

2017

# NJDOT Value Engineering Process Guideline



NJDOT  
Value Engineering Unit

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## Disclaimer:

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This is not a legal document and is not to be used in any way against the Department of Transportation or the Value Engineering Unit.

# NJDOT Value Engineering Process

## Introduction

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The objective of the Value Engineering (VE) study is to identify opportunities and recommend alternatives aimed at improving the value of the project in terms of cost, constructability, and maintenance of traffic, while maintaining the basic functional requirements and complying with the purpose and need of the project.

The New Jersey Department of Transportation (NJDOT) has been conducting Value Engineering (VE) studies in accordance with the methodology and the core value engineering methods and procedures established by SAVE International. Since timing is very essential to the success of the VE Study, the NJDOT Value Engineering Unit recommends conducting the study in the early stages of the project at the Concept Development phase after selecting the Preliminary Preferred Alternative (PPA), and before the Preliminary Engineering design phase.

## Value Engineering Process and Job Plan

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The NJDOT process for conducting the VE studies utilizes a systematic problem solving approach by a multidiscipline team to generate alternatives through the use of creative thinking. The NJDOT VE Process consists of three stages and eight phase methodology.

1. VE Study Stages:
  - Stage I. Pre-VE Workshop Study
  - Stage II. VE-Workshop Study
  - Stage III. Post VE-Workshop Study
2. VE Study Phases:
  1. Project Selection
  2. Information Gathering and Investigation
  3. Function Analysis
  4. Speculation/Creative
  5. Evaluation
  6. Development
  7. Presentation/Report Documentation
  8. Implementation

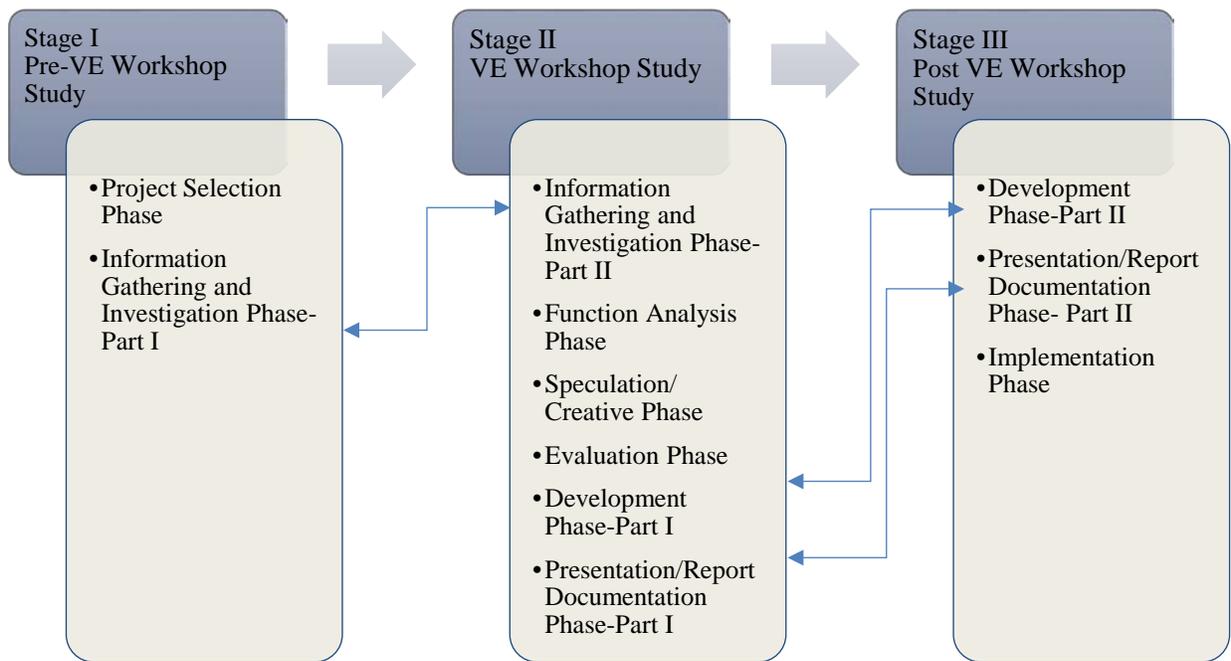


Figure 1 - Value Engineering Study Process

## Stage I. Pre-VE Workshop Study

The focus of this stage is to identify and select the appropriate project for the VE Study; establish a clear communication line with the Project Manager (PM) and the Designer to obtain and verify all necessary information; and select a VE Team with experience related to the scope of work of the project. All team members will be informed of their responsibility toward achieving the goal of the workshop which is to identify opportunities and recommend alternatives aimed towards improving the value of the project in terms of cost, constructability, and maintenance of traffic, while achieving the best balance between cost, performance, and quality.

Stage I Pre-VE Workshop consists of two main phases:

1. Project Selection Phase and
2. Information Gathering and Investigation Phase-Part I

All of the following activities should be completed during this stage by the VE Unit:

- Identify and select VE project
- Collect and review project documentation (Project Purpose and Need Statement, PPA, Cost Estimate...etc.)
- Identify key issues
- Identify major objectives of the project

- Evaluate cost estimate and identify highest cost elements
- Identify team members
- Determine workshop location and prepare agenda
- Prepare for the VE Workshop

