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Responsible Office: Construction Management  
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Division of Construction Management

## **STANDARD PROCEDURE FOR VALUE ENGINEERING IN CONSTRUCTION**

### **PURPOSE:**

This procedure outlines Value Engineering Change Proposal (VECP) processing during the construction phase of a project. The Value Engineering Change Proposal note in construction allows the Contractor to submit Value Engineering Change Proposals which lower the project cost or offer a time savings in construction without altering the essential functions and characteristics of the project. If the proposal is accepted by the Department, the Contractor and Department share equally in the savings.

### **AUTHORITY:**

23 U.S.C. 106(d), 106(e), 106(f), 302, 307, and 315; 49 CFR 18  
Source: 62 FR 6868, February 14, 1997, unless otherwise noted.

Section 5525.01 of the Ohio Revised Code

### **REFERENCES:**

NHI Course No. 13405, Value Engineering for Highways; USDOT; FHWA: Publication No. FHWA-HI-88-047 and V.E. Study Workbook; Publication No. FHWA-HI-88-051.

Federal Highway Administration VE Web Site: [www.fhwa.dot.gov/ve/index.htm](http://www.fhwa.dot.gov/ve/index.htm)

### **DEFINITIONS:**

Function: Any performance characteristic that an item or service accomplishes.

Life Cycle Cost: Total cost of an item's ownership. This includes initial acquisition costs (right-of-way,

planning, design, construction), operation, maintenance, modification, replacement, demolition, financing, taxes and disposal as applicable.

Unnecessary Costs: Those costs which are not required for the performance of the necessary functions.

Value Engineering Change Proposal (VECP): A written document submitted by a Contractor in accordance with this procedure. A VECP modifies the project contract requirements to allow limited changes in materials or construction techniques, which, if accepted and implemented, provides for an overall cost, and possibly, time savings. Material or construction technique changes that are permitted without changes to the project documents are NOT considered VECP's.

## **PROCEDURE:**

Attachment A outlines graphically the VECP review process.

### **I. General Considerations**

- A. When a contract contains a proposal note titled "*Value Engineering Change Proposal ...*", the Contractor who has been awarded a contract may submit a Value Engineering Change Proposal (VECP). The VECP must reduce the cost of a project and may, when the provision specifically allows time savings, reduce the duration of the project.
- B. Considerations for the calculation of VECP time and costs:
  - 1. Engineering and drawing development and implementation costs for the VECP are not recoverable. The Contractor's share of the net savings as defined in this procedure shall be considered full compensation to the Contractor for the VECP.
  - 2. Changes in collateral or life cycle costs to the Department shall not be considered in the determination of the estimated costs savings and are specifically excluded.
  - 3. A minimum guaranteed cost savings must be included.
  - 4. When the bid documents contain a proposal note titled "*Value Engineering Change Proposal - Construction Costs and Time*", the Contractor may propose a VECP which reduces the completion time for the entire project or for a project portion which has an interim completion date. The total value of a calendar day of time on the project or portion of a project is defined as the cost

of the time savings incurred by ODOT. The cost of time savings to ODOT will be the amount of the daily liquidated damages as set forth in Section 108.07 of the specified Construction and Material Specifications or a contract provision which establishes a daily liquidated damages amount. The Contractor and Department will each receive 50 percent of net savings in the value of time for the Contract calculated using the number of calendar days less than the original project completion date (or revised completion date if revised based on factors unrelated to the VECP) or interim completion date or time specified in the contract and using the total value of time as described in this Subarticle. Any other method of valuing time, including road user costs, are specifically excluded.

5. In the event that the Department accepts a final VECP based on both time savings and a change in material or specification that results in a lower cost to the project, the Department will process the change order for the material or specification changes, division of time savings and the agreed upon change in completion date only after receipt of the acceptable final drawings. However, any payments due the Contractor for the time savings will be held until the completion of the project or a specific portion referenced in the VECP in order to verify that the time savings actually occurred. If the entire time savings is achieved, the Department will then initiate payment of the final time-savings portion of the VECP change order. If only a portion of the time savings is achieved and the project is completed before the original completion date, the Department will deduct from the time savings portion of the VECP change order payment for the number of days exceeding the revised completion date. If the project is completed after the original completion date (or revised completion date if revised based on factors unrelated to the VECP), the Department will deduct the entire time savings payment from the approved VECP and will assess liquidated damages for each day that the actual completion exceeds the original completion date (or revised completion date if revised based on factors unrelated to the VECP).
7. Time savings will not include weather delays or winter shut down periods.
8. Even though unit pricing is required for preparing the Contractors estimate, unit prices are not to be used in the third change order.

