Value Engineering

of

State Agency Capital Outlay Projects

for

Fiscal Year 2011

DEPARTMENT OF
GENERAL SERVICES

BUREAU OF CAPITAL OUTLAY MANAGEMENT

Serving Government. Serving Virginians.

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EXECUTIVE SUMMARY

I. Introduction

The Director of the Department of General Services is required by Section 2.2-1133 of the *Code of Virginia* to report to the Governor and the General Assembly on or before September 15 of each year, the following:

(i) the number and value of the state capital projects where value engineering (VE) was employed

(ii) the identity of the capital projects for which a waiver of the requirements of Section 2.2-1133.C was granted, including a statement of the compelling reasons for granting the waiver.

II. Projects

Thirteen (13) projects with a combined estimated construction value of approximately $260 million were reported by Agencies as undergoing the Value Engineering process during Fiscal Year 2011. The requirements for Value Engineering are defined in Section 2.2-1133 of the *Code of Virginia.* The associated administrative procedures are provided in the Commonwealth of Virginia's *Construction and Professional Services Manual.*

III. Savings / Cost

Estimated savings for owner-accepted VE items were provided for these projects by the applicable agencies and institutions. The estimated savings recommended by the value engineering teams and accepted by state agencies for these projects totaled approximately $11.9 million. The average VE savings were 4.6% of the estimated construction value.

The average cost of a VE Study was $35,000. The average savings in construction value was $915,000. The aggregate costs of the VE studies as a percent of aggregate savings were 3.8%. This is equivalent to a payback ratio of 26:1 for employing the VE process.

IV. Waivers Granted / Projects Excluded

Thirteen (13) reported projects were granted waivers or otherwise excluded from the VE process. These projects and the associated reasons for exclusion are identified in Table 3. Projects approved for procurement using the "Design Build" methodology are typically excluded from the standard VE process as the Design Build Contractor provides a lump sum fixed price prior to design and contract award. Projects procured using Construction Management at Risk (CM at Risk or CM/GC) are also typically exempted from the VE process. The average "value" savings reported by agencies as being incorporated in the design for these thirteen projects were 6.7% of the estimated construction value.

Projects procured under the provisions of the Public-Private Education Facilities and Infrastructure Act of 2002 (PPEA) are specifically exempted from the value engineering requirements defined in Code of Virginia Section 2.2-1133.

VALUE ENGINEERING OF STATE CAPITAL OUTLAY PROJECTS FOR THE PERIOD JULY 1, 2010 - JUNE 30, 2011

1. Introduction

The Director of the Department of General Services is required by Section 2.2-1133 of the Code of Virginia to report by September 15 each year to the Governor and the General Assembly on the (i) number and value of the capital projects where value engineering (VE) was employed and (ii) identity of the capital projects for which a waiver of the requirements of Section 2.2-1133.B was granted, including a statement of the compelling reasons for granting the waiver. This report provides the information for Fiscal Year 2011 which encompasses the period from July 1, 2010 - June 30, 2011.

2. Background

Section 2.2-1133.A of the *Code of Virginia* establishes the requirement for use of value engineering on any capital project costing more than five million ($5,000,000) dollars. This requirement became effective in 1994 and procedures for implementing a value engineering program were developed and issued to state agencies in July 1994. The procedures for implementing the VE process are contained Section 814.0 of the Commonwealth of Virginia's *Construction and Professional Services Manual (CPSM)*.

Value engineering is a systematic process of review and analysis of a project design performed by an independent team of persons not originally involved in the design of the project. The team members are themselves licensed design professionals and the team leader is specially trained in conducting the team study process.

The purpose of the Value Engineering review and analysis of the design is to offer suggestions to the project owner and project design firm that improve project quality and reduce total project cost by combining or eliminating inefficient or expensive parts or steps in the original design or recommending redesign of the project using different technologies, materials or methods. Value engineering is often used to deal with "cost growth" during the project design phase. In some cases, a VE study may result in an increase in initial cost for a portion of a project. This generally occurs when the team recommends a design change that may involve a higher initial investment during construction, but is more cost effective when measured on a life cycle basis.

Not all projects are candidates for VE. Where an initial analysis of a project indicates that the cost of conducting the VE study may not produce sufficient recommendations of cost savings to cover study costs, there is no potential net benefit in conducting the study. Also, projects which are site adaptations or reuse

of previously value-engineered projects are not typically cost-effective for a second VE study.

Current state procedures require capital projects with an estimated construction cost exceeding **$5,000,000** to be value engineered, unless waived by the Director of the Department of General Services. The VE study is conducted at the preliminary design stage of the project after the design concept has been selected and the various building systems evaluated and selected by the designer. The project design is approximately **35% complete** at the preliminary design stage.

The Commonwealth's process involves a **40-hour study** of the project by the VE team. The team is composed of registered design professionals that practice architecture and the engineering disciplines (civil, structural, electrical, and mechanical) involved in the project design and a certified value specialist who is the VE team leader. The A/E (architect/engineer) firm that designed the project is a part-time participant in the VE study. Building shape, floor plan layout and building systems components are sufficiently developed at the preliminary stage of design for all VE team disciplines to evaluate the essential elements of the design and suggest alternatives where appropriate.