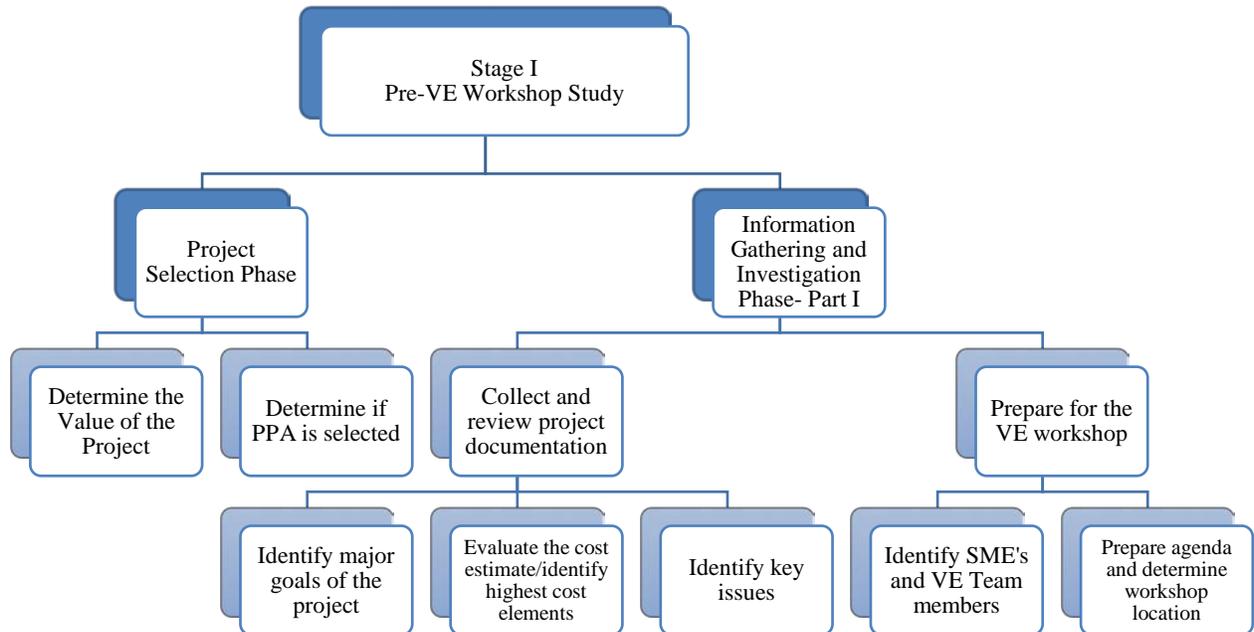


Figure 2 - Stage I. Pre-VE Workshop Study

### 1. Project Selection Phase

The objective of the Project Selection phase is to identify projects that meet the FHWA value threshold and projects that could benefit from conducting a VE Study.

All projects that meet the following FHWA value threshold criteria shall have a VE Study performed during the Concept Development phase of the project:

- Projects on the National Highway System (NHS) that utilize Federal-aid highway funding with an estimated total cost of \$50 million or more.
- Bridge projects on the NHS that utilize Federal-aid highway funding with an estimated total cost of \$40 million or more which includes superstructure and substructure requirements based on construction material. Bridge projects shall be evaluated based on engineering and economic bases, taking into consideration acceptable designs, lifecycle cost analysis, and the duration of the project construction.
- Any major project (as defined in 23 USC 106h), located on or off of the NHS, that utilizes Federal-aid highway funding in any contract phase or phase comprising the major project

- Any project where a VE Analysis has not been conducted and a change is made to the project's scope or design between the final design and the construction letting which results in an increase in the project's total cost exceeding the value thresholds.
- Any other project FHWA determines to be appropriate that utilizes Federal-aid highway program funding.

The Project Manager may request a VE Study to be performed during the development of the project prior to the final design if the project doesn't meet the FHWA value threshold but meets one or all of the following criteria:

- Project cost substantially increased
- Project has complex elements
- Project with high ROW cost
- Project with specific high cost items
- Requested by Senior Management

## 2. Information Gathering and Investigation Phase- Part I

The Information Gathering and Investigation Phase-Part I is very important to the outcome and success of the VE Workshop. During this phase the VE Unit will be collecting project documentation such as Project Plans, Project Key Issues , Project Data (Cost Estimate, Congestion Management System Ranking, Bridge Management System Ranking, Safety Management System Ranking...etc.), in addition to selecting VE Team members with experience suitable for this project.

The VE Team should consist of members with diverse work experience and knowledge to appropriately evaluate the major areas anticipated within the project. The VE Team members should have no prior involvement with the selected project.

## Stage II. VE Workshop Study

The objective of the VE Workshop study is to look for opportunities to improve the value of the project while complying with the project purpose and need and conforming to the project constraints. The NJDOT Value Engineering Unit follows a systematic approach in conducting the VE studies, this systematic methodology consist of the following phases:

1. Information Gathering and Investigation Phase- Part II
2. Function Analysis Phase
3. Speculation/Creative Phase
4. Evaluation Phase
5. Development Phase- Part I
6. Presentation/Report Documentation Phase- Part I

