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**Plans for Renovating the
Cannon House Office
Building and Garages**

Statement of Terrell G. Dorn, Director
Physical Infrastructure Issues



GAO

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Mr. Chairman and Members of the Committee:

We appreciate the opportunity to participate in this hearing to discuss renovations of the Cannon House Office Building and Garages. The Cannon House Office Building (Cannon Building)—completed in 1908—and the East and West House Underground Garages (East and West Garages)—built in 1968—have deteriorated over time and will need to be repaired, according to assessments conducted for the Architect of the Capitol (AOC). AOC plans to renovate these three facilities over approximately the next 8 years as part of a long-term effort to reduce maintenance backlogs and execute major renewal projects to sustain all Capitol Complex facilities. My statement today is based on work we conducted over the past several months to assess AOC’s plans for renovating the Cannon Building and East and West Garages. To conduct this work, we toured the facilities, analyzed AOC documents—including facility condition assessments (FCA),¹ planning studies, and project development documents—and interviewed AOC officials. We relied on the information in AOC’s project documents and cost estimates, which was largely based on the work of professional consultants, and did not independently evaluate the condition of the facilities, determine repair needs, or estimate costs.

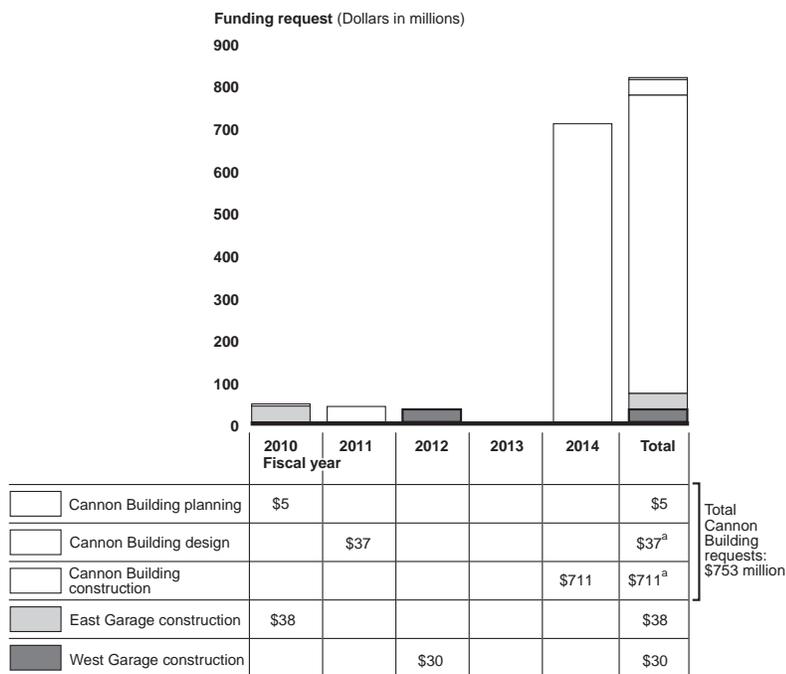
Summary

Renovations of the Cannon Building and East and West Garages are needed to maintain the integrity and safety of these facilities and reduce the likelihood of unplanned outages and associated costs. According to comprehensive FCAs completed for AOC by an expert consultant, most of the deficiencies identified in the Cannon Building—such as 70-year-old hot water heating and building ventilation systems and damaged, often nonfunctional windows—should be corrected within the next 5 to 7 years. The deficiencies identified in the garages are more urgent structural problems—including cracking concrete and corroding reinforcing steel—and, according to the FCAs, should be addressed within the next 2 to 4 years. In addition to correcting these and other identified deficiencies, the renovation projects will address other considerations, such as energy conservation, historic preservation, hazardous materials abatement, and fire safety. AOC anticipates that each of the garage renovation projects

¹Condition assessments provide information on a facility’s state of repair and are developed from inspections of structural, electrical, mechanical, plumbing, and other building systems. FCA reports typically catalog all of the deficiencies identified during the inspections along with the estimated cost to correct the problems.

will last approximately 2 years while the Cannon Building renovation will be completed in phases over 5 years. In order for these renovations to occur within the time frames specified in the FCAs, AOC has requested or plans to request \$38 million for construction of the East Garage renovation in fiscal year 2010, \$30 million for construction of the West Garage renovation in fiscal year 2012, and \$753 million for the planning, design, and construction of the Cannon Building renovation beginning in fiscal year 2010. (See fig. 1.) Limiting the scope of the renovations by deferring some work could reduce near-term costs; however, such action may result in the need to make more expensive emergency repairs in the future that could disrupt operations.

