Administration.

e. Right of Way Property Plans

Right of Way property plans shall be prepared on all Federally funded projects, as follows:

- (1) Plans are to be prepared on linen or plastic drafting film, in ink, or as a second original (sepla or vellum) of the metes and bounds plats, prepared.

The following should be omitted when a second original is made:

- Plat numbers, metes and bounds of the fee take, and/or perpetual easement areas, and all legends.
- (2) Outer dimensions are 22" x 36", including a 1 1/2" border on left and a 1/2" border on the other three (3) sides.
- (3) Title block (appended hereto as Exhibit B) shall be included in the upper right hand corner.
- (4) Generally a scale of 1" = 200' will be used.

- (5) The property plan shall show:
- (a) A meridian arrow in relation to the bearings shown on the plan.
 - (b) Directional arrows for orientation, at both ends of each plan (i.e., to towns, roads, etc.).
 - (c) Base line stations and dimensions to all breaks in the new right of way line, including all P.C.'s, P.T.'s, T.S.'s, S.C.'s, C.S.'s, S.T.'s, offsets, etc.
 - (d) References to pertinent right of way plat numbers.
 - (e) Base line(s) of right of way, right of way line(s), right of way lines of through highway, easement areas, vehicular and through highway controls, overpass - underpass notations, etc.
 - (f) Existing culture and topography located within the right of way taking or in close proximity thereto, together with all road or street right of way dedication lines, route numbers and street names.
 - (g) Match marks showing the preceding and succeeding plan sheet number.
 - (h) Each property shall be identified with full name and item number.
- (6) A property tabulation area sheet (appended hereto as Exhibit A) shall be completed showing the area of each affected property. The total area of properties bisected by match lines shall be included on the property tabulation area sheet for each plan on which the property appears. (See also paragraph C-4-c(7) of this Section of the Specifications).

5. Certification of Plats

The title lines or lines of division established as the limits of the property or properties, and the plat, or plats prepared from such information shall be certified as correct by the Consultant. Each record plat shall contain both the signature and seal of a Land Surveyor or a Property Line Surveyor registered in the State of Maryland.

However, when the Consultant is required to prepare plats from survey information furnished by the Highway Administration, the following statement shall be included on each plat.

"I hereby certify that the property lines shown hereon are a correct interpretation of the field survey supplied to me by the State Highway Administration."

6. Court Testimony

The Consultant, through the Land Surveyor or the Property Line Surveyor who certifies to the survey and plats, shall be responsible for defending the accuracy thereof in a Court of Law during condemnation proceedings or other litigation.

D. STATE HIGHWAY ADMINISTRATION SERVICES

The Highway Administration will provide those services and materials for which it is responsible as set forth in paragraph "C" above and Section I of the Specifications. In addition thereto, the Highway Administration will perform or provide the following:

1. Engineering standards, procedures, and review services through the Bureau of Highway Design.
2. Updates of title abstracts, as necessary, including available deed descriptions of the subject property, or properties, and copies of pertinent plats as are found among the Land Records for the county(ies) in which the subject property is located.
3. Blank standard linen (or equal) right of way sheets, plotting or working sheets, including property tabulation sheets.

PROPERTY TABULATION

R/W PROJ. NO.
F.A.P. NO.
R/W PROJ.

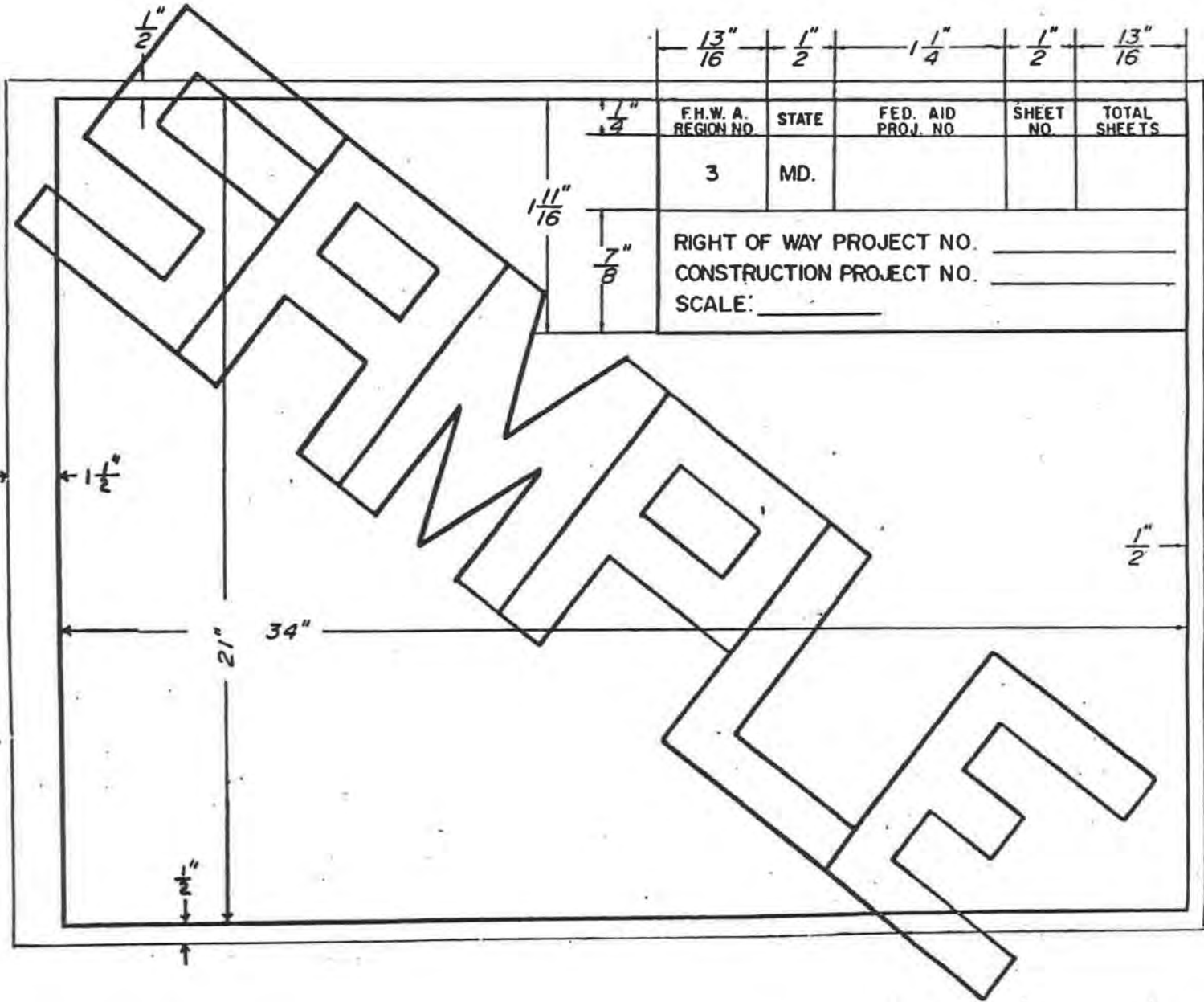
SHA 61.1-805
6-19-75

REVISED

SHEET NO. OF PLAT NO.