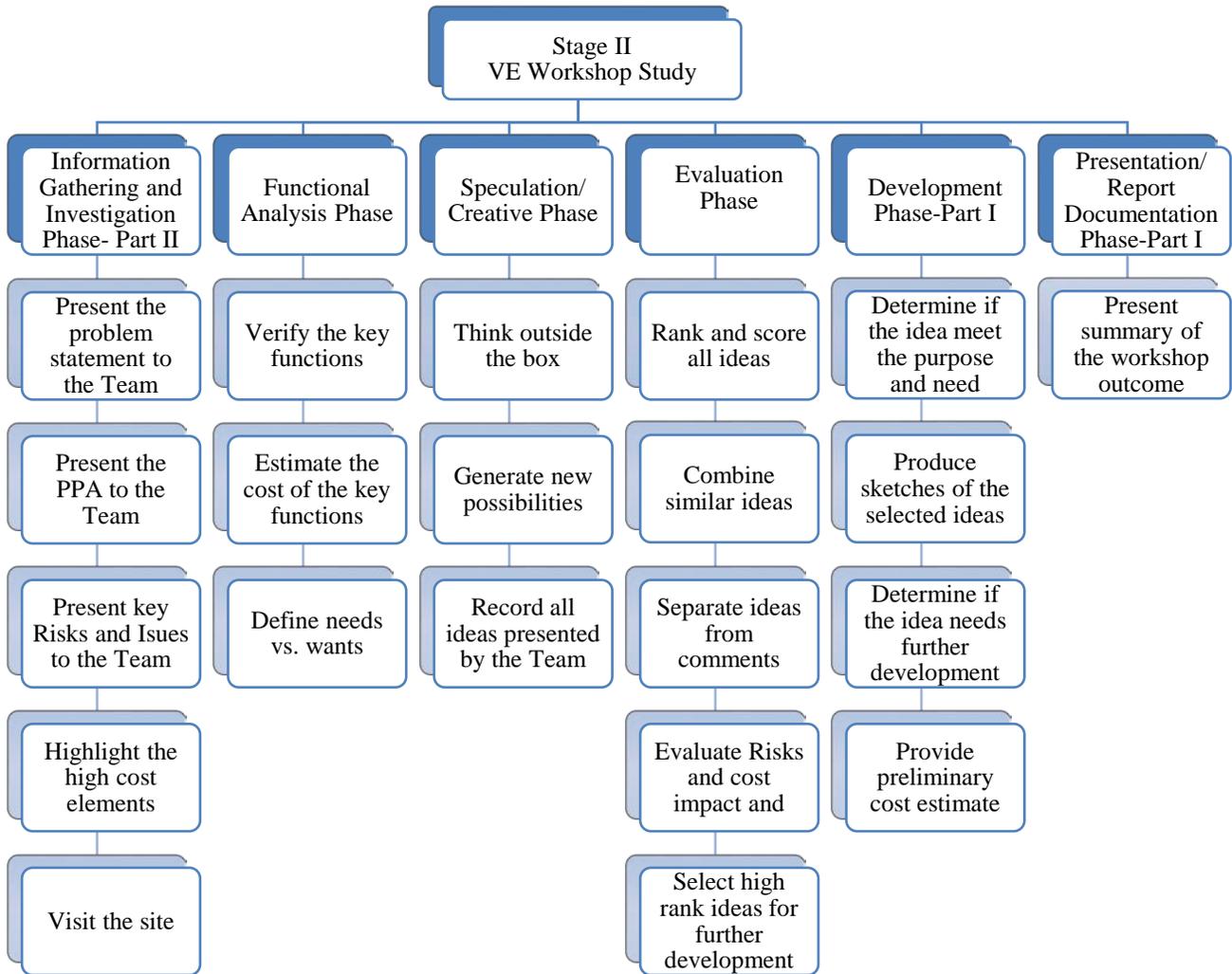


Figure 3 - Stage II. VE Workshop Study

## 1. Information Gathering and Investigation Phase- Part II

This purpose of this phase is to insure that the VE Team members understand the objective and the purpose and need of the project. The major goals and objectives of the project will be discussed and identified. The Designer's team will provide an overview presentation of the project and its various risks and requirements, describe the proposed PPA, and cover the important technical reports. The VE Unit will conduct a field visit following the Designer presentation to further enhance the VE Team's knowledge and understanding of the project.

The following activities will be completed - during the Part II of the Information Gathering and Investigation Phase - by the Designer, the VE Unit, and the VE Team:

- Provide an overview of the project purpose and need, and the selected PPA to the VE Team
- Identify the project key issues, risks and constraints
- Highlight the high cost elements
- Define the scope of the study, and the workshop goals
- Conduct site visit

## 2. Function Analysis Phase

During this phase the team will determine the functions of the project components and the overall function of the project. Understanding the functional requirements of a project is key to ensure that the project design meets the goal and the purpose and need of the project.

Examples of project components and related functions are shown below:

ROW	—————>	Provide Space
Pavement	—————>	Support Load
Bridge	—————>	Cross Obstacle
Drainage	—————>	Remove Water
Sidewalks	—————>	Carry Pedestrians
Maintenance of Traffic	—————>	Maintain Traffic
NEPA	—————>	Protect Environment
SHPO	—————>	Preserve History
Traffic Operations	—————>	Move Traffic
Safety Operations	—————>	Preserve Life
Maintenance	—————>	Preserve Infrastructure
ITS/VMS	—————>	Inform Traveler
Access Management	—————>	Minimize Conflicts
New Pavement	—————>	Provide Connectivity
Shoulder	—————>	Accommodate Bicyclist

The following activities will be completed during this phase:

- Identify and verify the key functions of the project.
- Estimate the cost of the key function elements
- Define the project needs and requirements vs. wants and nice to have.

### 3. Speculation/Creative Phase

The Speculation Phase involves identifying opportunities to improve the value of the project through creative thinking. During this phase, the VE Team will participate in a brainstorming session to generate a list of ideas that convey potential value improvement to the project. These ideas will be further reviewed and ranked by the VE Team.

This phase includes the following activities:

- Think outside the box
- Generate new ideas, new possibilities to improve the value of the project while complying with the purpose and need of the project.
- Log and record all ideas presented by the VE Team for further evaluation

### 4. Evaluation Phase

The purpose of this phase is to evaluate and rank the list of ideas generated by the VE Team during the workshop against the proposed PPA design concept.

The evaluation of the ideas will be based on the following criteria: Cost Impact, Environmental Impact, Operational Performance, Constructability and Likelihood of Acceptance or any other major criteria that the VE Team feels is significant to utilize. The ideas will be scored according to the rating legend provided within this section, the highest ranked ideas will be considered for further development.

Activities to be completed during this phase are:

- Rank and score all ideas
- Sort and group similar ideas
- Separate ideas from comments
- Evaluate ideas for risks and cost impact (see evaluation criteria next)
- Select high ranked ideas for further development

The rating legend for the evaluation criteria shown next.