Figure 1: AOC’s Planned Funding Requests for Cannon Building and East and West Garage Renovation Projects



Source: GAO analysis of AOC data.

^aThe table indicates that AOC will request full funding for the Cannon Building’s design and construction for fiscal years 2011 (\$37 million) and 2014 (\$711 million), respectively. However, AOC will likely request this funding over multiple years, beginning in 2011 for design work and 2014 for construction.

To date, AOC has followed a reasonable process to plan the renovations of the Cannon Building and East and West Garages, and the agency’s current and planned requests for funding are timed to move the renovations forward within the time frames recommended in the FCAs. However,

because the Cannon Building renovation is at an early stage of development—meaning that the plans lack definition and the cost estimate is preliminary—AOC’s current estimate of \$711 million for the renovation work should not be considered sufficiently accurate for funding purposes. To renovate the Cannon Building within the time frame recommended in the FCA and to provide Congress with better cost information for making future renovation decisions, it is important that AOC continue, as planned, to refine the project’s scope and cost estimate over the next 2 years. AOC’s request for \$5 million in 2010 and planned request for \$37 million beginning in 2011 should allow the agency to proceed with planning and design and position it to award a contract for and complete the Cannon Building renovations within the recommended 5- to 7-year time frame. For the East and West Garages, cost estimates are more reliable because the projects are at a later stage of development and are based on more complete information than the Cannon Building and—with updates planned by AOC—are at an appropriate level of development to justify funding to enter into a contract for construction.

Background

To develop and execute capital projects, AOC assesses the condition of its facilities; plans the work necessary to correct identified deficiencies and address other requirements; completes detailed design documents, including engineering plans and specifications; and awards contracts for construction services.² As a project progresses through these stages—which generally take about 5 years to complete—its scope matures and its estimated cost is refined until, at the detailed design stage, the estimated cost should be fairly close to the actual cost of the awarded construction contract. AOC controls the timing of these project development activities through its project prioritization process—a standard approach for scoring projects that considers the project’s urgency, type, and importance—and then prioritizes funding requests for planning studies, design, or construction work in its annual budget submission. In the past, we have recommended improvements to AOC’s processes for developing projects and prioritizing their execution; AOC has implemented these recommendations. For example, in response to recommendations we made in January 2003 and December 2004, AOC has completed FCAs for most of the facilities under its jurisdiction and developed a process for

²Construction could include any demolition, maintenance, repair, or restorative work completed at a facility. In some cases, construction work could also include building an addition to or expanding a facility.

prioritizing projects. More detailed information on AOC's process for developing and prioritizing projects appears in appendix I.

Cannon Building Renovation Is in the Planning Stage, and Its Estimated Cost Is Expected to Change

According to AOC's FCA of the Cannon Building, most of the identified deficiencies should be corrected within 5 to 7 years.³ For example, hot water heating and air-handling systems, which are not publicly visible, have components dating back to the 1930s that are deficient and in need of replacement. Other deficiencies identified in the FCA include an outdated fire alarm system for which repair parts are difficult to obtain, worn and stained marble tile in corridors, and original windows that are damaged and often nonfunctional.

AOC plans to correct most of the identified deficiencies through a comprehensive renovation project that will also consider requirements such as energy conservation, physical security, hazardous materials abatement, and historic preservation. The project is expected to include replacement windows, a new copper roof, and work to preserve and repair the building's stone exterior. On the interior, the project is expected to provide new wall and floor finishes in some areas; refurbish restrooms and make them more accessible to disabled people; and allow for complete replacement of all plumbing, heating and cooling, fire protection, electrical, and alarm systems. Included in the project is work to remove asbestos that may be contained in insulation used on hot water pipes in the building's heating system. In addition, the renovation will address fire safety issues related to work that AOC plans to complete through a separate project.⁴

³AOC's consultant, ENTECH Engineering, Inc., is currently updating the FCA prepared as part of a planning study of the Cannon Building completed by another consultant, URS Corporation, in December 2004. We referenced a draft copy of the final ENTECH Engineering study in conducting our work.

