Chapter 43 Design Approval

43.1 General Discussion

On all Federal Highway Administration (FHWA) funded transportation projects, local agencies must document design approval prior to preparation of plans, specifications, and estimates (PS&E).

A project design shall not be approved until the project's environmental documentation (NEPA) has been approved and its public hearing requirements have been met.

Value Engineering Studies (VEs) are required for all projects on the NHS receiving $50 million or more and for all bridges on the NHS receiving $40 million or more. Any project that approaches this cost limit on the preliminary estimate should also have a VE study performed in anticipation of cost increases from preliminary design to the final Plans, Specification and Estimate stage of a project. Refer to Section 43.4 for more information on Value Engineering. A VE study is not required for a Design-Build project.

When there is a subsequent change to the project design or scope, an amended location-design approval is required.

43.2 Requirements for Design Approval

All items on the appropriate design matrix are required to be addressed (see Chapter 42, Table 1.1, 1.2, and 1.3 and Appendix 42.101 and 43.62. In addition, items listed below are also required to be addressed (some of these are included in the Project Prospectus).

.21 Traffic Data – Design-year ADT, the average daily traffic forecast during the design year should be included. The design year for new and reconstruction projects is 20 years from the projected start of construction. All other projects may be any point within 8 to 20 years from the projected start of construction.

.22 Pavement Design Criteria – Rationale for selection of the pavement type and depth of surfacing.

.23 Cost Estimate – An updated cost estimate should be prepared. Include VE study when applicable.

.24 Environmental Document (NEPA) – Documentation, including approval.

The project design must be approved by the approving authority as outlined on the agency's Certification Acceptance Agreement or the acting designated authority for a Non-Certification Acceptance agency. For an example, see Appendix 43.62.

.25 Right of Way – Local agencies must ensure that the R/W plans were reviewed and approved and that they are consistent with the PS&E.

43.3 Bridge Design Approval

.31 Policy

1. The bridge site data should be prepared in conjunction with the Design. Extensive structural studies and the preparation of the bridge preliminary plans during the Design Report phase are not recommended. Expected changes to the roadway geometrics, project staging, construction costs, and other conceptual data will affect the structure and, therefore, impact the structural design effort.
2. Agencies that perform a Type, Size, and Location (TS&L) for bridge projects, as the first order of work after being selected, must receive approval from Local Programs. (The FHWA regulatory requirements for large or unusual bridges contained in the Federal Aid Policy Guide (FAPG) also apply to large or unusual structures, tunnels, or hydraulic facilities. The definitions and requirements for major or unusual bridges will be addressed below; for other cases, refer to the FAPG.)
3. For bridge projects on, over, or under state routes WSDOT concurrence with the design of the bridge is required.

.32 Definitions – A "major bridge" is a bridge estimated to cost more than $40 million. This criterion applies to individual units of separated dual bridges. An "unusual bridge" is a bridge involving difficult or unusual foundation problems, new or complex designs with unusual structures or operational features, or a bridge for which the design standards or criteria might be questionable.

.33 Submittal of Data – Refer to Section 34.5.

Local Programs approval of TS&L is required for major or unusual bridges before the local agency may approve the design and before the local agency may begin preparing the final PS&E.

43.4 Value Engineering

Value Engineering Studies (VEs) are required for all NHS projects $50 million or more and for all bridges on NHS routes $40 million or more. Any project that approaches this cost limit on the preliminary estimate should also have a VE study performed in anticipation of cost increases from preliminary design to the final Plans, Specifications and Estimate stage of a project.

.41 Definition – Value Engineering (VE) is the systematic application of recognized techniques by multidiscipline team(s). These techniques are:

- Identify a product's function or service.
- Establish a function's monetary value or worth.
- Provide alternate ways, using creative techniques, to reliably accomplish necessary functions in the most effective and efficient manner.

Reducing the scope of a project, compromising the performance of an element, or simply substituting cheaper materials is not VE. VE is not just "good engineering." It simply answers the question, "What else will accomplish the purpose of the product, service, or process we are studying?" All costs are taken into account over the entire life of the project.

.42 Why VE is Needed – The costs of highway needs far exceed the funds available for improvements. As the cost of highway construction increases, more emphasis is being placed on the maintenance and rehabilitation of existing facilities to maximize these available funds.

VE is a tool that can counteract these growing problems by providing (1) cost reduction, (2) product or process improvement, and (3) alternative means and materials for highway construction and maintenance.

.43 VE Application (General) – VE may be applied at any point in highway development, operation, and maintenance. For maximum effectiveness, however, VE should be undertaken as early as possible (during the first 30 percent of design) when decisions on life-cycle costs are being made and valid project development recommendations can be implemented. When a complex, costly project is selected as a candidate for potential cost reductions, investigations should start as soon as a preliminary estimate is in hand.

VE should be employed when the ratio of potential savings to the cost of the VE study is significant. VE can also be used in evaluating standard details that are used repetitively on many projects. The cost of VE studies in preconstruction activities may be allocated to the preliminary engineering cost of the related project.

Local agencies are also encouraged to include a VE incentive clause in their construction specifications; such clauses encourage contractors to propose changes to the contract that fulfill a project's functional requirements at less cost.