## **II. Initial VECP Submission by Contractor**

- A. The initial proposal must be written, identified as a Value Engineering Change Proposal and shall outline the general technical concepts associated with the proposal and the total estimated cost savings which will result.

- B. General requirements for the Initial VECP submittal.
1. VECPs must result in savings of money and possibly time as determined by the Department without altering the essential functions and characteristics of a project.
  2. The VECP shall apply only to the contract or contracts referenced in the proposal.
  3. Three (3) written copies of the initial proposal shall be submitted to the District Construction Engineer (DCE): one for the Engineer, one for the District Value Engineering Coordinator and one for the District Construction Engineer.
  4. The VECP submittal must be made by the prime Contractor. The Contractor is cautioned not to base any bid prices on the anticipated approval of a VECP proposal and to recognize that such a proposal may be rejected. In the event of a rejection, the Contractor is required to complete the project in accordance with the plans, specifications and bid prices.
  5. The VECP shall become the property of the Department and shall contain no restrictions imposed by the Contractor on their use or disclosure. The Department will have the right to use, duplicate, and disclose in whole or in part any data necessary for the utilization of the proposal. This provision is not intended to deny rights provided by law with respect to patented materials or processes.

### **III. Initial VECP Review by District**

- A. The initial VECP submittal will be reviewed thoroughly by the District and, if found to be conceptually acceptable, approval to submit a preliminary proposal will be granted.
- B. The District will respond to initial proposals within 5 working days.
- C. The Contractor shall have no claim against the Department for any costs or delays due to the Department's review or rejection of the initial VECP.
- D. The Department reserves the right to reject any VECP submitted.
- E. The District Construction Engineer may hold meetings with the Design Consultant, Contractor, Central Office reviewers, or others to work out review schedules and design constraints.
- F. General review considerations:
  1. If the Department already is considering revisions to the contract which are subsequently incorporated into a VECP proposal, the Department may reject the Contractor's initial VECP or portions thereof and may proceed with such

revisions without any obligations to the Contractor.

2. A VECP which includes changes to bridges and structures shall conform to the current AASHTO Standard Specifications for Highway Bridges as modified by the ODOT Bridge Design Manual. The Contractor is obligated to perform in accordance with the terms and conditions of the existing contract until a change order authorizing VECP work is executed.

The Department **may not** approve VECPs that:

1. Change essential functions and characteristics including design standards, service life, reliability, economy of operation, ease of maintenance, safety, and necessary standardized features and any engineering commitment such as environmental mitigation measures both during and following construction.
2. Requires additional right of way.
3. Requires excessive time and/or costs for review, evaluation and/or investigation.
4. Is not consistent with the Department's design policies and basic design criteria for the project, or has been previously evaluated as documented in the Value Engineering Design analysis Summary of Potential Savings.
5. Conflict with agreements made with local governmental agencies.

The Department **will not** approve VECPs with any of the following characteristics:

1. Consist only of non-performing items of work contained in the plans.
2. Include plan errors identified by the Contractor as part of the cost reduction.
3. The VECP designer/consultant for the Contractor is also the designer of record for ODOT.
4. Changes the special architectural aesthetic treatments of structures.
5. Changes the design or thickness of cast-in-place concrete decks.
6. Changes the cross section of geometric design features such as, but not limited to, bridge width, vertical clearance, horizontal clearance, shoulder width.
7. Requires concrete beams to be installed with less than 17' vertical clearance over a state highway.
8. Changes the design of overhead sign supports and breakaway sign supports.
9. Changes the type of noise barriers.
10. Changes the type or buildup of permanent pavement.
11. Proposes a time savings for any project which has an Incentive / Disincentive clause, which was awarded based on A+B Bidding or Lane Rental, or for interim completion date changes. A VECP which saves money on these types of projects will be considered.
12. Compromises controlling design criteria or would require a design exception as discussed in Volume I, Section 100, of the Location and Design Manual.
13. Includes cost savings based on revisions of utility relocations or other similar items to be done by other non-contract parties.