⁴AOC intends to execute a House Alternative Life Safety Approach (HALSA) project in fiscal year 2011 to address egress issues that are the subject of an Office of Compliance citation. According to the citation, exit stairwells in the building are unprotected against fire and smoke—thereby posing a safety risk to occupants—because they are either completely open or not equipped with fire-rated doors. To correct this problem while preserving the historic character of the building, AOC plans as part of the HALSA project to install cross-corridor fire-rated doors at each of the corner stairs and stairs adjacent to the rotunda to create compartments designed to protect occupants in the event of a fire. AOC will incorporate the HALSA design solution into its planning of the Cannon Building's renovation to determine whether there are any additional egress requirements that need to be addressed during the renovation.

To enable continued use of a part of the building during construction, AOC plans to complete the project in phases—a preconstruction phase and four construction phases (with each phase of construction roughly including one side of the four-sided building)—over 5 years. Accordingly, the project’s cost will include an allowance for the construction (or renovation) of a temporary facility for displaced occupants in the preconstruction phase. AOC’s preliminary planning studies suggest that this four-phase construction approach would allow for the most efficient operation, the fewest moves, and the shortest schedule of all phasing options considered.⁵ We have found in previous work that this method of phasing construction—renovating a portion of the building while keeping the remaining sections of the building operational—can be successful when the facility under construction must remain operational. For example, in renovating Bancroft Hall—the only residence facility at the United States Naval Academy—Navy officials executed a \$251 million nine-phase renovation project over 9 years by making one section available for construction while the other eight sections were in use.

Because the Cannon Building project is still in the planning stage, its scope and cost estimate are expected to change. For a project in the planning stage, the expected accuracy of its cost estimate is generally plus or minus 40 percent.⁶ As more is learned about a project during the planning process, the accuracy of its cost estimate is expected to improve. For example, we found some recommended work elements listed in AOC’s draft planning study for Cannon Building renovations that were not addressed in the conceptual cost estimate included with the same study.⁷ AOC officials indicated that these work elements will be addressed in the

⁵Other options considered were a vertical phasing plan that would include more phases than the preferred four-phase approach and a horizontal phasing plan under which one-half of a floor would be renovated at a time. Because implementing either of these alternative phasing plans would require utility system bypasses that are not required under the preferred four-phase approach, AOC estimates that project costs would increase between \$50 million and \$125 million depending on which alternative approach was used.

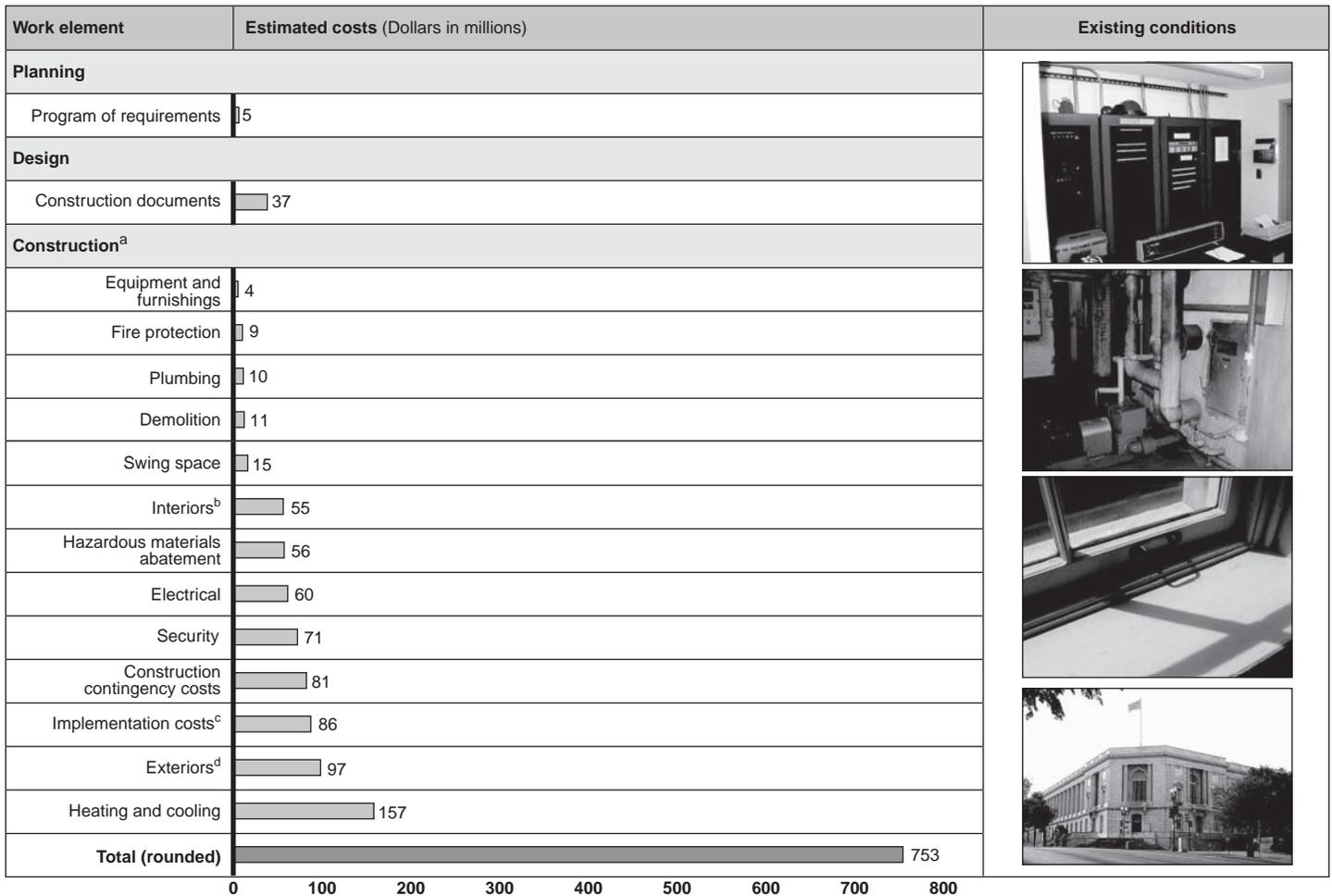
⁶Office of Management and Budget, *Planning, Budgeting, Acquisition, and Management of Capital Assets*, OMB Circular A-11, Part 7, Section 300, “Planning Budgeting, Acquisition, and Management of Capital Assets,” Supplement to Part 7, “Capital Programming Guide” (Washington, D.C.: June 2006) refers to the Department of Energy’s “Cost Estimating Guide,” DOE G 4301.1-1 (Washington, D.C.: Mar. 28, 1997).