## Ratings Legend

### *Cost Savings (CS)*

Significant Savings = 3

Some Savings = 2

No Savings = 1

Additional Costs = 0

### *Operational Performance (OP)*

Significant Improvement = 3

Moderate Improvement = 2

No Change = 1

Decreased Performance = 0

### *Likelihood of Acceptance (LOA)*

Very Likely = 3

Likely = 2

Possible = 1

Unlikely = 0

### *Environmental Impact (EI)*

Significant Improvement = 3

Moderate Improvement = 2

Minor Improvement = 1

Increased Impact = 0

### *Constructability (CON)*

Significant Improvement = 3

Some Improvement = 2

No Change = 1

More Complex = 0

### *Operational Performance (During Construction)*

Significant Improvement = 3

Some Improvement = 2

No Change = 1

Decrease Performance = 0

## 5. Development Phase- Part I

During the Development Phase, the selected ideas will be assessed further against operational performance, cost, environmental impact, constructability, risks and likelihood of acceptance. When appropriate, multiple ideas may be combined into one. Preliminary sketches will be developed during this phase for the top ranked ideas.

Activities included in this phase are:

- List all alternatives that meets the purpose and need of the project
- Validate the ideas and produce sketches of the selected ideas
- Turn the best ideas into VE Alternatives with support and justification
- Provide preliminary cost estimate

## 6. Presentation- Report documentation Phase- Part I

Part I of this phase (Presentation- Report documentation) will conclude the Stage II of the VE Study. The VE Team will provide a summary of the workshop outcome, and a list of VE alternatives recommended for further development during Stage III.

### Stage III. Post VE Workshop Study

This is the final stage and the conclusion of the VE Study. The VE Unit will further develop the workshop alternatives, determine the final recommendations, and present the Final VE report to the Project Manager and his team.

This stage consists of the following:

- Development Phase- Part II
- Presentation- Report Documentation Phase- Part II
- Implementation Phase

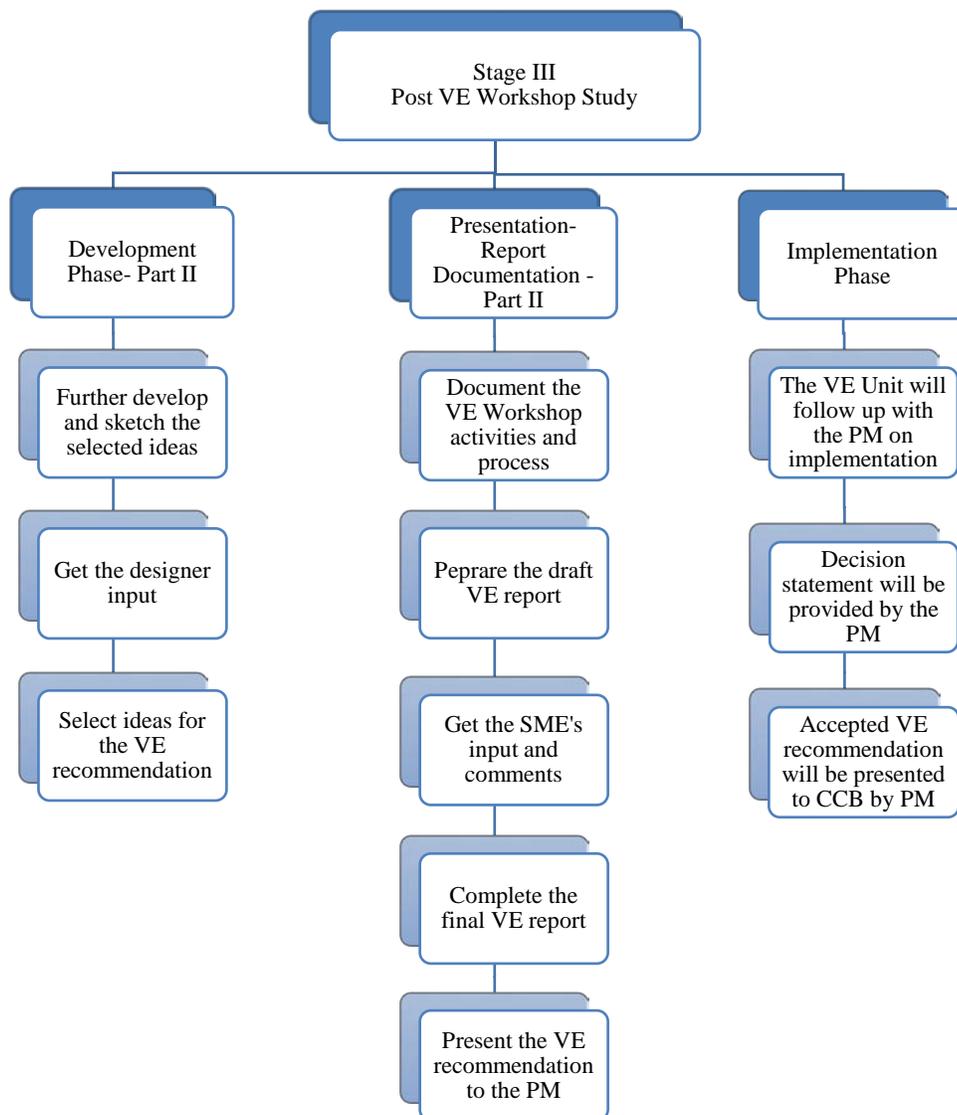


Figure 4 - Stage III. Post Workshop Study

## 1. Development Phase- Part II

Part II of the Development phase takes place after the workshop. The selected list of ideas presented by the VE Workshop will be further analyzed by the Designer and the VE Unit based on the following criteria when applicable:

- Purpose and Need
- Construction Cost
- Constructability
- Controlling Design Elements
- ROW Impacts
- Access Impacts
- Utility Relocation
- Environmental Impacts
- Staging Impacts
- Road User Analysis
- Life Cycle Cost

The criteria mentioned above will be used to identify the advantages and disadvantages of each alternative in comparison to the PPA. The results of this comparison along with the Designer feedback and input will be the determining factor in selecting the VE alternatives. The VE Team will then finalize and conclude the list of final VE recommendation to include in the VE Report.