- 14. Causes additional work, increases the cost, or causes modifications to adjacent projects.
- G. The savings generated by the VECP must be of sufficient significance to warrant review and processing. The Engineer will be the judge in determining sufficient significance.
- H. The VECP shall not be experimental in nature but shall have been proven to the Department's satisfaction either under similar conditions on another Department project or at another location acceptable to the Department.
- I. A VECP with total savings of less than \$50,000 does not require Central Office review and may be approved by the District Deputy Director.

#### **IV. Preliminary VECP Submittal by Contractor**

Six (6) copies of each preliminary VECP (seven (7) if the project is on the National Highway System (NHS)) shall be submitted to the DCE. The copies will be distributed to the Engineer, or his duly authorized representative, one to the District Value Engineering Coordinator, one to the District Construction Engineer, and three to the Department's VECP coordinator.

The Contractor will submit the following as part of a VECP:

- A. A statement that the Preliminary VECP is submitted in accordance with established ODOT guidelines.
- B. A description of the difference between the existing contract requirements and the proposed change, and the comparative advantages and disadvantages of each including considerations of service life, reliability, economy of operation, ease of maintenance, safety and necessary standardized features.
- C. Separate detailed cost estimates for both the existing contract requirements and the proposed change. The cost estimates shall be broken down by contract item numbers indicating quantity increases or decreases and deleted pay items. Additional proposed work, not covered by contract items, shall be identified by current Department pay item numbers. In preparing the estimates, the Contractor shall include overhead and profit. No separate pay items are allowed for these costs.
- D. An estimate of the effects the VECP will have on life cycle costs including, but not limited to, operational and maintenance costs.
- E. Complete drawings, specifications and calculations showing the proposed revisions in

sufficient detail to identify and describe specific features of the contract which must be changed if the VECP is accepted. The proposal must show how these changes can be accomplished with an assessment of their impact on other project elements. If the VECP involves a design change, the design of the proposed changes shall be performed by a consulting engineering firm prequalified by ODOT in the applicable class of design work. If the VECP involves a specification change or non-roadway or non-structural design change (e.g. maintenance of traffic change), the use of a pre-qualified designer is not required. All drawings and engineering calculations shall bear the signature of and be sealed by a Professional Engineer registered in the State of Ohio.

- F. A specific date by which Departmental approval of the VECP must be issued to obtain the total estimated cost reduction during the remainder of the contract, noting any effect on the contract completion time or delivery schedule. The date must be selected to allow the Department ample time, usually 10 working days, or as mutually agreed to by the parties, for review and processing of the VECP and change order or extra work change order. The Department may require up to 20 working days for extremely complex VECP submittals. Should the Department find that insufficient time is available for review and processing, it may reject the VECP solely on that basis. If the Department responds by rejecting the proposal, the Contractor shall consider the final proposal rejected and shall have no claim against the Department as a result thereof.
- G. A report of all previous uses or testing of the VECP on other projects including the project numbers, conditions, results, contact names and telephone numbers. Even though a similar submitted VECP was accepted on another project, the Department reserves the right to accept or reject the proposal.

#### **V. Preliminary VECP Review by District and Central Office**

- A. VECPs will be processed expeditiously. However, the Department shall not be liable for any delays or any VECP development cost in the case where a VECP is rejected or withdrawn prior to approval of the Preliminary VECP. The Contractor may withdraw, in whole or in part, a VECP not approved by the Department within the period specified in the VECP.
- B. General review considerations are the same as above, with the following additions:
  - 1. 10 working days will be allowed for Central Office / FHWA review.
  - 2. Three copies of the VECP are reviewed by Central Office.
  - 3. For projects with Federal oversight required or for VECPs involving proprietary items on Federal-aid projects, the concurrence of FHWA on the

accepted VECP is required.

4. The Office of Estimating will provide the official calculation of VECP savings.
5. The central office VECP coordinator will coordinate the appropriate engineering reviews to be performed, notify the Offices, and distribute materials accordingly.
6. The central office VECP coordinator will notify the following Offices of proposed VECP's: Construction, Production, Estimating
7. The central office VECP coordinator will maintain a web based database of VECP's.