⁷AOC’s consultant, URS Corporation, completed a planning study and cost estimate for the renovation of the Cannon Building in December 2004 and is currently updating the study to reflect changes to project requirements and applicable codes and standards, as well as updating the cost estimate. We based our analysis on a draft copy of the final study.

updated cost estimate that will be provided in the final study. If conducted properly, AOC's planning actions should enable criteria to be developed such that users' needs are identified and satisfied within the overall constraints affecting the project.⁸ AOC currently estimates that the total cost to complete the planning work, develop the project's design, and construct the project will be \$753 million. Specifically, AOC has requested \$5 million for fiscal year 2010 to fund the development of a program of requirements to further refine the project's scope and intends to request \$37 million beginning in fiscal year 2011 for design, and subject to scope determinations, \$711 million beginning in fiscal year 2014 for construction. See figure 2 for more detailed information on the planned project's estimated costs.

⁸For additional information on the planning stage of the project development process, see GAO, *Guide to the Building Development Process, the First Phase: Conceptual Planning*, [GAO-04-859G](#) (Washington, D.C.: July 2004).

Figure 2: Estimated Costs for Cannon Building Renovation



Sources: AOC (data); GAO (analysis); AOC (images).

^aConstruction costs are based on a March 2009 draft report of a planning study conducted by AOC's consultant, URS Corporation. The cost estimate assumes a 2014 construction contract award and includes a 3.5 percent annual escalation factor from 2009 (the year the estimate was prepared) to the estimated midpoint of each phase of construction.

^bInteriors includes costs for floor and wall repair work related to window replacement and restroom refurbishment.

^cImplementation includes costs for construction contract administration, testing, inspection, and quality control.

^dExteriors includes costs for window replacement, copper roof replacement, and stone preservation.