INDEX NO. & NAME	ITEM NO.	FEE	REVERTIBLE EASEMENT FOR SUPPORTING SLOPES	REVERTIBLE EASEMENT FOR SPECIAL PURPOSE	PERPETUAL EASEMENT FOR SPECIAL PURPOSE	PERPETUAL EASEMENT FOR DRAINAGE FACILITIES	AREA REMAINING		TOTAL AREA
							LEFT OF R/W LINE	RIGHT OF R/W LINE	
Exhibit A									

Exhibit B



Below are samples covering the two (2) methods in which areas would be shown on the plats including the recording information.

1. When area tabulation tables are used:

DAVID J. TAYLOR 69508		
SECY. NO. LIBER FOLIO R.D.		
1	R=6,541.12'	L=5.46'
	CHD.S45°48'40"W	5.45'
2	N67°35'33"W	57.84'
3	N22°24'27"E	5.00'
4	S67°35'33"E	60.00'
FEE SIMPLE AREA=296 SQ. FT. OR 0.007 AC. [±] SHOWN THUS: <input type="text"/>		

2. When perimeter metes and bounds are used:

DAVID J. TAYLOR
69508

SECY. NO. LIBER FOLIO R.D.	
FEE SIMPLE AREA=296 SQ. FT. OR 0.007 AC. [±] SHOWN THUS: <input type="text"/>	

EXHIBIT "C"

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section VIII

TRAFFIC ENGINEERING

SIGNING, MARKING, LIGHTING AND SIGNALIZATION

SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES

Section VIII

SIGNING, MARKING, LIGHTING AND SIGNALIZATION

PHASE IV

A. PURPOSE

The purpose of this Section of the Specifications is to describe the "Scope of Work" required of a Consultant with respect to the preparation of Design and Construction Contract Plans, Specifications, and Estimates for Signing, Lighting, Marking, and Signals.

B. OBJECTIVE

The objective of performing the signing, lighting, marking and signalization services set forth herein is to provide complete engineering and associated services including detailed plans, quantities, estimates, special provisions and necessary supporting documents, complete and approved ready for advertisement for bids.

C. SERVICES TO BE PROVIDED BY THE CONSULTANT

1. General

The Consultant shall provide all services set forth in this Section of the Specifications. The Consultant shall provide all contacts, professional advice, public relations, and field and office work necessary in the performance of these services as directed by the Highway Administration. The Consultant may also be required to perform Field Surveys.

2. Engineering Standards

The Consultant shall perform all engineering services in accordance with the standards, directives and instructions of or adopted by the Highway Administration.

3. Utility Contacts

The Consultant shall contact, through the District Utilities Engineer, all utility companies who supply electric power in the vicinity of the Project and determine the location for power connection and the type of equipment which will be satisfactory to and compatible with that in use by the utility serving the particular area.

4. Preparation of Plans and Supporting Documents

a. General

The Consultant shall prepare contract plans, quantities, estimates, and special provisions for the Project. The Consultant shall utilize to the fullest extent possible the available standard details and designs, and shall perform only such design necessitated by non-standard conditions, which shall include those conditions which do not fall within a reasonable range of the standard designs, as determined by the Highway Administration. Separate contract plans and documents may be required for (1) Signing and Marking, (2) Lighting and (3) Signalization.

b. Drafting Standards - Tracings, Lettering (see 4f(2))

c. Standards

In addition to the standards enumerated below, the Consultant shall observe other standards, directives, procedures, guides, etc., of The American Association of State Highway Transportation Officials (AASHTO), Federal Highway Administration, Institute of Traffic Engineers' Manual on Uniform Traffic Control Devices, high voltage line act of 1973, the 1974 report of the special AASHTO traffic safety committee entitled "Highway Design and Operational Practices Related to Highway Safety" as directed by the Highway Administration.

(1) Signing and Marking Standards

(a) Interstate Projects and Extensions.

"Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways", 1970, and subsequent revisions, by AASHTO: the current "Manual on Uniform Traffic Control Devices" (MUTCD), and official rulings on requests for interpretations, changes, and experimentations by The National Joint Committee on Uniform Traffic Control Devices.

(b) Federal Aid Primary Projects - MUTCD

(c) All Other Projects - MUTCD

(2) Lighting Standards

(a) "Informational Guide for Roadway Lighting", dated 1984 and subsequent revisions, by AASHTO.

(b) "American National Standard Practice for Roadway Lighting", approved July 21, 1983, and subsequent revisions, by the American National Standards Institute, ANSI/IES RP-8, 1983.

(3) Safety Standards Relative to Signing, Marking and Lighting

Particular consideration shall be given to the recommendations set forth in the 1974 report of the special AASHTO Traffic Safety Committee entitled "Highway Design and Operational Practices Related to Highway Safety" and subsequent additions by AASHTO.

(4) Sign and Lighting Structure Criteria

Sign and lighting structures shall meet the criteria set forth in AASHTO's "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", 1975, and subsequent revisions.

d. Preliminary Field Reconnaissance

The Consultant shall conduct a preliminary field reconnaissance in company with Highway Administration representatives to determine tentative locations for guide signs, non-standard applications of markings, regulatory and warning signs, and also for lighting and signalization. In addition, the Consultant shall utilize available plans, other existing data, and applicable standards to facilitate making said determinations, which shall be subject to approval by the Highway Administration.

e. Preliminary Plans and Estimates

- (1) The Consultant shall prepare preliminary plans showing the location of guide, regulatory and warning signs, delineators, and markings (exclusive of pavement centerline and standard edge marking) for the Project, including those to be provided on the intersecting roads. Sign messages, types of supports, and the provision of illumination for overhead signs shall be indicated.
- (2) The Consultant shall prepare preliminary plans for the lighting and signalization of the Project indicating location of lighting standards, signal poles, wiring, power supply, detector location and proposed intersection geometrics. The lighting shall produce the degree of illumination, expressed in foot-candles, acceptable to the Highway Administration. The highway lighting shall be so designed to be compatible with the signing on the Project.
- (3) For Signing, Marking, and Lighting, the scale of plan sheets shall be 1"=100'.
For Traffic Signals, the scale shall be 1"=20'.

