

Executive Summary

In the fall of 2005 the U.S. Congress passed the Energy Policy Act (EPAAct – 2005), which required Federal agencies to achieve mandated sustainability goals to protect the environment. Subsequently, the Department of Veterans Affairs (VA), along with 18 other Executive Branch agencies, signed a Memorandum of Understanding (MOU) to work together to achieve these goals. The MOU was followed by Executive Order 13423, Strengthening Environmental, Energy, and Transportation, which extended the MOU to all Executive Branch agencies and set forth additional goals for sustainability. The Department of Energy (DOE) has also issued an Interim Final Rule that outlines energy targets required by EPAAct for Executive branch agencies. This manual is in response to these Federal Mandates, and provides guidance and assistance to achieve them.

The Federal Mandates require all Federal government construction projects to comply with sustainability and energy reduction requirements. For VA, the Federal Mandates will affect the design and construction of existing buildings, [VA initiated] leased space, grants, and land development projects such as cemeteries¹. However, some requirements will require additional funding, which VA will request in the FY 2009 budget cycle. Until full funding occurs, projects in progress shall incorporate the sustainability and energy requirements, using life-cycle costing to determine viable energy reduction goals, as scope and budget permit. Where the Mandates are not achievable, written justification must be provided.

VA has determined that using the widely adopted U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED[®]) rating system will provide a well known industry framework to achieve the Federal Mandates. LEED has several rating systems for various building types. At this time two² will be used by VA: LEED – NC (New Construction) is appropriate for all stand-alone and major renovations at VA buildings and individual credits can be used as applicable for new construction, renovation, and cemetery use; LEED – CI (Commercial Interiors) is applicable for interior work only, such as for VA initiated leased office space.

After complying with all the credits to achieve the Federal Mandates, VA research indicates that new stand-alone construction and major renovation projects should be able to achieve LEED Silver status with minimum extra effort and cost; those projects should register with the USGBC with the goal of obtaining LEED Silver or LEED Silver equivalency. Nationwide markets will vary in LEED sophistication, however. Consequently, VA encourages project teams to achieve the highest LEED level possible within the scope and budget of each project. The project team is also encouraged, but not required, to pursue third party review and formal LEED Certification with the U.S. Green Building Council and display the seal in the facility.

Each project is unique. This manual is intended as a reference guide and source of design direction. It is not intended to limit the potential for innovation that each project presents, nor does it stipulate internal design team procedures. Firms that are selected to design VA projects should already have demonstrated their sustainable design capabilities through the VA selection process. They will find the criteria and procedures in this manual a baseline for developing the design according to the unique conditions that each project represents.

¹ VA Green Buildings Action Plan Implementing the Memorandum of Understanding on Federal Leadership in High Performance and Sustainable Buildings, signed by Robert J. Henke, VA Assistant Secretary for Management, March 30, 2007

² There are efforts currently underway to create a national standard for sustainability that is specific to healthcare facilities. This guide will be adapted to LEED healthcare standards that are more appropriate as time goes on.



Department of
Veterans Affairs

Table of Contents

1	INTRODUCTION	1-1
1.1	Objectives	1-1
1.2	Federal Mandates	1-1
1.2.1	Energy Policy Act of 2005 and DOE Interim Final Rule	
1.2.2	Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding	
1.2.3	Executive Order 13423: Strengthening Federal Environmental, Energy and Transportation Management	
1.3	Implementation	1-2
1.3.1	LEED and Federal Mandates	
2	FEDERAL MANDATES MAPPED TO LEED	2-1
2.1	Integrated Design	2-3
2.2	Commissioning	2-3
2.3	Optimize Energy Performance	2-4
2.4	Measurement and Verification	2-7
2.5	Protect and Conserve Indoor Water	2-8
2.6	Protect and Conserve Outdoor Water	2-8
2.7	Enhance Indoor Environmental Quality	2-10
2.8	Reduce Environmental Impact of Materials	2-12
3	ADJUSTMENTS TO THE DELIVERY PROCESS	3-1
3.1	Team Composition and Work Flow	3-1
3.2	Use of Building Information Modeling (BIM)	3-2
3.3	Survivability	3-3
3.4	Estimating Process	3-3
3.5	Schedule	3-5
3.6	Key Steps and Deliverables by Phase	3-6
3.7	Schematic 1	3-8
3.7.1	Sustainability Kick-Off Meeting	
3.7.2	Preliminary Evaluation Meeting	
3.7.3	Alternative Concepts and Deliverables	
3.7.4	Schematic 1 Deliverables	

3.8	Schematic 2/Design Development 1 and 2	3-10
3.8.1	Ongoing Evaluation Meetings	
3.8.2	Schematic 2 Deliverables	
3.8.3	Design Development 1 and 2 Deliverables	
3.9	Construction Documentation	3-12
3.9.1	Construction Documentation Deliverables	
3.10	Construction Phase	3-13
3.10.1	Construction Phase Deliverables	
4	METHODS TO ACHIEVE THE GOALS	4-1
4.1	Integrated Strategies	4-1
4.1.1	Orientation	
4.1.2	Massing	
4.1.3	Storm Water	
4.2	Energy Efficiency Strategies	4-4
4.2.1	Building Load Reduction Strategies	
4.2.1.1	Fenestration	
4.2.1.2	Walls, Roof and Slab	
4.2.1.3	Air Barriers	
4.2.1.4	Daylight Dimming Controls for Perimeter Areas	
4.2.1.5	Variable ACH Ventilation Rates	
4.2.1.6	Lighting and Occupancy Sensor Lighting Controls	
4.2.1.7	Warmest Supply Temperature Reset	
4.2.2	High Efficiency Systems	
4.2.2.1	High Efficiency Chiller Systems	
4.2.2.2	Increased Chiller Water Delta-T	
4.2.2.3	Cogeneration – Combined Heat and Power	
4.2.2.4	Energy Recovery	
4.2.2.5	Condensing Boilers	
4.2.2.6	Ground Source Heat Pumps	
4.2.3	Renewable Systems	
4.2.3.1	Off Site	
4.2.3.2	On Site	
4.3	Funding Options	4-12

5	APPENDIX A: COST IMPLICATIONS BY LEED CREDIT	5-1
	LEED-NC Credit Chart	5-2
	LEED-CI Credit Chart	5-3
5.1	Sustainable Sites	5-4
5.2	Water Efficiency	5-17
5.3	Energy and Atmosphere	5-21
5.4	Materials and Resources	5-27
5.5	Indoor Environmental Quality	5-32
6	APPENDIX B: CASE STUDIES	6-1
6.1	Health Care Facilities	6-2
6.2	Commercial Interiors	6-10
6.3	Cemeteries	6-14
7	APPENDIX C: TOOLS	7-1
7.1	Sustainability Kick-Off	7-2
7.2	Design Checklists	7-5
8	APPENDIX D: RESOURCES	8-1
8.1	Websites	8-2
8.2	Glossary of Terms	8-5
8.3	Glossary of Acronyms	8-12
8.4	Bibliography	8-14
8.5	Project Team	8-15

Note: This document contains hyperlinks to locations within the document, as well as to locations on VA's website (www.va.gov). Hyperlinks are visible when the mouse scrolls over linked text. For users referencing a printed version of the Sustainable Design Manual, the internet address of each link is listed in parentheses.



Department of
Veterans Affairs