East and West Garage Renovations Are Awaiting Construction, and Estimated Costs Are Firmer

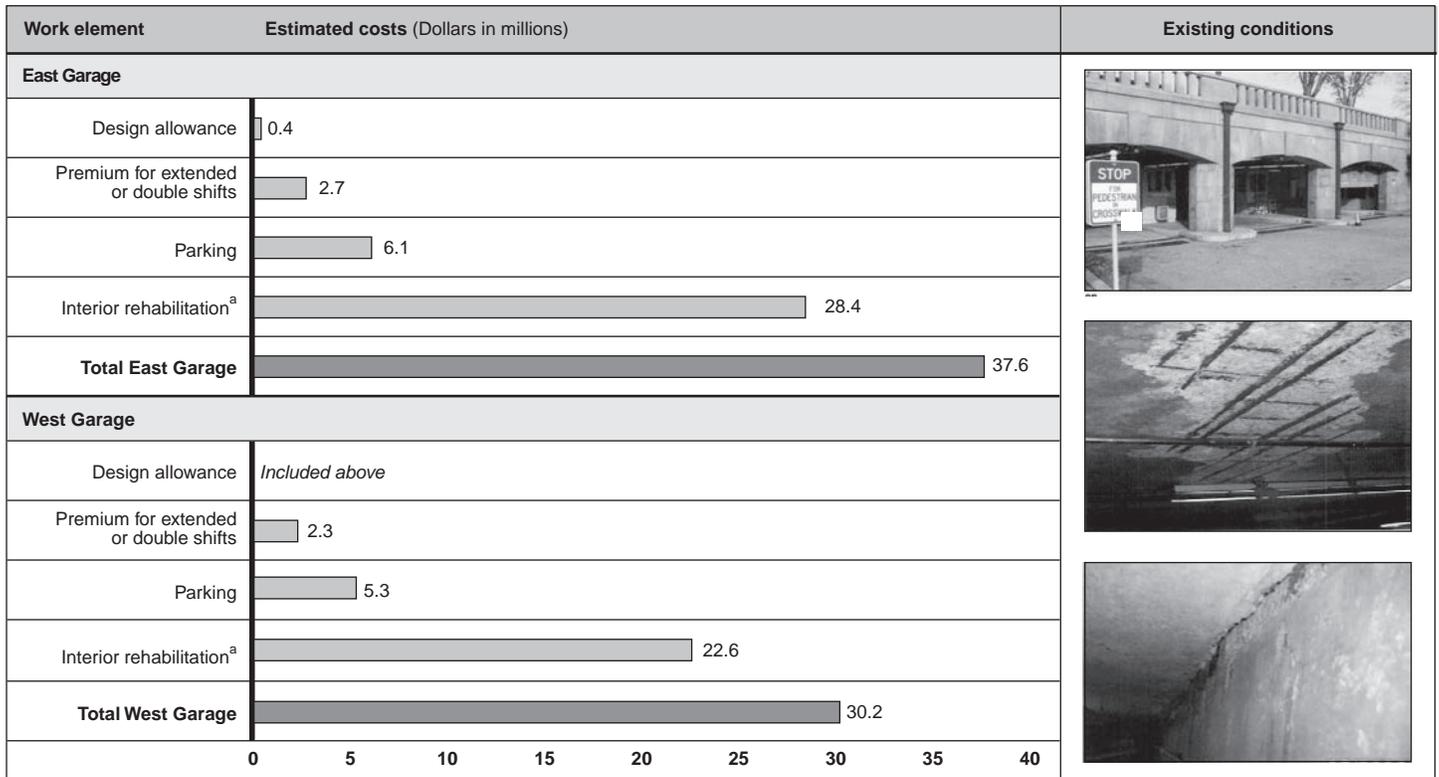
AOC's FCAs of the East and West Garages identify structural deficiencies, including cracking and delaminating⁹ concrete and corroding reinforcing steel, that have weakened the structures. According to the FCAs, repairs should be completed within the next 2 to 4 years. AOC plans to make the needed structural repairs to the garages as part of comprehensive renovation projects that will also provide new drainage systems, energy-efficient lighting, ventilation and heating equipment, and fire protection systems. AOC expects a 2-year duration for each of the garage renovation projects.¹⁰

AOC initially completed the designs of both garage projects in 2005 and updated the cost estimates for the projects in November 2008. Based on its current cost estimates, AOC has requested \$38 million for fiscal year 2010 to fund construction of the East Garage renovation and plans to request \$30 million for fiscal year 2012 to fund construction of the West Garage renovation. AOC has included a premium for extended shifts (overtime) or double shifts (back-to-back 8-hour shifts) in its project cost estimates so that each project can be completed in 2 years. In addition, AOC has included a \$400,000 allowance in its fiscal year 2010 funding request for updates to the projects' 5-year-old designs to account for further deterioration that may have occurred to the facilities and to incorporate work needed to address any code changes. As a result of the design updates, specifications for new equipment—such as that planned to be part of the lighting and ventilation systems—can then reflect current technologies. AOC's funding requests also include or will include an allowance to provide temporary parking while the garages are being renovated, which will likely involve leasing space in nearby lots and busing people to the Capitol Complex. See figure 3 for additional information on the scope of the projects and their estimated construction costs.