When VE is not mandatory and the local agency staff is considering a VE, it is recommended that the local agency staff prepare a "VE Assessment Report" (Appendix 43.61). The report will address the project characteristics, cost per mile, potential savings of high cost items, and other considerations unique to the project. From this assessment, a recommendation can be developed as to whether a VE study is needed. Use the references listed in Section 43.45 when a mandatory VE study is performed.

.44 VE Study Team – The VE Study Team will be headed by a qualified facilitator. The duties and responsibilities of the facilitator will include, but are not limited to, the following:

1. Acts as chairperson at meetings of the VE Team.
2. Presents the findings and recommendations of the VE study to the local agency management and other interested agencies.
3. Provides the final VE Study Report to the local agency and WSDOT Local Programs.

The VE Team will be comprised of a minimum of five members including the facilitator. One team member should have a background in bridge design (if a bridge is part of the project) or construction. If environmental factors are part of the study process, then the team should also include a member who has expertise on environmental issues.

The VE Team will formally present their study results to local agency representatives, WSDOT Local Programs, and all other interested persons. Team findings and recommendations will then be documented in a formal report and should be provided to all interested parties soon as possible. Courtesy copies are sent to other appropriate agencies and individuals.

The local agency will evaluate the VE Team recommendations. Should their preferred alternative differ from the prospectus or if no project prospectus has been approved, the local agency submits a new or revised prospectus for their preferred alternative to the Region Local Programs Engineer. A summary of the VE study results shall be included in this transmittal as reference material. The project then proceeds as defined in this manual.

.45 Reference Materials

- *Value Engineering Guide for Cities and Counties,* Kempter-Rossman International.
- *Operating Tip — Value Engineering,* NWT2 Center, October 1985.
- *Value Engineering Contract Provisions on Federal Aid Highway Construction Projects,* Report No. 7584217, FHWA, December 1984.
- *Pavement and Shoulder Maintenance Performance Guide*, Report No. TS-84-208, FHWA, August 1984 (Developed in conjunction with Arkansas, Colorado, Iowa, New Mexico, North Dakota, South Dakota, Utah, and Washington).
- *Value Engineering for Highways,* prepared for FHWA by Kempler-Rossman International, revised October 1983.
- *Value Engineering Conference Summary Report,* Report No. TS-80-246, FHWA, August 7, 1980.
- *Value Engineering — A Systematic Approach,* Arthur E. Mudge, McGraw-Hill, New York, 1971.
- *Value Engineering in the Construction Industry,* Alphonse J. Dell'isola, Construction Publishing Co., Inc., New York, 1974.
- *Guidelines for Value Engineering (VE)*, subcommittee on New Highway Materials, AASHTO-AGC-ARTBA Joint Cooperative Committee. Reprinted by USDOT/ FHWA February 1983.
- WSDOT *Design Manual* M 22-01 Value Engineering (VE) section.

43.5 Additional Data Required for Special Projects

.51 Traffic Signal Projects – The local agency shall provide warrants for signalization in accordance with Part 4c of the Manual on Uniform Traffic Control Devices (MUTCD). Designs for signalization at intersections with state routes require review by WSDOT. A signal permit is required for all traffic signals on state routes. An early application to the WSDOT Region Administrator is advisable.

.52 Projects Involving State Routes – Designs for all projects involving state routes shall be submitted to WSDOT for approval. All work at intersections with state routes requires submittal of an intersection plan to WSDOT for approval. Prints of existing intersection plans are available from WSDOT. Revisions should be shown on these prints.

43.6 Appendices

43.61 VE Assessment Report
43.62 Example of Design Approval Documentation

Washington State Department of Transportation

VE Assessment Report

Agency: Click here to enter text. Date: Click here to enter text.

Project Title: Click here to enter text.

Project Number: Click here to enter text.

Reviewing Team: Click here to enter text.

Project Characteristics

Length: Click here to enter text. Cost: Click here to enter text. Cost/Unit Length: Click here to enter text.

Major structure ☐ Yes ☐ No

Extensive R/W ☐ Yes ☐ No

Complex project ☐ Yes ☐ No

Includes Items that appear too costly ☐ Yes ☐ No

Includes Critical or Expensive Materials ☐ Yes ☐ No

Includes items that have questionable, complex, or costly function ☐ Yes ☐ No

Includes items difficult to construct ☐ Yes ☐ No

Complicated or costly traffic control or detours ☐ Yes ☐ No

Horizontal Alignment: Click here to enter text.

Vertical Alignment: Click here to enter text.

Materials Source: Click here to enter text.

Design Concept: Click here to enter text.

Other Considerations: Click here to enter text.

Other Alternatives Considered: Click here to enter text.

Major High Cost Items and Potential Cost Saving Ideas	Cost	Potential Savings
1. Click here to enter text.	$	$
2. Click here to enter text.	$	$
3. Click here to enter text.	$	$

Conclusions and Recommendations: Click here to enter text.

Approving Authority Recommendations: Click here to enter text.

DOT 140-572
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Page 1 of 1

Design Approval Documentation

[Agency Name]

[Project Title]

All items on the appropriate design matrix have been followed. Items that have been reviewed and addressed include:

- Traffic Data
- Pavement Design Criteria
- NEPA
- Right of Way (Plans must be consistent with the PS&E)

A Cost Estimate has also been prepared.

The [*title of the approving authority as outlined on the agency's Certification Acceptance Agreement*] has reviewed and approved the Design Documentation.

Name Title Agency	Date