



# MILITARY CONSTRUCTION

## Better Information Sharing Would Improve DOD's Oversight

Report to Congressional Committees

September 2024

GAO-24-106499

United States Government Accountability Office

Accessible Version

# GAO Highlights

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Highlights of [GAO-24-106499](#), a report to congressional committees

September 2024

## MILITARY CONSTRUCTION

### Better Information Sharing Would Improve DOD's Oversight

#### Why GAO Did This Study

For fiscal year 2025, DOD has requested over \$15 billion for its military construction program, including projects ranging from child care centers to barracks and maintenance hangars. Proper planning of such projects is critical to avoid delays from errors that could increase costs. DOD relies on UFC in completing military construction projects. At the end of fiscal year 2023, DOD had 598 military construction projects under way.

The joint explanatory statement accompanying the NDAA for fiscal Year 2022 includes a provision for GAO to review the UFC program and implementation of standards. This report examines (1) how DOD manages the UFC program, including its incorporation of relevant fiscal year 2018–2022 NDAA provisions; and (2) the extent to which DOD monitors the execution of its military construction program and projects.

GAO selected a nongeneralizable sample of five working groups and eight military construction locations. GAO analyzed relevant laws, military construction reports, and policies and procedures; and interviewed officials.

#### What GAO Recommends

GAO is making seven recommendations, including for DOD to issue guidance for reporting relevant project information, and for the Army and the Navy to develop guidance and training and improve processes for sharing lessons learned. DOD concurred with all of GAO's recommendations and stated that it is taking action to implement them.

#### What GAO Found

The Office of the Secretary of Defense (OSD) and the military departments (Army, Navy, and Air Force) collectively manage the Unified Facilities Criteria (UFC) program. UFC documents provide criteria for the planning, design, and construction, among other things, of Department of Defense (DOD) owned facilities. According to officials, DOD creates or updates UFC documents based on National Defense Authorization Acts (NDAA), among other things. GAO found that DOD largely incorporated relevant fiscal year 2018–2022 NDAA provisions.

GAO found that DOD does not fully monitor the execution of its military construction program and projects. OSD, which is responsible for general program oversight, collects detailed information on two military construction portfolios including the Indo-Pacific Command area of responsibility and two other high-profile projects. However, information OSD collects for all other construction projects is limited and OSD relies on Army and Navy construction agents for project monitoring. OSD officials told GAO the information they collect for these projects is for reporting purposes only and is not relevant for identifying trends, which can help inform a risk-based oversight approach. DOD's annual reports on military construction delays show that over the prior 5 fiscal years, poor initial planning contributed to about 25 percent of the projects delayed for at least a year. By issuing guidance to require reporting of more relevant information, such as the DOD construction agent responsible for each project and planning and

design milestones, OSD would have better visibility into projects and could better identify and address individual and systemic issues.

Further, GAO found that Army and Navy construction agents do not consistently document and share lessons learned in their project monitoring. For example, one building was delayed for over 3 years due to design errors (e.g., incorrect roof design) and insufficient quality control oversight, according to Army documentation (see figure). Army construction agent officials said they were not using a lessons-learned system to share project observations, which may help prevent repeating past mistakes on future projects.

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### Example of a Delayed Military Construction Project

#### Special Operations Forces (SOF) Training Command Building



**Location:** Fort Liberty, NC

**Construction start date:** Mar. 2017

**Original planned construction completion date:** Feb. 2019

**Actual construction completion date:** July 2022

**Original construction amount:** Approximately \$38.7 million

**Current obligation amount:** Approximately \$54.3 million

**Scope of project:** A three-story facility that includes administrative and operations space, classrooms, and a library.

**Reasons for schedule delays:** Design errors (e.g., not including all roof loading), insufficient quality control, personnel turnover, and changing customer requirements.

Source: GAO analysis of Department of Defense information; U.S. Army Corps of Engineers (photo). | GAO-24-106499

Note: For more details, see figure 6 in GAO-24-106499.

Better guidance, training, and processes for sharing lessons learned could help prevent future mistakes, such as insufficient quality control, and save resources.