⁹Delamination is a splitting, cracking, or separation of a cementitious material (concrete) on the surface of a concrete structure.

¹⁰AOC intends to award a contract for construction to renovate the East Garage. This contract will include an option to renovate the West Garage.

Figure 3: Estimated Costs for East and West Garage Renovations



Sources: AOC (data); GAO (analysis); AOC (images).

^aInterior rehabilitation includes structural repairs and the provision of new drainage systems, energy-efficient lighting, ventilation and heating equipment, and fire protection systems. The estimate (for both East and West Garages) is based on probable construction costs in 2010 and includes mark-ups for construction contingency and implementation costs for services such as construction management, inspection, and quality control.

Mr. Chairman, this concludes my prepared statement. I would be pleased to respond to any questions that you or other Members of the Committee might have.

We conducted our work from November 2008 to May 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions.

For further information on this statement, please contact Terrell G. Dorn at (202) 512-6923 or dornt@gao.gov. Contact points for our Congressional Relations and Public Affairs offices may be found on the last page of this statement. Individuals making key contributions to this testimony were Sara Vermillion, Assistant Director; Michael Armes, John Bauckman, George Depaoli, Elizabeth Eisenstadt, and Joshua Ormond.

Appendix I: AOC's Capital Projects Development and Prioritization Process

The Architect of the Capitol's (AOC) capital projects development process is based on sequential stages that include assessing the condition of facilities and identifying deficiencies, conducting planning work to develop the scope of projects to correct identified deficiencies and address other requirements, completing detailed design work, and awarding contracts for construction services. The timing of a project's progression through these development stages is affected by AOC's project prioritization process—a standard approach for scoring projects that considers the project's urgency, type, and importance. This process enables the agency to prioritize funding requests for planning studies, design, or construction work in its annual budget submission.

Project Development Process

Facility Condition Assessments (FCA). As we recommended in 2003, AOC periodically assesses the condition of each of its facilities using a consultant that specializes in such work.¹ Information on each deficiency identified at a facility through an FCA is stored in a database, along with an assessment of the urgency of the problem and the estimated cost to correct it. The urgency rating—immediate, high, medium, or low—assigned to each deficiency indicates the recommended time frame for corrective action: immediate (within 2 years), high (between 2 and 4 years), medium (between 5 and 7 years), or low (between 8 and 10 years).

Planning. Approximately 3 to 5 years prior to construction, AOC contracts for planning studies that consider facility repair needs identified through the FCA and other factors in establishing conceptual plans and cost and schedule estimates for the project. In some cases, planning studies may include the development of a program of requirements—that is, a detailed framework of requirements to guide the project's designer and ensure a smooth transition from the planning to the design stage. The program of requirements sets functional requirements for space layouts and may outline requirements for other areas, such as telecommunications, physical security, energy conservation, historic preservation, fire safety, hazardous materials abatement, and accessibility.

Design. At least 2 years prior to construction, AOC procures architectural and engineering services for the development of construction documents, including final plans, specifications, and a detailed cost estimate for the

¹ GAO, *Architect of the Capitol: Management and Accountability Framework Needed for Organizational Transformation*, [GAO-03-231](#) (Washington, D.C.: Jan. 17, 2003).

project. AOC uses these documents to solicit and evaluate construction contract bids. AOC's professional staff review the design periodically during its development to ensure that it fully meets project requirements.

Construction. AOC procures construction services by following a solicitation process during which it requests proposals from contractors interested in performing the work detailed in the construction documents, evaluates the contractors' proposals, and awards the contract to the winning contractor in accordance with its acquisition regulations.

Project Prioritization Process

As we recommended in 2003, AOC prioritizes projects through a standardized process that assesses each project's urgency, type, and importance.² AOC scores each project's importance in six areas—preservation of historic resources, regulatory compliance, mission accommodation, economics, physical security, and energy efficiency and environmental quality—and uses these scores to determine the project's overall urgency—immediate, high, medium, or low—for prioritization. AOC also considers the type of project—deferred maintenance, capital renewal, capital improvement, or capital construction—to further differentiate projects in the prioritization process. AOC annually evaluates funding requirements for developing its portfolio of projects and submits a budget request that identifies project-specific needs for each stage of the development process.

²[GAO-03-231](#).

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