## 2. Presentation- Report Documentation Phase- Part II

The VE Unit will submit a draft VE Report to share and present the preliminary findings and recommendations of the VE Workshop with the Project Manager, the Design Team, and the VE Team. The draft VE Report will provide an opportunity for the Project Manager and the Design Team to review the alternatives and provide their input.

As the VE Report is a working document, the VE Unit will capture the input and feedback received from the VE Team, the PM and the Designer to finalize the VE recommendations. The final VE Report will document the entire VE Study and will conclude and summarize the final VE recommended alternatives. (See sample VE report in appendix B)

Steps to be taken at this stage:

- Document the VE Workshop activities and process and outcome
- Prepare and submit a draft VE Report to Project Manager, VE Team, and Designer
- Present VE Workshop finding to Designer and Project Manager and obtain their feedback
- Prepare the final VE Report and submit to CPM Senior Management, Project Manager, and VE Team

For projects that do not meet the FHWA threshold, an informal Value Engineering Study can be conducted if requested by the Project Manager or Senior Management. In order to expedite the process for these projects the VE Unit will not provide a full VE report, however a summary report of the final recommendations will be submitted to the Project Manager and his team

### 3. Monitoring/Implementation Phase

The purpose of this step is to follow up on the Project Manager's decision regarding the final VE recommendations.

After submission of the final VE Report, the Project Manager and his Design Team will generate a Summary Statement regarding the VE recommendations. The Summary Statement will include the decision and a detailed justification for that decision. This Summary Statement will be included in the CD report and should be shared with the VE Unit.

Accepted VE recommendations will be incorporated into the PPA and will be presented to the Capital Program Screening Committee (CPCS) by the Project Manager for their concurrence.

If the VE recommendations are found unacceptable by the Project Manager and his design team, the VE Unit, when appropriate, may request to present the VE alternatives to CPM Senior Management for their decision.

The VE Unit may monitor the progress of the projects that have implemented VE recommendations throughout design (PE and FD) and construction.

## Appendices

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Appendix A  
VE Process Flow Chart