The recommendations produced by the VE team are reviewed by the project owner and the A/E firm employed to design the project. Recommendations are selected or rejected by the project owner in consultation with the design firm based on program requirements, cost, technical feasibility, aesthetics, and other related considerations.

Recommendations dealing with technical design issues must ultimately be accepted or rejected by the owner's design consultant as the designer of record is the party with ultimate liability for the design and is required by law to professionally seal the design documents.

Accepted recommendations must be incorporated into the project design and most often this will require additional work on the part of the design consultant. Since the nature and scope of this additional work is not known when the A/E design contract and price are negotiated, the A/E is entitled to a fee for this additional design service.

3. Projects Studied and Savings Identified

Thirteen (13) projects with a combined estimated construction value of approximately $260 million were reported by Agencies as undergoing the VE process during Fiscal Year 2011. The Value Engineering teams identified design changes, which were accepted by the agencies and institutions, which produced an aggregate estimated savings in construction cost of approximately $11.9 million. (See Table 1.)

The aggregate VE savings reported are equivalent to 4.6% of the combined preliminary budgets of these thirteen projects.

4. Study Costs

The aggregate cost for preparing studies for these 13 projects was $417,218. Study costs ranged from a low of $12,000 to a high of $53,000. The average study cost was $35,000. The median cost was $45,250. Deducting the study costs, the Commonwealth realized a net savings in estimated construction value of approximately $11,478,000 by employing the Value Engineering process. The VE Cost as a percent of the VE Savings as an aggregate for these 13 projects was 3.8%. Stated otherwise, this represents a payback ratio of 26 to 1. (See Table 2.)

5. Waivers Granted / Projects Excluded

Agencies are requested each year to report all projects under their purview which were at the preliminary design phase during the reporting period and which exceed the $5,000,000 threshold, but did not undergo a formal VE process.

Thirteen (13) projects exceeding the $5,000,000 threshold were identified by agencies as being granted waivers or otherwise excluded from the VE process. These thirteen projects and the associated reasons for exclusion from the VE process are identified in Table 3.

Projects approved for procurement using the "Design Build" (D/B) methodology are typically excluded from the standard VE process as the Design Build Contractor provides a lump sum fixed price prior to design and contract award. Projects procured using Construction Management at Risk (CM at Risk or CM/GC) are also typically exempted from the VE process. Projects procured under the provisions of the Public Public-Private Education Facilities and Infrastructure Act of 2002 (PPEA) are specifically exempted from the VE provisions mandated in Section 2.2-1133 of the Code of Virginia. (The PPEA exemption from the Value Engineering process is identified in § 56-575.16 of the *Code of Virginia*.)

Exemptions from the formal VE process continue to expand due to the use of these alternative procurement methods for major projects. Agencies did, however, report "value" savings of approximately $30.7 million for these exempted projects. Based on an aggregate construction value of approximately $456 million, the savings reported represent 6.7% of the total construction value.

Table 1

VE Study Savings vs. Construction Budget

Item No.	Project Code	Agency / Institution	Project Title	Estimated VE Savings (Accepted Items)	Preliminary Construction Budget	VE Savings as a % of Con. Budget
1)	209-B1162	University of Virginia Medical Center	Hospital Helipad Relocation	$366,850	$4,900,000	7.5%
2)	247-17697	George Mason University	Fine Arts Building Renovation	$146,095	$7,918,000	1.8%
3)	247-17698	George Mason University	Science and Technology II Renovation and Addition	$4,505,000	$47,887,000	9.4%
4)	216-17674/17824	James Madison University	West Wing (RMH)/Student Health Center	$68,700	$54,287,398	0.1%
5)	214-17668	Longwood University	Construct University Technology Center	$433,977	$14,117,668	3.1%
6)	215-17671	University of Mary Washington	Information and Technology Convergence Center	$950,040	$24,350,000	3.9%
7)	207-B1101-001	University of Virginia	Thrust Theater Preliminary Design	$620,277	$9,000,000	6.9%
8)	207-B1076/B109	University of Virginia	Newcomb Hall Dining & Phase III Renovations	($90,000)	$13,700,000	-0.7%
9)	207-B1157	University of Virginia	East Chiller Plant & Lee Street Realignment	$4,300,305	$22,000,000	19.5%
10)	260-17703	VCCS / NVCC - Loudoun Campus	Higher Ed Center	$85,000	$12,057,847	0.7%
11)	260-17720	VCCS / NVCC - Alexandria Campus	Phase III Academic Building	$10,000	$29,329,773	0.0%
12)	260-17711	VCCS / NVCC - Annandale Campus	Brault Building Renovation and Addition	$367,700	$12,460,496	3.0%
13)	260-17785	VCCS / BRCC	Student Recreation Center	$131,252	$8,690,000	1.5%
			TOTAL	**$11,895,196**	**$260,698,182**	
			AVERAGE	**$915,000**	**$20,054,000**	**4.6%**
			MEDIAN	**$366,850**	**$13,700,000**	