- (4) The Consultant shall submit preliminary plans and estimates for review by the Highway Administration and, if a Federal Aid non-Certification Acceptance Project, the Federal Highway Administration.

- (5) Preliminary Field Investigation and Approval

A preliminary field investigation will be made by the Consultant, representatives of the State Highway Administration and representatives of the Federal Highway Administration, if applicable.

The Consultant shall not proceed with the preparation of final contract plans and documents until the preliminary plans have been approved and written notice to proceed has been given by the Highway Administration.

f. Final Contract Plans & Documents

- (1) After approval of the preliminary plans, the Consultant shall complete the preparation of separate detailed contract plans for (1) all guide, regulatory, and warning signs, delineators and markings (exclusive of pavement centerline and standard edge markings), and (2) lighting and signalization of the Project for advertisement for bids. The Consultant shall also locate any existing signs and lights on the plans and indicate removal or retention as appropriate. The plans shall tie signing and lighting and signal installations to existing features, such as curbs, inlets, etc.
- (2) Plans shall be prepared on standard linens (or equal) furnished to the Consultant by the Highway Administration. The Consultant shall prepare tracings, in ink, for all construction drawings.

The size of all lettering and dimensioning shall be a minimum height of 1/8" and the spacing between lines shall be a minimum of 1/16". All lettering shall be capable of 50% reduction without loss of legibility.

- (3) Final Review and Approval

The Consultant shall submit contract plans for final review by the State Highway Administration and, if a Federal Aid non-Certification Acceptance Project, the Federal Highway Administration. The Consultant shall attend and participate in the final review, and shall halt productive design work until provided written approval of the final review plans by the Highway Administration.

The Consultant shall then prepare all final documents in accordance with the approved final review, as directed by the Highway Administration.

(4) Special Provisions

The Consultant shall prepare all Special Provisions required in addition to the Highway Administration's "Standard Specifications for Construction and Materials", as amended; for the proper and efficient construction of the signing, marking, lighting and signalization.

The Consultant shall be responsible for a thorough knowledge of the Specifications and any and all amendments thereto, as well as flyers approved for inclusion in contract documents.

The Consultant shall prepare Special Provisions only for those items not satisfactorily detailed in the Specifications or those peculiar to the Project and shall not rewrite or repeat information contained in the Specifications, amendments thereto or flyers.

The Consultant shall submit for approval with final review plans a draft of the Special Provisions in number required by the Highway Administration for signing and marking and separately for lighting and signalization each in a self-contained format.

Following review and approval of the draft by the Highway Administration, the Consultant shall prepare a corrected master copy on white bond paper, size 8 1/2" x 11", conforming in every respect to the approved draft, and ready for advertisement for bids, and shall submit same with the completed contract plans, quantity sheets, and Final Engineer's Estimate.

Each sheet shall state the subject of the Special Provisions, as well as the pertinent contract number(s).

(5) Final Engineer's Estimate

The Final Engineer's Estimate shall be prepared by the Consultant on forms and in accordance with the procedures of the Highway Administration including the publication "Procedures for Preparing the Contract Estimate and Proposal Quantity Booklet". The completed computer input forms shall be submitted with the completed contract documents and the required Special Provisions ready for advertisement.

(6) Title Sheet

The Title Sheet, 22" x 36", shall show the complete layout of the Project, including stations showing the limits of work, to a scale of 1" = 1 mile, 2" = 1 mile, or 1" = 2,000 feet, whichever is most appropriate to the Project. The Title Sheet shall also include State, and Federal (if a Federal Aid Project) contract numbers and descriptions, an index of sheets, conventional symbols, numbers of all survey books used, and appropriate notes.

(7) Consultant Endorsement

Upon submission of the contract plans ready for advertisement, the Title Sheet shall contain the endorsement of a Professional Engineer, registered in the State of Maryland, who supervised the preparation of the plans.

5. Field Surveys

a. General

The Consultant will perform those services, in whole or in part, as set forth in volume II of the SPECIFICATIONS FOR CONSULTING ENGINEERS' SERVICES, dated December, 1985, and any amendments thereto, Section VII, "Surveys and Stakeouts" and "Preparation of Metes and Bounds Right-of-Way Plats, Special Plats, and Right-of-Way Property Plans". In addition, the Consultant may be required to provide the following.

b. Field Surveys for Traffic Signalizations

(1) Traverse -

Establish new B/L 300 feet in all directions from intersection or utilize existing B/L's if available.

(2) Topography -

In addition to locating the general topography as outlined in Section VII of Volume II of the Specifications, the Consultant will locate the following:

- (a) all painted traffic controls (stop bars, islands, acceleration and deceleration lanes, etc.).
- (b) location height and directions of all overhead wires.

- (c) location of street lights and direction of support arms.
- (d) location and description of traffic signals (3 Phase, 4 Phase, etc.).
- (e) location of magnetic and loop detectors plus related traffic signal appurtenances.

(3) Elevations -

The Consultant will obtain distance from ground level of all wires, lights, and traffic signals, and show relationship to level of roadway.

c. Metes and Bounds Right of Way Plats

The Consultant will furnish all technical and drafting services required for the reduction of survey notes and computations and the preparation of metes and bounds right-of-way plats.

The Consultant shall request a title examination and item number for each property that is to be acquired, and this is to be performed as soon as the design confirms the necessary taking.

6. Incidental Services

As directed by the Highway Administration, the Consultant shall:

- a. Adhere to procedures and requirements of the Action Plan as may be applicable to the Project.
- b. Prepare Federal Aid program data.
- c. Participate in periodic visits to the Project site, meetings and conferences.
- d. Prepare various estimates per Highway Administration direction. These may be required to accompany every plan submission.
- e. Prepare progress reports per Highway Administration direction.
- f. Prepare various supporting documents per Highway Administration direction.
- g. Furnish white prints, photostats, photographs; reproductions, sepia prints, etc.
- h. Review property plats to determine effects of proposed Project.

D. STATE HIGHWAY ADMINISTRATION SERVICES

The Highway Administration will provide those services and materials for which it is responsible as set forth below and Section I of the Specifications.