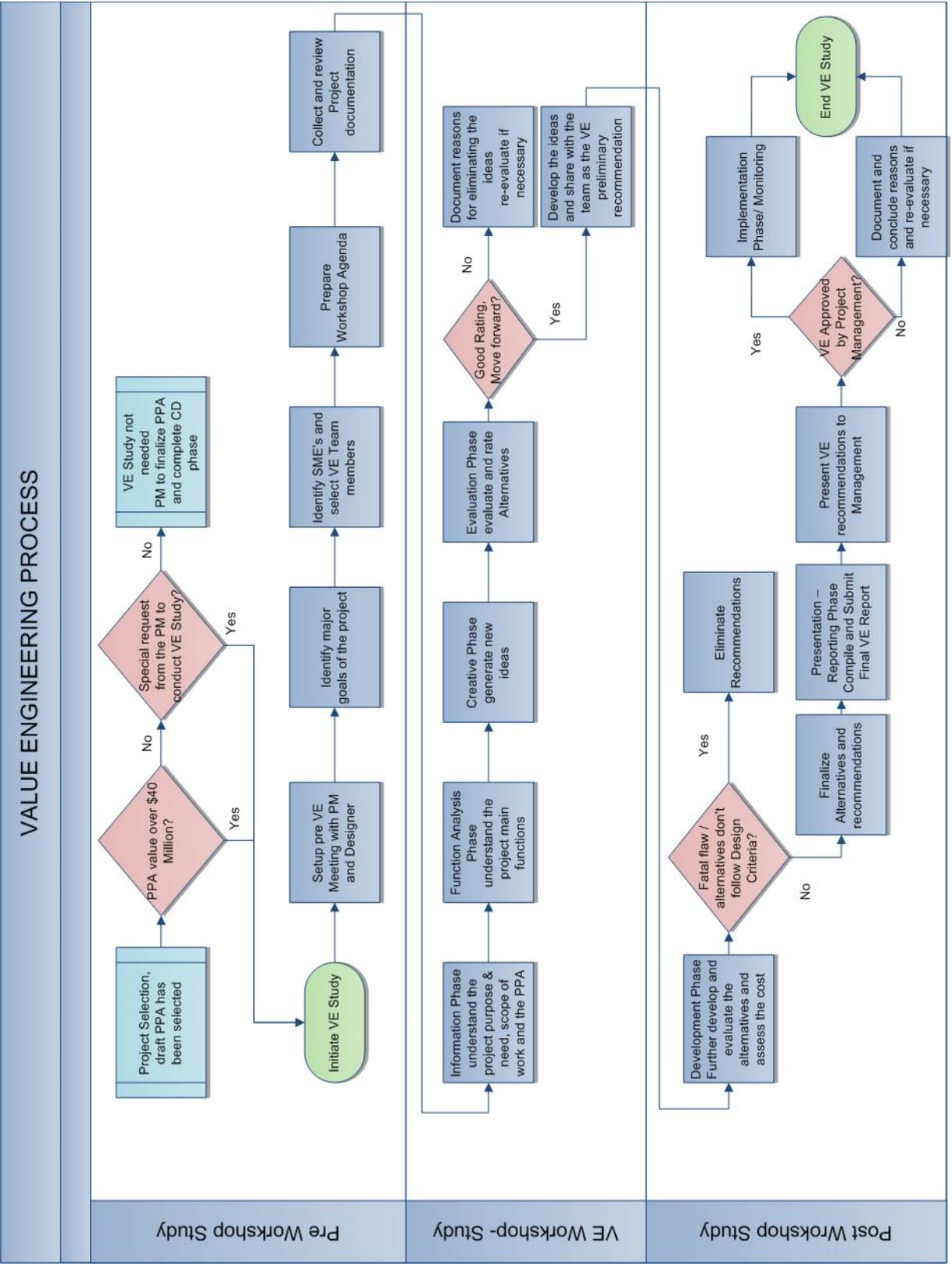


Figure 5 - Value Engineering Process Flow Chart

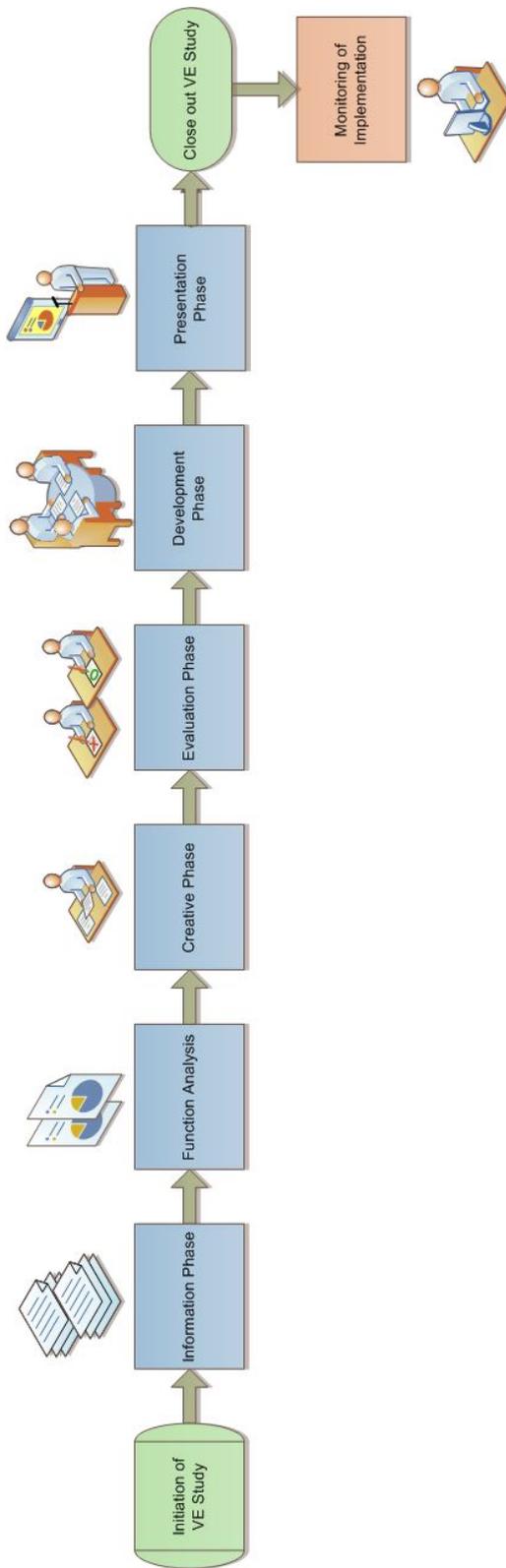


Figure 6 - Value Engineering Flow Chart

Appendix B  
Value Engineering Report Template

# VALUE ENGINEERING REPORT

ROUTE XXX PROJECT

TOWNSHIP OF XXX.....XXX COUNTY



**NJDOT**  
**VALUE ENGINEERING UNIT**  
**DATE**

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## SECTION 1. EXECUTIVE SUMMARY

The New Jersey Department of Transportation (NJDOT) Value Engineering (VE) group is responsible for conducting VE studies and an analysis of all NJDOT projects that meet the FHWA thresholds. The thresholds are \$50 million for all projects on the National Highway System and \$40 million for bridge projects. Upon request of the Project Management Office, the Value Engineering Unit will conduct studies of projects that have particularly high cost items.

The NJDOT Value Engineering group conducted a study of the “Name of the project”, while in the Conceptual Development phase. This report highlights the conclusion of the study and lists the recommended alternatives that achieve the same objectives of the project yet at a reduced cost than originally proposed.

The Executive Summary includes an overview of the project, the study methodology, key findings, and the recommendations developed by the VE Team. Also included are detailed documentations and exhibits of the study provided in the report.

The Value Engineering (VE) workshop was held on Date. The VE Team consisted of subject matter experts (SMEs) with diverse engineering backgrounds. All participants were independent of the project development team to ensure maximum objectivity towards identifying alternative solutions. (See Table Below)

Name	Work Unit	Title
	Program Management Office	Manager
	Value Engineering	VE Coordinator
	Value Engineering	
	Environmental	
	Structural Design	
	Structural Evaluation	
	Geotechnical Engineering	
	Utilities	
	Regional Construction	
	Construction Engineering	
	Traffic Engineering	
	Traffic Operations	
	Geometrics	
	Right of Way	
	Access Design	
	Operations/Maintenance	

Table 1 - VE Team

## PROJECT OVERVIEW:

Project summary information.



Figure 2 – Project Location

## PURPOSE AND NEED:

State the purpose and need of the project

## FOCUS AND METHODOLOGY OF THE VALUE ENGINEERING (VE) STUDY:

The objective of the Value Engineering (VE) study is to identify opportunities and recommend concepts aimed at improving value in terms of: cost, constructability, maintenance of traffic, and the basic functional requirements of the project.