- C. The Department shall be the sole judge of the acceptability of a VECP and of the estimated net savings in construction costs or time from the adoption of all or any part of such proposal. In determining the estimated net savings from a VECP, the Department reserves the right to consider other factors in addition to the contract bid prices and proposed unit prices if, in the judgment of the Department, such prices do not represent a fair measure of the value of the work to be deleted from or added to the contract.
- D. The Department may modify a VECP with the written concurrence of the Contractor in order to make it acceptable. If a modification increases or decreases the net savings resulting from the VECP, the Contractor's fair share will be determined upon the basis of the VECP as modified and upon determination of final quantities. The net savings shall be computed by subtracting the revised lump sum total cost of all bid items affected by the VECP design from the total cost of the same bid items as represented in the original contract.
- E. When materials or processes not covered by specifications are proposed by the VECP, the proposal shall include complete material and process controls and past performance documentation to ensure the performance described in the VECP. In the event that additional test equipment is required to ensure compliance with those specifications, such equipment, properly calibrated, shall be provided, at no cost, for the use of ODOT Construction project personnel for the duration of the project. Instruction in the use of this equipment, by the manufacturer shall also be provided at no cost to the Department.
- F. Upon acceptance of a VECP, any restrictions imposed by the Contractor, Subcontractors or suppliers on the use or disclosure of information submitted shall be void. The Department shall thereafter have the right to use, duplicate and disclose in whole or in part any data necessary for utilization of the VECP on this project or other department projects.

- G. If additional information is needed by the Department to evaluate a VECP, this information must be provided in a timely manner, otherwise the proposal will be rejected. Such additional information could include, revised waterway permits, where design changes are proposed, results of field investigations and surveys, design computations and field change sheets.

#### **VI. District Executes first VECP Change Order authorizing work**

- A. The first VECP change order is processed authorizing work to proceed after the preliminary District / Central Office review and approval. The minimum guaranteed savings stated in the change order will be calculated by Central Office Estimating.
- B. Standard VECP Change Order clause language is shown in Attachment B.
- C. The Engineer will inspect the work in accordance with CMS Section 105.10. Removal of defective and unauthorized work shall be in accordance with CMS Section 105.11. Time extensions and compensation for modifications to an approved VECP will be in accordance with CMS Sections 108.06.B.7 and 108.06.D. Compensation for necessary modifications to an approved VECP shall not reduce the guaranteed minimum savings indicated on the VECP change order unless approved by the Director.

#### **VII. Final VECP and Final Drawings Submittal by Contractor**

- A. Six (6) copies of the final VECP (seven (7) if the project is on the National Highway System (NHS)) shall be submitted to the DCE. The copies will be distributed to the Engineer, or his duly authorized representative, one to the District Value Engineering Coordinator, one to the District Construction Engineer, and three to the Departments VECP coordinator.
- B. The final VECP submission will be considered after Department approval of the initial and preliminary VECP submittals, and after the Change Order authorizing the VECP is processed.
- C. The Contractor shall submit final drawings to the DCE showing all details consistent with the accepted VECP design. Failure of the Contractor to provide acceptable final drawings within 15 working days after the change order authorizing the VECP shall result in rejection of the entire VECP and the Contractor shall have no claim against the Department.
- D. The final drawings shall be submitted to the DCE in accordance with current versions of the ODOT Location & Design Manual, Volume III and the ODOT Bridge Design

Manual. If the VECP involves design changes, the design of the proposed changes shall be performed by a consulting engineering firm prequalified by ODOT in the applicable class of design work. All drawings and engineering calculations shall bear the signature of and be sealed by a Professional Engineer registered in the State of Ohio. Final drawings will be submitted in hard copy form and electronic CADD (MicroStation format).

**VIII. District Executes second and third VECP Change Orders**

- A. The Contractor and Department shall each receive 50% of the net reduction in the cost of the Contract due to the VECP.
- B. The second VECP change order is processed after the final drawings are received and approved by the Engineer. The dollar amount of the change order should be the sum of the original items that are to be replaced as part of the VECP and be a negative dollar amount.
- C. The third VECP change order is processed at the same time as the second VECP change order. The dollar amount of the change order should be the sum of the new VECP lump sum items, (as calculated by the Office of Estimating) plus 50% of the net VECP savings.
- D. Standard VECP Change Order clause language is shown in Attachment B.