1. Management and review services through the Bureau of Traffic Engineering.
2. Engineering standards, participation in field reviews and reviews of preliminary and final contract documents.
3. All existing data relative to the Project, including roadway and interchange construction plans, right-of-way plats, subsurface information, plans of utility installations that may be affected, maps of intersecting roads and adjacent areas, and all other data pertinent to preparation of the contract documents.
4. All information which may come to the Highway Administration during the term of the Consultant's agreement and which, in the opinion of the Highway Administration, is necessary to the prosecution of the work.
5. Certain plan sheets and supporting items for use in signing and marking contracts, including title sheets, general notes and proposal item schedules, schedules for overhead and roadside signs, form for guide sign message details and dimensions, multiple sheet sign panel details, sign illumination and foot walk details, layout sheets for warning and regulatory signs, route marker shields, delineators and pavement marking details, and scheduled sheets for sign index and summary of quantities.
6. Certain plan sheets and supporting items for use in lighting contracts, including title sheets, general notes and proposal item schedules, detail sheets for luminaires, lighting standards and foundations, splice details, roadway cross sections showing conduit installation details, and summary of quantities sheets.
7. Standard plan sheets (linen or equal), Book of Standards, Category Code Book, and other forms and documents as necessary.
8. Public notices and advertisements if necessary.
9. Assembly of plans and proposal booklet for advertisement.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES
Section IX
LANDSCAPE ARCHITECTURE**

SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES

Section IX

LANDSCAPE ARCHITECTURE

- A. PLANTING AND SITEWORK DESIGN
- B. NOISE ABATEMENT DESIGN

PHASE IV

Part I

PLANTING AND SITEWORK DESIGN

A. PURPOSE

The purpose of this Section of the Specifications is to describe the "Scope of Work" required of a Consultant with respect to the furnishing of the planting and sitework design for a project complete and ready for advertisement for bids.

Note: This work is usually performed during and/or after Phase V, the construction of a highway project, although considered a design (Phase IV) activity for purposes of work classification.

B. OBJECTIVE

The objective of performing the planting and sitework design services set forth herein is to provide the complete design for the project, including detail plans, quantities and required special provisions complete and approved ready for advertisement for bids. These specifications are also applicable for landscape architectural services included as part of a highway or bridge project.

C. CRITERIA

1. All landscape architectural services provided by the Consultant shall be performed under the supervision of a Maryland Registered Landscape Architect.
2. The Consultant shall perform all services in accordance with the latest standards, directives, specifications and instructions of the Highway Administration.
3. The Consultant shall perform the planting design in general conformity with the basic concepts and principles as set forth in the 1970 American Association of State Highway and Transportation Officials (AASHTO) publication "A Guide for Highway Landscape and Environmental Design" as amended.

D. SERVICES TO BE PROVIDED BY CONSULTANT

1. General

The Consultant shall provide all services as set forth in this Section of the Specifications and/or described in Section I of the Specifications. The Consultant shall provide all contacts, professional advice, public relations, field and office work necessary in the performance of this service as directed by the Highway Administration.

2. Preliminary Field Reconnaissance

The Consultant shall accompany a Highway Administration representative on a preliminary field reconnaissance to become familiar with the scope of the project.

3. Preparation of Plans

a. General

The Consultant shall prepare and furnish all plans and special provisions necessary to obtain final design approval.

b. Drafting Standards - Tracings, Lettering

(1) Tracings

Tracings are required for all construction drawings. All drawings will be in ink on printed sheets supplied by the Highway Administration.

(2) Lettering

The size of all lettering and dimensioning shall be a minimum height of 1/8", and the spacing between lines shall be a minimum of 1/16". All lettering shall be capable of 50% reduction without loss of legibility.

c. Location of Existing Physical Features

All existing physical features noted under Detailed Design-Plan Sheets, paragraph (e) below, shall be located and shown on the plans by the Consultant. Many of these features will appear on construction plans and/or right-of-way plats which will be furnished to the Consultant by the Highway Administration; however, it shall be the Consultant's responsibility to check these features in the field to assure their location as shown. In the event that these features are not shown, the Consultant shall locate them within an accuracy of 5 feet for landscaping projects. Topographic features for sitework design shall be located by survey.

d. Preliminary Plans - 30% Design Stage, and Preliminary Field Inspection

The Consultant shall prepare preliminary plans to a 30% completion stage for use at the Preliminary Field Inspection, as directed by the Highway Administration. Included in this stage shall be the preparation of preliminary design schematic drawings. The drawings shall indicate the following: plant masses (color coded as to type, i.e., deciduous, evergreen shrubs, vines, whips, etc.), land use patterns, areas to be screened and reasons for screen, buffers, etc., views, along with sketches to indicate design intent. Retained excess lands shall be indicated on 30% drawings.

Upon completion of 30% design stage, the Consultant shall accompany the Highway Administration's Landscape personnel on the Preliminary Field Inspection for general design layout. Highway Administration's Landscape personnel will prepare a memo report to the Chief, Bureau of Landscape Architecture documenting the recommendations agreed upon at this review.

Upon approval of this report by the Deputy Chief Engineer - Office of Highway Development, or if required, by the Federal Highway Administration, the Consultant shall proceed with design of the project and shall incorporate into his design all revisions which were approved.

e. Detailed Design - Plan Sheets

The plan of the proposed improvement shall be shown to the horizontal scale of 1"=50' unless otherwise specified. The plan sheets shall show all existing features, such as buildings, other structures, drainage, top and toe of slopes, poles, overhead wires, other utilities, fences, hedges, woodland, individual trees, pavements, curb limits, entrances, streets in the vicinity (by name), major signs, centerline and ramp stations every 100 feet, right-of-way lines, limits of easements, the nature of adjacent development, and any other pertinent data specified by the Highway Administration. Plan sheets of interchange areas shall include an interchange key map to identify the portion of the interchange on each sheet. All plans shall be identified by using the Highway Administration's Plant Materials Key. Any non-standard planting details required for the project shall be shown.

The Consultant shall prepare separate detail sheets only for non-standard details that are not included in the Highway Administration's Book of Standards. The plan sheet shall contain a north (meridian) arrow, traffic flow indications, and State title block, and they shall conform to the standards of the Highway Administration.

All additions, deletions, and/or corrections to the plans shall be made to the satisfaction of the Highway Administration.

f. Semi-Final Plans - 70% Design Stage, and Office Review

After the detailed design has been prepared but prior to the preparation of Distribution of Materials Sheets, the Consultant shall prepare and submit tracings of semi-final plans, incorporating comments received as a result of the Preliminary Field Inspection.

The Consultant shall participate with the Highway Administration's Landscape personnel in a 70% Office Review.