Constraints identified for this project are:

- Constructability
- Environmental Impacts
- Right of Way Impacts
- Utilities

---

## METHODOLOGY:

The VE Team followed the core Value Engineering methods and procedures (M&P) for conducting this type of analysis. The Value Engineering process followed consists of the following phases:

1. Information Gathering and Investigation
2. Function Analysis
3. Speculation
4. Evaluation
5. Development
6. Presentation – Report documentation

The Value Engineering Study included a functional analysis of the major components of the project using a systematic problem solving process by a multidiscipline team. The study generated alternatives through the use of creative thinking to provide the intended purpose of the project while achieving the best balance between cost, performance and quality.

## VE STUDY RESULTS SUMMARY AND RECOMMENDATIONS

During the Creative/Speculation Phase of the workshop, the VE Team generated XX different ideas for Route XYZ and X comments or risk factors that would need to be analyzed for further review. These ideas were then compared and evaluated to identify ideas with the most promise to achieve saving while preserving functions or improving operations.

These ideas were further compared and evaluated against the ranking system that was developed by the Project Team. The ideas that performed the best were further developed by the VE Team. The evaluation process reflected five attributes, listed below, that considered key aspects of project performance.

- Improved Safety
- Improved Traffic Operations
- Mitigated Environmental impacts
- Improved Construction
- Minimized Right-Of-Way (ROW) impacts

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## VE RECOMMENDATION SUMMARY

State the VE final recommendations

## OVERVIEW

Project location, Existing condition, Background of the project

## PURPOSE AND NEED OF THE PROJECT

State the purpose and need of the project along with the project goals and objectives based on the purpose and need statement:

## PROPOSED PPA AND COST ESTIMATE

This section provides a brief description of the proposed Preliminary Preferred Alternative for improvements to the structural and geometrical deficiencies. The PPA was first introduced in the Conceptual Development Phase by the Office of Project Management.

---

### PPA: NAME THE PPA

Description of the PPA

Geometry, Impacts, Risks...etc.

PPA: COST ESTIMATE

The Preliminary Preferred Alternative has an estimated total project cost of \$XXXX including the Total Construction Cost close to \$XXXX. The table below shows a more detailed layout of the construction layout.

Project Name	
Work Type	Cost
Earthwork	
Pavement	
Other Roadway Items (Curb, Sidewalk, Guiderail, etc.)	
Drainage	
Utility	
Overhead Sign Structure Relocation	
Demolition	
Retaining Wall	
Bridge Replacement	
General Items (MPT, Mobilization, Erosion Control, etc., 30%)	
Design Contingency (5%)	
Escalation (2% for 3 years)	
Construction Engineering (12.2%)	
Contingency for Construction Change Order	
<b>Total Construction Cost</b>	

Table 2 –Cost Estimate

## SECTION 3. VALUE ENGINEERING METHODOLOGY

The Value Engineering (VE) workshop was conducted in accordance with the methodology as established by SAVE International, and followed the core Value Engineering methods and procedures and was structured using the NJDOT VE Process and Job Plan as outlined below:

### PRE-STUDY, PRE-WORKSHOP

This stage is essential to the success of the VE study. It is important that all of the following steps are taken seriously and that communication is clear with all individuals involved in the study. The VE-Workshop participants should be aware of their responsibility toward achieving the VE goal which is to identify opportunities aimed towards improving the value of the project and achieve the best balance between cost, performance and quality. Items to be completed at this stage are:

- Identify team members
- Define workshop location
- Review project documentation
- Prepare for the VE study (workshop)

### VE STUDY, WORKSHOP

The basic VE job plan consists of the following stages:

#### 1. Information phase:

- Gather, organize and analyze data
- Define costs
- Define the goals and the purpose and need of the study
- Define the scope of the study and the project goals and the workshop goals

At the beginning of the VE study, the design team presents a more detailed review of the project design, this includes an overview of the project and its various requirements, which further enhances the VE Team's knowledge and understanding of the project. The project team also responds to questions posed by the VE Team.

The major goals of the Route XYZ project were identified as follow:

- Improve structural deficiencies

- Improve structural geometry
- Improve transportation access
- Improve pedestrian access

## **2. Function Analysis phase**

- Define and evaluate functions of the project.
- Define needs vs. wants.

Function analysis is key to the VE Process. Analyzing the functional requirements of a project is essential to insure that the project design meets the criteria and the purpose and need of the project. The analysis of functions such as cost, performance, and acceptance are primary element in the VE study and is used to develop alternatives.

Key Issues identified that impact function analysis on this project are:

- Traffic Operation
- Staging
- Safety
- Cost
- Constructability

## **3. Creative/Speculation phase**

- Identify and list creative ideas
- Produce other possibilities of the design that could perform the same functions
- Think outside the box

The Speculation Phase involves identifying and listing creative ideas. During this phase, the VE Team participates in a brainstorming session to identify as many means as possible to provide the necessary project functions.

The idea list includes all of the ideas suggested during the study. These ideas should be reviewed further by the project team, since they may contain ideas that are worthy of further evaluation and may be used as the design develops. These ideas could also help stimulate additional ideas by others.

## **4. Evaluation phase**

- Rank and rate the ideas to select
- Refine the best ideas for further development

The purpose of the Evaluation Phase is to methodically assess the potential impacts of ideas generated during the Speculation Phase relative to their potential for value improvement. Each idea is evaluated in terms of its potential impact to Cost, Environmental Impact, Operational Performance, Constructability and Likelihood of Acceptance.

The alternative concepts are evaluated and rated in against the proposed PPA design concept.