Table 2

VE Study Savings vs. VE Study Cost

Item No.	Project Code	Agency / Institution	Project Title	VE Study Cost	Estimated VE Savings (Accepted Items)	Study Cost as % of VE Savings	Payback Ratio
1)	209-B1162	University of Virginia Medical Center	Hospital Helipad Relocation	$12,000	$366,850	3.3%	31:1
2)	247-17697	George Mason University	Fine Arts Building Renovation	$19,984	$146,095	13.7%	7:1
3)	247-17698	George Mason University	Science and Technology II Renovation and Addition	In A/E Contract	$4,505,000	n/a	n/a
4)	216-17674/17824	James Madison University	West Wing (RMH)/Student Health Center	$47,284	$68,700	68.8%	1:1
5)	214-17668	Longwood University	Construct University Technology Center	$44,767	$433,977	10.3%	10:1
6)	215-17671	University of Mary Washington	Information and Technology Convergence Center	$53,413	$950,040	5.6%	18:1
7)	207-B1101-001	University of Virginia	Thrust Theater Preliminary Design	$22,048	$620,277	3.6%	28:1
8)	207-B1076/B109	University of Virginia	Newcomb Hall Dining & Phase III Renovations	$12,368	($90,000)	-13.7%	-7:1
9)	207-B1157	University of Virginia	East Chiller Plant & Lee Street Realignment	$13,229	$4,300,305	0.3%	325:1
10)	260-17703	VCCS / NVCC - Loudoun Campus	Higher Ed Center	$47,692	$85,000	56.1%	2:1
11)	260-17720	VCCS / NVCC - Alexandria Campus	Phase III Academic Building	$49,243	$10,000	492.4%	0:1
12)	260-17711	VCCS / NVCC - Annandale Campus	Brault Building Renovation and Addition	$49,457	$367,700	13.5%	7:1
13)	260-17785	VCCS / BRCC	Student Recreation Center	$45,733	$131,252	34.8%	3:1
			TOTAL	**$417,218**	**$11,895,196**		
			AVERAGE	**$35,000**	**$915,000**	**3.8%**	**26:1**
			MEDIAN	**$45,250**	**$366,850**		

(a) VE was included in the A/E contract. No specific value was assigned for the VE effort.

Table 3
Other Projects Exceeding $5,000,000 Threshold

Item No.	Project Code	Agency / Institution	Project Title	Estimated "Value" Savings (Accepted Items)	Preliminary Construction Budget	Savings as a % of Con. Budget	Reason Reported for VE Study Exemption	See Note
1)	720-17276	Department of Behavioral Health and Developmental Services	Replace Western State Hospital	$1,728,672	$120,000,000	1.4%	Design-Build PPEA	(a)
2)	247-17572	George Mason University	Smithsonian - Mason Conservation Studies Program	$43,000	$15,696,000	0.3%	Design Build project.	
3)	216-17675	James Madison University	Duke Renovation/Expansion	$4,056,750	$30,106,555	13.5%	Construction Mgmt project.	
4)	217-17892	Radford University	Moffett Hall Renovation	$682,000	$10,280,000	6.6%	Life Safety & MEP Upgrades	(c)
5)	208-17658	Virginia Tech	Signature Engineering Building	$5,820,335	$69,343,000	8.4%	Construction Mgmt project.	
6)	208-L00022	Virginia Tech	Veterinary Medical Instructional Facility	$547,103	$9,500,000	5.8%	Construction Mgmt project.	
7)	208-17661	Virginia Tech	National Institute of Aerospace (Hampton Roads)	$671,101	$9,940,000	6.8%	Construction Mgmt project.	
8)	208-16758-002	Virginia Tech	Center for the Arts / Creative Technologies	$14,713,535	$71,990,000	20.4%	Construction Mgmt project.	(b)
9)	425-17626	Jamestown-Yorktown Foundation	Yorktown Museum	$1,531,858	$18,153,884	8.4%	Construction Mgmt project.	(a),(b)
10)	242-17691	Christopher Newport University	Center for the Arts / Creative Technologies	$104,350	$40,346,313	0.3%	Construction Mgmt project.	
11)	242-17690	Christopher Newport University	Construct Science Building Phase 2	$64,190	$18,909,670	0.3%	Construction Mgmt project.	
12)	212-17531	Virginia State University	Gateway II Residence Hall	$617,666	$30,643,362	2.0%	Construction Mgmt project.	
13)	204-17652	College of William & Mary	Tucker Hall Renovation	$118,005	$10,992,717	1.1%	Construction Mgmt project.	
			TOTAL	**$30,698,565**	**$455,901,501**	**6.7%**		

Notes:

(a) Denotes waiver granted by DGS/DEB. Certain institutions have authority granted by Higher Education Management Agreements to waive requirements for projects under their purview.

(b) Project was included in the previous year's report, however, more current information is included in this report.

(c) Project was upgrades to a residence hall. Scope of work is principally life safety and MEP upgrades to the building with minimum wall and room modification. VE analysis was conducted with in-house personnel.