The Consultant shall prepare a report to the Chief - Bureau of Landscape Architecture documenting the recommendations agreed upon at the review.

g. Distribution of Materials Sheets

These sheets shall show a breakdown, in alphabetical botanical order, of all major, minor and evergreen trees, all shrubs, whips, vines, seedlings and all other plants by plan sheet numbers, and shall show all other items necessary to complete the project. This breakdown shall also indicate item number, botanical name, common plant name, bare root or balled and burlapped designation, minimum ball diameter, size, contract quantities, and remarks.

The Distribution of Materials Sheets shall contain the State title block and shall conform to standards furnished by the Highway Administration.

h. Title Sheet

The Title Sheet (22" x 36") furnished by the Highway Administration shall include a location map showing the complete layout of the project to a scale of 1"=1 mile, 2"=1 mile, or as directed by the Highway Administration.

The Consultant shall include other information on the Title Sheet as directed by the Highway Administration.

Upon submission of the contract plans ready for P.S. & E., the Title Sheet shall contain the endorsement and recommendation (seal) of the Consultant, registered in the State of Maryland, who supervised the preparation of the plans, and all other required endorsements and approvals.

i. Special Provisions

As directed by the Highway Administration, the Consultant shall prepare all Special Provisions required in addition to the Highway Administration's "Standard Specifications", as amended, for the proper and efficient construction of the project. The Consultant shall be responsible for a thorough knowledge of the Specifications and any and all amendments thereto, as well as all flyers approved for inclusion in contract documents. The Consultant shall prepare Special Provisions only for those items not satisfactorily detailed in the Specifications or those peculiar to the project, and must not rewrite or repeat information contained in the Specifications, amendments thereto, standard plates, or flyers.

The Consultant shall submit for approval with final review plans an accurate double spaced typewritten draft of the Special Provisions, in number required by the Highway Administration. Following review and approval of the draft by the Highway Administration, the Consultant shall prepare a corrected master copy on white bond paper, size 8 1/2" x 11", conforming in every respect to the approved draft, ready for advertisement for bids, and shall submit same with the completed contract drawings.

j. Final Office Review

A final review of complete plans, quantities, and Special Provisions will be made by Highway Administration personnel and the Federal Highway Administration, if applicable, prior to acceptance. After approval of final review and before advertising, the Consultant shall submit originals of final drawings to the Highway Administration.

4. Prints, Reproductions, etc.

When requested by the Highway Administration, the Consultant shall furnish white prints, photostats, photographs, reproductions, sepia prints, etc.

5. Post Award Services

The Consultant shall remain at the call of the Highway Administration for the interpretation of plans and design during the actual construction. It is not intended that the Consultant shall have a full time staff for this purpose during this period, but, in the event questions concerning completed plans arise, the Consultant will be called in for explanation or interpretation. In addition, the Consultant shall review shop drawings if required.

6. Incidental Services

As directed by the Highway Administration, the Consultant shall:

- a. Adhere to procedures and requirements of the Highway Administration as may be applicable to the project.
- b. Participate in periodic visits to the project site, meetings, conferences, hearings, etc.
- c. Prepare monthly progress reports.
- d. Prepare other project monitoring data as required.
- e. Prepare various supporting documents.
- f. Prepare data for regulatory permit applications required by various governmental authorities.
- g. Revise contract drawings if required.

E. STATE HIGHWAY ADMINISTRATION SERVICES

The Highway Administration will provide those services and materials for which it is responsible as set forth in Section 3 above and other sections of these Standard Specifications as required. In addition thereto, the Highway Administration will perform or provide the following:

1. Management and review services.
2. All information presently prepared and assembled by the Highway Administration for this project.
3. The following as required: standard plan sheets, distribution of materials sheets, title sheets, Plant Materials Key, standard landscaping special provisions inserts, other forms and documents.
4. A general location plan of the project, together with roadway construction plans, sample plans, and right of way plats.
5. Distribution of prints for preliminary field inspection, 70% design stage office review, and final office review.
6. Review of Engineers Estimate submitted by Consultant and computerization of same.
7. Assembly of P.S. & E. package, for submission to the Federal Highway Administration, or to the Highway Administration if a Certification Acceptance Project.

8. Assembly of plans and proposal for advertisement.
9. Distribution of plans and proposal.
10. Issuance of addenda.

PART II

NOISE ABATEMENT DESIGN - PHASE III, PHASE IV AND PHASE V

A. PURPOSE

The purpose of this portion of the Specifications is to describe the requirements specific to the design of noise abatement projects. These specifications are applicable for Type I or Type II noise abatement projects.

B. CRITERIA

Design of noise barriers will be based on criteria and policies established by the State Highway Administration. The Consultant shall also adhere to the Federal Highway Program Manual (FHPM) Vol. 7, Chapter 7, Section 3, titled "Procedures for Abatement of Highway Traffic Noise and Construction Noise".

The design of noise barriers shall give thorough and continual consideration to topographic relationships, views of and from the highway, location of the barriers to both source and receiver, color, texture, material, etc.

All barrier analyses shall be performed utilizing the latest version of FHWA computer model, STAMINA 2.0/OPTIMA. Due to the environmental sensitivity of noise barrier implementation and the importance of aesthetic compatibility, the services of a Maryland Registered Landscape Architect are required through all phases of noise barrier design.

Every effort shall be made to achieve substantial noise reduction.

1. A minimum insertion loss (noise reduction) of 7-10 decibels (dBA) is desirable at critical sensitive receptors.
2. Achieve "with-barrier" noise levels at or below Federal Highway Administration noise abatement criteria (Leq-67 dBA, residential).

Critical sensitive receptors are defined as first-row, ground level sites, where worst-case noise impact is found. Generally these areas abut the highway right-of-way. Critical sensitive receptors only should be used to govern barrier design. Attenuation at second row receptors is considered an added benefit, but should not generally be used to influence barrier design.

In general, noise barrier design for multi-story apartment buildings should use ground floor units as design points, unless topographic conditions allow for upper floor protection without extraordinary added costs to the barrier system or extreme adverse visual impact.

Maximum barrier height (from existing ground to top of barrier) should not exceed 20 feet, unless acoustically warranted to achieve minimum design criteria. Such situations should be evaluated on a case-by-case basis considering costs, potential benefits and possible visual impacts.

Proposed barrier height should break line-of-sight between heavy truck exhaust stack (typically 11' above pavement) and critical receivers, and should be increased in height above optimum acoustic profile if necessary to shield the exhaust stack.