### **Ratings Legend**

#### ***Cost Saving (CS)***

Significant Savings = 3

Some Savings = 2

No Savings = 1

Additional Costs = 0

#### ***Operational Performance (OP)***

Significant Improvement = 3

Moderate Improvement = 2

No Change = 1

Decreased Performance = 0

#### ***Likelihood of Acceptance (LOA)***

Very Likely = 3

Likely = 2

Possible = 1

Unlikely = 0

#### ***Environmental Impact (EI)***

Significant Improvement = 3

Moderate Improvement = 2

Minor Improvement = 1

Increased Impact = 0

#### ***Constructability (CON)***

Significant Improvement = 3

Some Improvement = 2

No Change = 1

More Complex = 0

#### ***Construction Performance (During Construction)***

Significant Improvement = 3

Some Improvement = 2

No Change = 1

Increase Duration = 0

### **5. Development phase:**

- List all alternatives or combination of alternatives which provide potential saving.
- Obtain technical assistance from the design team.
- Develop the best ideas into VE Alternatives with support and justification

During the Development Phase, the highly rated ideas are expanded and developed into VE alternatives. The development process considers the impact to performance, cost, environmental, constructability, and likelihood of acceptance. This analysis is prepared as appropriate for each alternative, and the information may include a performance assessment, initial cost, operational performance and the level of service (LOS).

## 6. Presentation- Report preparation

- The VE Unit will share and present the proposed VE alternatives to the PM and the design team
- The VE Unit will prepare and issue the VE report and provide the final recommendations

The VE study concludes with a preliminary presentation of the VE Team's assessment of the project and VE alternatives. The presentation provides an opportunity for the project manager and the design team to review the alternatives and provide their input.

### POST STUDY

At this stage a formal VE report will be prepared to summarize the results of the study. The report will be shared with the Project Manager, the Design Team, and the VE Team.

### WORKSHOP STUDY PROJECT GOAL

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#### MAJOR GOALS

- Improve Structure (Substructure and Superstructure)
- Improve roadway geometry
- Improve pedestrian access
- 

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#### KEY ISSUES

- Traffic Operation
- Staging
- Safety
- Cost
- Constructability

## SECTION 4. CREATIVE/SPECULATION PHASE

### BRAINSTORMING IDEAS AND PRELIMINARY RATINGS

The table below summarize the main ideas that were produced during the workshop with the appropriate rating. It should be noted that ratings are intended to generate discussion. They do not necessarily reflect the best ideas, solutions or recommendations. (Example below)

Route XXX							
No	Brainstorming Ideas	CS	EI	OP -AC	CON	LOA	TOTAL
1	Re-align Church Road and reduce to one traffic signal	3	2	0	2	1	8
2	Re-align Church Road to Ramblewood Road	3	2	0	2	1	8
3	Utilize Atrium Way for left turn to get to Church Road	2	1	0	2	1	6
4	Church Rd. Right in and Right out to 73 South- combined with 39	-	-	-	-	-	-
5	Cut and cover Church Road under Route 73	1	1	1	0	1	4
6	Right in and right out from Church Road to 73 South with Jug-handle	3	2	0	2	1	8
7	Two forward jug-handles instead of left turn slots, increase spacing between signals	2	2	0	2	1	7
8	Back to back left turn slots at Church Road, increase spacing between signals	2	2	0	2	1	7
9	Use Road near Arbor Way as the new connector instead of Atrium Way	3	2	0	2	1	8
10	Flyover U-turn for Route 73 South	1	2	0	2	1	6
11	Provide Northbound movement to Church Road at Rogers Walk	3	2	0	2	1	8
12	Northbund left turn slot to Clover Road	3	2	0	2	1	8
13	2-phase signals with Roundabout at Rogers Walk	0	0	3	0	1	4
14	Cut and cover at Fellowship Road and Route 73	0	0	3	0	2	5
15	Reverse jug-handle for Route 73 North	0	0	2	0	1	3

Table 3 – Brainstorming Ideas

### BRAINSTORMING COMMENTS

List the general ideas and comments that were introduced during the workshop.

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- 
-

## SECTION 5. PRELIMINARY EVALUATION PHASE

### WORKSHOP EVALUATION OF IDEAS

The VE Team further discussed the brainstorming ideas and recommended moving forward with any idea that is likely to meet the purpose and need. Based on that, the following ideas considered for further review and evaluation:

---

IDEA 1:

Provide description and sketches of the idea

---

IDEA 2

### POST WORKSHOP EVALUATION

A follow up meeting was held between the Value Engineering Unit, Project Management, and the Designer on **Date** to discuss the alternatives/ideas from the Preliminary Evaluation Phase. All brainstorming ideas were evaluated based upon the following criteria:

- Traffic Operation
- Staging
- Safety
- Cost
- Constructability
- Environmental Impact
- ROW Impact

## SECTION 6. DEVELOPMENT AND FINAL EVALUATION PHASE

### FINAL EVALUATION AND DESIGNER INPUT

The selected list of ideas presented in the Preliminary Evaluation Phase were further analyzed by the Value Engineering Unit and the Designer. Feasibility and required actions were identified for each individual alternative/idea based upon the following criteria:

- Purpose and Need
- Geometric Evaluation
- Cost Analysis
- Environmental Impact
- ROW Impact
- Traffic Impact
- Constructability

The Designer's input and the criteria mentioned above were used to determine the advantages/disadvantages and feasibility of the ideas as shown below:

### FINAL EVALUATION PHASE AND DETERMINATION PER ALTERNATIVE/IDEA

Describe the advantages and the disadvantages of alternatives and the outcome of the final evaluation.

## SECTION 7. VALUE ENGINEERING CONCLUSION AND RECOMMENDATION

Final conclusion and the VE Unit recommendation

This draft report was prepared by the NJDOT Value Engineering Unit

If you have any questions about the content of this report please contact:

Name .....Title.....Phone number

Name .....Title.....Phone number

Name .....Title.....Phone number

## APPENDICES