**IX. District Executes payments**

- A. The Department will prorate payments of Extra Work lump sum items based on the work progress at the discretion of the Engineer.
- B. The Contractor savings portion of the payment will be paid 50% at the time of the third VECP change order, and 50% upon successful completion of the VECP work.

**TRAINING:**

The Division of Construction Management will provide training for District and Central Office personnel to implement the policy and standard procedure.

**FISCAL ANALYSIS:**

Value Engineering Change Proposals have no initial cost for the Department since the proposal

originates with the Contractor. If the Department determines that the savings from the proposal do not justify the cost to review and process the proposal, the VECP will be rejected. The savings from accepted VECP's will be shared equally with the Contractor, allowing each party to benefit from the proposal. Because the Department is the decision maker on which VECP's are accepted and has input on the agreed upon savings, value engineering in construction also offer an excellent return on the investment in review costs.

### Value Engineering Change Proposal Process

#### Flow Chart



Baseline Schedule received	Initial VECP Submittal	ODOT District Review	Preliminary VECP Submittal	ODOT District/CO Review	Change Order 1	Final VECP Submittal	Final Drawings Submittal	Change Order 2	Change Order 3
	Must include:	Must include:	Must include:	Must include:	Must include:	Must include:	Must include:	Must include:	Must include:
	Cover letter proposing VECP and written description	Reviewers cost check (is VECP worth review time?)	Updated schedule	Individual Central Office Review	Standard Change Order clauses	Final Structural / Design Calculations	Full Properly sealed Drawings	Non-perform items to be VECP'ed	Standard Change Order clauses
	Traffic control changes	Planning commitment check	Minimum cost savings	Detailed Estimate	Guaranteed savings	Full Drawings			Adds all Lump Sum work items
	Preliminary sketch	Highway Management	Preliminary full drawings		Permission to Proceed				
	Lifecycle cost analysis	ROW check, MOT check, Production check	Preliminary Structural / Design calculations	If Savings under \$50k District review / Approval only					
	Required ROW, Design Assumption	Must cc: CO Construction and Program Managers	DCE may hold coordination meeting	Must cc: CO Construction and Program Managers	Contractor is authorized to start VECP work		Must cc: CO Construction Structures, Test Lab		

## **Attachment B**

### **FIRST CHANGE ORDER REQUIRED LANGUAGE:**

This change order reflects the Contractor's Value Engineering Cost Proposal (VECP) to [describe the VECP].

The Department has reviewed and approved this preliminary VECP, in accordance with the Department's Standard Operating Procedure SOP 510-005(SP), and by this change order grant the Contractor the permission to proceed with the VECP design and construction work.

By signing this change order, the Contractor acknowledges that all VECP errors, omissions and constructability issues are the responsibility of the Contractor. The Department will not extend the contract nor compensate the Contractor for errors, omissions and constructability problems related to this VECP.

By signing this change order, the Contractor guarantees the Department a minimum cost savings of [\$].

### **SECOND CHANGE ORDER REQUIRED LANGUAGE:**

The Department has reviewed and approved the final Value Engineering Cost Proposal (VECP) in accordance with the Department's Standard Operating Procedure SOP 510-005(SP) on [date].

This change order reflects the reference items to be non-performed as part of the Contractor's approved VECP. No other unit price adjustment shall apply to these reference items.

The total VECP cost savings of [\$] will be equally shared between the Department and the Contractor. 50% of this cost savings is paid on this change order. The remainder 50% will be paid upon successful completion of all the VECP work by the Contractor.

See change order [#] for additional items related to this VECP.

### **THIRD CHANGE ORDER REQUIRED LANGUAGE:**

The Department has reviewed and approved the final Value Engineering Cost Proposal (VECP) in accordance with the Department's Standard Operating Procedure SOP 510-005(SP) on [date].

This change order reflects the extra work items to be performed as part of the Contractor's approved VECP. The total extra work to be performed shall not exceed the agreed upon lump sum of [\$]

The total VECP cost savings of [\$] will be equally shared between the Department and the Contractor. Payments will be prorated and paid upon successful completion of the VECP work by the Contractor.