Landscaping

Landscaping of noise barriers will be based on criteria and policies established by the State Highway Administration, Section XIII A of these specifications SHA Planting Specifications and sound landscape architectural practices. Design of landscaping for noise barriers will be performed under the direction of a Maryland Registered Landscape Architect.

Structural Engineering

Structural engineering required for the design of foundations and superstructure of the noise barriers shall be in accordance with the latest AASHTO specifications, including interim specifications, the Division of Bridge Development P.P.M. and standards and applicable SHA structural design criteria for noise abatement walls. Additional criteria for supporting design services for noise abatement projects such as surveys, hydraulics design, etc. are included in other applicable sections of these Specifications.

C. SERVICES TO BE PROVIDED BY CONSULTANT

Phase III

The noise barrier length and heights previously noted are approximate only. This phase of design will determine the final length and height parameters, barrier location, effectiveness, materials, and preliminary cost estimate. While it appears that wall type noise barriers may be most feasible, the Consultant shall also investigate initially the feasibility of earth berms or berm/wall combinations, which can be implemented within the existing right-of-way and taking into account costs, safety, etc. Coordination will be maintained with the Administration to arrive at a decision on the feasibility of alternate solutions to walls.

After this decision is made, the Consultant shall prepare a preliminary design for each barrier to refine height, length, and location. Each preliminary barrier will be reviewed by the Administration with the Consultant. Revisions to this initial design may be required based upon aesthetic, right-of-way constraints, engineering, and monetary considerations, etc. The Consultant's proposal should contain sufficient time to investigate multiple combinations of length, height, and locations in order to achieve a balanced barrier design. Type of barrier need not be limited to an existing system or systems, but should consider the necessity and desirability of modifying or designing new systems to meet project needs.

1. Prepare two (2) design concepts for each barrier including preliminary costs. One design concept shall be based on the SHA standard concrete or wood noise barrier. The second design concept shall be for a different system capable of meeting the needs of the project. Upon review of the concepts the Administration will schedule and conduct community informational meetings to present the barrier concepts to the public. It is anticipated that two (2) community informational meetings will be required for each barrier designed.
2. Prepare displays depicting preliminary barrier concepts of each barrier for presentation to community groups. Displays shall consist of a sufficient number of perspective sketches, cross-sections, artists renderings, models, etc., to convey design intent to the general public.
3. Prepare concept drawings depicting relationship of noise barriers to the highway, adjacent development and existing site conditions. These shall be in the form of cross-section sketches, perspective sketches, etc.
4. The landscape architect shall assist the acoustical engineer in determining barrier location so the barrier will be an integral component of the surrounding area. The intent is to utilize the information obtained from the site analysis in determining barrier position.
5. The landscape architect shall prepare studies of possible barrier materials with emphasis in color, texture, composition, etc. Conceptual planting design drawings shall be prepared during this phase. Emphasis should be on retention of existing vegetation to the greatest degree possible. Areas where supplemental planting will be necessary shall be shown on the conceptual drawings along with an indication of type of material to be used, i.e., evergreen, deciduous shrub, tree, etc.
6. Attend meetings with community groups to present and discuss barrier proposals. It is anticipated that two (2) meetings for each barrier location will be required.

7. Prepare a draft Noise Study Report in accordance with FHPM 7.7.3 design methodology and results of Phase IV Preliminary Design, including community involvement. Upon completion, three (3) copies of the Draft Noise Study Report shall be submitted to the Administration. Upon review of the Draft Noise Study Report, the Administration will notify the Consultant of selection of the barrier concept for each barrier to be carried into Phase IV - Final Design.

PHASE IV FINAL DESIGN

1. Noise Barriers

Upon approval of the noise barrier conceptual design and upon notice from the State Highway Administration, the Consultant will proceed with the final design of the noise barriers for each project. The final design will include the preparation of all final construction plans, profiles, details, specifications and estimates required for final approval and advertisement of each project. The Consultant shall base his costs for this phase of the work on providing complete design services for each noise barrier and shall not anticipate the use of a standard noise barrier system. If it is determined that a standard noise barrier system is to be used on either of these projects, the Consultant's fee will reflect only the services required for the design requirements of that system.

2. Landscaping

The Consultant shall prepare final landscape plans, special provisions and estimates for the landscaping of the noise barriers for each project.

3. Structural Engineering

The Consultant shall provide structural engineering required for the foundations, superstructure design, or other structural requirements of the noise barriers. All structural design shall be prepared under the supervision of a registered professional engineer who shall sign and seal all pertinent drawings.

D. STATE HIGHWAY ADMINISTRATION SERVICES

1. General Services

- a. Provide overall management and liaison services related to design phases.
- b. Coordinate and conduct all required meetings with the public.

- c. Provide noise barrier standards, design criteria and copies of past design projects for use as examples or guides.
- d. Coordinate and conduct Preliminary Field Investigation (P.I.) and Final Review.
- e. Provide review and approval of contract documents.

2. Noise Abatement Services

- a. Provide 1"=50' scale photogrammetric mapping.
- b. Provide available highway plans and metes and bounds plats.
- c. Provide a preliminary noise analysis and identification of noise sensitive areas.
- d. Provide current and projected Average Daily Traffic (ADT) required for noise analysis.
- e. Provide soil borings, foundation data and boring logs.
- f. Provide pertinent standard noise barrier plans and related structural design criteria.
- g. Provide standard landscaping special provisions.
- h. Request Utilities Survey and make final agreements with utility companies.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section X

CONSTRUCTION ENGINEERING AND INSPECTION

SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES

Section X

CONSTRUCTION ENGINEERING AND INSPECTION

PHASE V

A. PURPOSE

The purpose of this Section of the Specifications is to describe the "Scope of Work" required of a Consultant when construction engineering and inspection services are required and when said Project services are to be financed with State and/or Federal funds.

The Consultant will be required to furnish competent personnel who will be responsible to the Highway Administration's District Engineer or his designated representative. The Highway Administration will provide Project Engineers to all projects and shall have the option of assigning Highway Administration Inspectors or Inspectors available through other private companies to supplement and/or replace the Consultant's inspection forces, should the need arise.

The State Highway Administration reserves the right to vary the number of personnel required from the Consultant dependent on projects' needs. Needs shall be determined by the Bureau of Construction Inspection. Qualified engineers and technicians in the numbers and skill levels described in the Project resumes shall be provided to the State Highway Administration's District Engineer for assignment as construction inspectors or construction contract surveying party members. Assignment may be made to a project or projects located anywhere in the District, unless otherwise stipulated in the Project resume.

B. SERVICES TO BE PROVIDED BY THE CONSULTANT

1. General

- a. The Consultant shall perform, under the direction of and to the satisfaction of the Highway Administration's District Engineer or his designated representative, the engineering and inspection of construction required to provide a completed Project in accordance with the plans and specifications for the Project. The Consultant shall ascertain the practices of the Highway Administration prior to performance of the work and all engineering and inspection shall be performed in accordance with these standard practices.

- b. The Consultant shall provide, competent personnel to perform checks of the Construction Contractor's construction stakeout, detailed inspection of construction, inspection of on-site materials, off-site plant inspection when directed, and workmanship to assure that the construction complies with the intent of the plans, special provisions, and specifications. All work performed by Consultant personnel on the Project shall be supervised by a State Highway Administration's Project Engineer. The extent of the field control by the Consultant shall be subject to the approval of the Highway Administration through its duly authorized representative and the Federal Highway Administration.
- c. This assignment is intended to completely cover all facets of normal company supervision, assignment of personnel, inspection, testing, engineering interpersonnel activities, etc. No additional compensation will be allowed unless properly documented and presented in a timely manner to the Highway Administration's District Engineer for review and approval, prior to performing such extra duties, which the Consultant considers may be compensable outside the terms of this agreement.

2. Engineering and Inspection Staff

- a. The Consultant shall provide competent personnel in sufficient numbers and skill levels as directed to comply with the requirements of the Highway Administration for the particular contract. The quality and extent of the field control shall be under the immediate direction of the State Highway Administration's Project Engineer. The Consultant shall furnish transportation, if necessary. The Consultant shall provide all necessary field engineering tools and equipment such as rules, hand levels, surveying equipment, slump cones, air meters, soil density equipment, aggregate gradation equipment, etc. except for District-wide agreements in which case the Consultant shall be required to provide small tools such as rules and hand levels. All tools and equipment provided by the Consultant shall be available for use by Highway Administration employees in addition to the Consultant forces. Personnel assigned to the Projects shall be skilled in construction stake-out and in the inspection of the individual phases of work to be accomplished for the Projects. The Consultant shall provide safety equipment to his personnel as necessary to comply with all applicable safety requirements. Reflective vests will be required at night.
- b. The Consultant shall provide personnel at the required skill levels on the dates specified in writing by the Chief, Bureau of Construction Inspection.

- c. Release of personnel shall be at the discretion of the Highway Administration's District Engineer or his authorized representative.
- d. Any Consultant employee whose service is deemed unsatisfactory for any reason by the District Engineer shall be removed from the Project and replaced by a qualified individual as directed in writing by the District Engineer. Any employee so removed may not be assigned to any other SHA District or project.
- e. If the Consultant's employees report for work as previously directed by the Highway Administration's Project Engineer and no work is done by the Construction Contractor due to inclement weather or any other reason, the employees will be assigned duties by the Project Engineer and will be credited with eight (8) hours for the day, or two (2) hours for reporting on other than normal work days. Monday through Friday shall be considered normal work days.

3. Responsibility of Consultant Personnel

- a. The Highway Administration's District Engineer will assign a State employee as Project Engineer for all Projects, who will be the agent of the Highway Administration and official representative on the Project, and will be in responsible charge of the Project. The Project Engineer will be monitoring and assuring full and competent performance of the work by the Consultant under this agreement. The Consultant's assigned personnel shall report to and be directly responsible to the said Project Engineer for such time and duties as may be assigned.
- b. All orders to the Construction Contractor's forces will be transmitted through the Highway Administration's Project Engineer or designated representative. The Consultant's assigned forces shall be available for discussions of all issues arising on the project so that the Project Engineer may have the benefit of their knowledge in deciding and agreeing on the course of action to be transmitted to the Construction Contractor.
- c. The Highway Administration's Project Engineer shall notify the Consultant's assigned forces concerning his decision on any activity where the Consultant forces are involved.
- d. Project correspondence will be initiated by the Highway Administration's Project Engineers or District Engineer, as the case may be. Any correspondence initiated by the Consultants other than resumes for approval shall be directed to the District Engineer.

- e. The Consultant's assigned forces shall have no authority to make changes in the plans and specifications for the Project. Recommendations may be made only to the Highway Administration's Project Engineer. The Consultant shall be responsible for only those administrative matters which pertain to maintaining a properly equipped inspection force at the required level, payment for services of his personnel, payment of expenses, vacations, and reassignments. The level of the force must be maintained by the Consultant when the Consultant's personnel are on vacation, sick leave, or absent for training at the Consultant's expense, or are reassigned. The Highway Administration shall approve any changes as far in advance as possible.
- f. The Consultant's assigned forces shall have no duties or authority to advise or issue directions as to safety precautions or programs in connection with the work. Further, the Consultant's assigned forces shall have no duty or responsibility to inspect and report as to the Contractor's compliance with OSHA and other laws, regulations and specifications pertaining to safety precautions and programs during the construction phase, except the duty to report safety concerns to the Highway Administration's Project Engineer as prescribed in the State Highway Administration Safety Handbook.

4. Qualifications of Consultant's Personnel

The Consultant shall submit to the Highway Administration a roster of all personnel contemplated to be assigned to the Project together with a detailed resume (in duplicate) describing the education, experience qualifications, and proposed hourly salary of each individual included on the roster. No personnel shall be assigned to the Project by the Consultant until the proposed employee's qualifications have been reviewed and approved by the Highway Administration. The roster and resumes are to be submitted to the Chief, Bureau of Construction Inspection for approval. No reimbursement will be made by the Highway Administration for employees assigned prior to approval.

5. Inspection

Inspection to be provided under the terms of the Agreement shall include and cover normal field tests indicated by the State Highway Administration's Standard Specifications for Construction and Materials and Materials Field Procedures Manual. Breaking of cylinders, hardness tests, coring, chemical tests and other heavy and involved laboratory examinations will be conducted by the testing materials laboratory of the Highway Administration.

Inspection shall be performed in accordance with the current practice of the Highway Administration as set forth in the Specifications, State Highway Administration Construction Manual, Materials Field Procedures Manual, and pertinent directives and memoranda issued by the Highway Administration. Also included are all duties assigned by the Highway Administration's Project Engineer regardless of whether such duties are menial or complex.

6. Reports

The Consultant's assigned personnel shall compile and furnish to the Project Engineer, State Highway Administration, all Inspector's Daily Reports (IDR's) required of State Highway Administration's inspection force. Practice shall be as detailed in the State Highway Administration Construction Manual and Construction Directives. Reports on duties assigned by the Project Engineer will be submitted to the Project Engineer.

7. Records

a. The Consultant's assigned personnel shall keep neat and accurate records, on paper and forms provided by the Highway Administration, of contract items and quantities completed by the construction Contractor. The records shall include all diaries, sketches, measurements and computations of quantities. Records will be signed and dated by the inspector who witnessed the work and/or measured the quantity. Records on the Project will be kept by the Highway Administration's Project Engineer. Records that are transcribed or copied by the Consultant's personnel will be signed and dated when submitted to the Highway Administration's Project Engineer. All records and computations which are kept by the Consultant's field or office personnel shall be kept in such a manner that they may be referred to at any time. This shall be as detailed in the State Highway Administration Construction Manual and Construction Directives. Records shall be compiled and documented as assigned by the Highway Administration's Project Engineer.

b. The Consultant shall assist with preparation of the sketch books during the progress of the work and until such time as the Highway Administration's Project Engineer has turned the sketch books over to the District Engineer for checking. All computations and sketches shall be signed, dated and referenced to original documentation in conformance with the SHA Construction Manual.

8. Estimates

The Consultant's personnel shall assist as directed in the preparation of a Monthly Estimate, performing such duties as are assigned by the Highway Administration's Project Engineer.

9. Field Reviews

A management level representative of the Consultant shall participate in field reviews, when requested, with the Highway Administration's Project Engineer, in company with the District Engineer or his designated representative on each construction contract to which the Consultant's forces are assigned.

The purpose of this review is to discuss and resolve any problems being experienced by the Consultant's forces or State Highway Administration representatives in conjunction with the performance of this inspection agreement.

10. As-Built Plans

The Highway Administration's Project Engineer may assign the Consultant personnel to assist in the preparation of as-built plans. Such plans shall be submitted to the Project Engineer for his acceptance. One set of plans will be maintained in the Project field office on which will be kept current all changes and as-built conditions.

11. Review of Claims

The District Engineer, State Highway Administration, or an authorized representative Engineer may request the presence and testimony of the Consultant's assigned personnel in the reviewing of any claims submitted by the Construction Contractor, for submission of time and/or extra compensation. At the request of the Highway Administration, the Consultant's assigned personnel shall be made available at all meetings relative to these claims.

12. Final Sketch Book Review

Consultant's personnel shall be available for any correction, additions or revisions of documents they were responsible for during the course of the Project.

C. STATE HIGHWAY ADMINISTRATION SERVICES

1. All information prepared and assembled by the Highway Administration necessary for construction of the project including available survey information, contract drawings, special provisions, specifications, estimates, and copies of bid proposals, Standards, Construction Manual, Materials Field Procedures Manual, and copies of all pertinent construction memoranda and directives will be furnished to the Highway Administration's Project Engineer and will be available to the individuals assigned by the Consultant.
2. Such information as may be available pertaining to existing utilities, structures and other facilities which may expedite the construction of the Project.

3. When required, the Highway Administration will make available such representatives of its staff as may be necessary to resolve problems relative to specialized soils, bridge or roadway conditions. These services are available if requested by the State Highway Administration's Project Engineer.
4. Survey and field notebooks, all standard report forms and forms or daily logs, and progress, estimate forms etc., will be furnished to the Highway Administration's Project Engineer for use as needed.
5. Copies of agreements with Utilities, Railroads, or other companies for construction or reconstruction of their facilities within the Contract limits will be available from the Highway Administration's Project Engineer.
6. All right-of-way agreements will be in the custody of the Highway Administration's Project Engineer.
7. Field Offices and Field Laboratories shall be furnished by the Construction Contractor under the terms of his contract. Telephone for official project use will be provided in the Field Office by the Construction Contractor.
8. All off-site laboratory services except the field tests described previously and plant inspectors furnished by the Consultant when directed by the Highway Administration.
9. Reports of tests and samples of materials approved for use on the Project will be transmitted to the Highway Administration's Project Engineer and will be available to the Consultant's assigned forces.
10. Design of bituminous concrete and cement concrete mixes and off-site inspection at plants producing such mixes, except plant inspectors furnished by the Consultant when directed by the Highway Administration.
11. Copies of reviews and/or approved shop drawings will be available from the Highway Administration's Project Engineer.
12. Inspection of shop fabrication of steel and similar off-site processed items with the exception of items to be inspected when directed by the Highway Administration.
13. General direction to the Consultant through the Highway Administration's District Engineer who shall have overall control of the Project. Direct supervision through the Highway Administration's Project Engineer, who shall have responsible control of the Project on a daily basis.

14. Notification by the District Engineer or designated representative to each construction Contractor of the assignments of the Consultant's forces as agents of the Highway Administration on the Project under the direct supervision of the Highway Administration's Project Engineer.
15. The District Engineer shall have the option of assigning State Highway Administration Inspectors to the Project inspection force.

D. PROSECUTION OF WORK

1. The Consultant will be advised of the Official Notice to Proceed on the Consultant contract by the State Highway Administration and will be prepared to place personnel at the disposal of the Highway Administration within two weeks thereof. Personnel shall not be assigned to the Projects until the roster, resumes and salaries are approved by the Chief, Bureau of Construction Inspection, and until assignment is authorized by the Chief, Bureau of Construction Inspection.
2. Construction engineering and inspection forces will be required of the Consultants at all times day or night, weekend or holiday while the construction Contractor is working. If the contract is shut-down, the Consultant forces will be adjusted at the direction of the Highway Administration's District Engineer to correspond with the type of cessation either complete shut-down or partial shut-down, or reduced operations.
3. The Consultant will remain at the call of the Highway Administration for conferences, negotiations and preparation of closing documents after the acceptance of the construction contracts and until final payment has been made to the construction Contractors. It is not intended that the Consultant shall have a full-time staff during this period, but in the event that questions and claims concerning the completed work arise, the Consultant will be called in for explanation, interpretation, and recommendations. The Consultant's representative shall be a member of the assigned field force who is familiar with the points of issue, if available.

E. FEDERAL HIGHWAY ADMINISTRATION REVIEW

On Federal-Aid Projects, the Project records, the work of the Consultant, and the work of the Construction Contractor shall at all times be subject to inspection and review by Federal Highway Administration representatives. Cooperation of the Consultant's assigned forces with the Federal Highway Administration shall be required under the agreement.

F. STATE HIGHWAY ADMINISTRATION OPTION

The State Highway Administration reserves the right to separate this proposed agreement into two or more smaller agreements if deemed necessary by the Administration.

**SPECIFICATIONS FOR
CONSULTING ENGINEERS' SERVICES**

Section XI

CRITICAL PATH NETWORK

(C.P.N.)