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**Abbreviations**

A&E	architect-engineering
Corps	U.S. Army Corps of Engineers
DOD	Department of Defense
FC	Facilities Criteria
FEC	Facilities Engineering Command
HVAC	heating, ventilation, and air conditioning
NAVFAC	Naval Facilities Engineering Systems Command
NDAA	National Defense Authorization Act
OSD	Office of the Secretary of Defense
UFC	Unified Facilities Criteria
UFGS	Unified Facilities Guide Specifications

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September 16, 2024

The Honorable Jack Reed  
Chairman  
The Honorable Roger Wicker  
Ranking Member  
Committee on Armed Services  
United States Senate

The Honorable Mike Rogers  
Chairman  
The Honorable Adam Smith  
Ranking Member  
Committee on Armed Services  
House of Representatives

For fiscal year 2025, the Department of Defense (DOD) requested over \$15 billion for its military construction program, including projects ranging from child development centers and test facilities to barracks and maintenance hangars.<sup>1</sup> The U.S. Army Corps of Engineers (Corps) and Naval Facilities Engineering Systems Command (NAVFAC) function as construction agents for DOD facilities.<sup>2</sup> As such, they are responsible for the design and execution of military construction projects. According to DOD documentation, proper planning of projects is critical to avoid delays that may result from design errors and could lead to increased costs for project sponsors.

DOD's Unified Facilities Criteria (UFC) are technical criteria documents and specifications used for the planning, design, and construction of DOD military construction projects. The objectives of the UFC program include streamlining military facilities criteria, increasing reliance on private sector standards, and creating a more efficient criteria development process. UFC documents consist of around 150 issuances and provide common requirements across DOD for a wide range of standards, including for safety, sustainability, durability, and functionality of DOD facilities.

The joint explanatory statement accompanying the National Defense Authorization Act (NDAA) for Fiscal Year 2022 includes a provision for us to review the UFC program and the implementation of standards.<sup>3</sup> This report examines (1) how DOD manages its UFC program, including the extent to which it incorporated relevant provisions from the NDAA's for fiscal years 2018 through 2022 into UFC documents; and (2) the extent to which DOD monitors the execution of its military construction program and projects.

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<sup>1</sup>According to DOD, the military construction program includes all work necessary to produce complete and usable facilities, or to complete usable improvements to existing facilities, in support of DOD components.

<sup>2</sup>Department of Defense (DOD) Directive 4270.05, *Military Construction* (Feb. 12, 2005) (incorporating change 1, effective Aug. 31, 2018).

<sup>3</sup>House Armed Services Comm. Print No. 2, at 1,249 (2021).

To address our first objective, we interviewed officials from selected working groups that develop and update UFC documents to gain their perspectives on how they maintain UFC documents within their respective areas of responsibility. We reviewed and identified working groups responsible for core UFC documents, which provide requirements for the majority of the traditional building systems prevalent on DOD facility construction projects. We then selected a nongeneralizable sample of five of these 23 identified working groups for further review based on the number of criteria change requests in fiscal year 2022 and the average number of publications within the respective areas of responsibility for each working group.<sup>4</sup>

To assess the extent to which DOD incorporated relevant provisions from the NDAs for fiscal year 2018 through fiscal year 2022, we analyzed the NDAs from these fiscal years and identified 16 total provisions related to UFC. We then requested and obtained DOD documentation on how the department implemented these requirements and analyzed the results. If DOD addressed all relevant sections of the identified provisions, we determined that it incorporated the provision. If DOD addressed at least part of the provision, we determined that DOD partially incorporated the provision. Finally, if DOD addressed none of the provision, we determined that DOD did not incorporate the provision.

To address our second objective, we reviewed monthly and annual military construction reports to determine what information was included and reasons DOD identified and noted for delayed military construction projects. We found the data in these reports to be sufficiently reliable for the purposes of selecting a subset of military construction projects for further review. We reviewed DOD policies, procedures, and documentation, and interviewed officials to determine how they conduct oversight. We then selected a nongeneralizable sample of eight military construction projects based on specific criteria.

Specifically, we selected four military construction projects within the United States that DOD identified as being delayed for at least 365 days in DOD's fiscal year 2022 report on delayed military construction projects. We analyzed this report and selected military construction projects that were delayed, at least in part, due to a design-related factor. From this subset we selected two military construction projects from the Corps and two projects from NAVFAC based on the length of schedule delays and the description of the design issue. We also selected four military construction projects the Corps and NAVFAC identified as being successful.<sup>5</sup> Specifically, we selected one project that cost over \$50 million and one project that cost under \$50 million for both the Corps and NAVFAC. We analyzed these projects by assessing design documentation and interviewing responsible officials. See appendix I for a complete list of organizations and military construction projects we selected and reviewed.

We conducted this performance audit from January 2023 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our

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<sup>4</sup>A criteria change request, commonly referred to as a CCR, is a requested modification to a UFC, Unified Facilities Guide Specification, or Facilities Criteria. Criteria change requests may be provided by anyone, such as but not limited to industry representatives, private entities, or DOD personnel. The requests are automatically routed for adjudication to the appropriate criteria managers within working groups. DOD Military Standard 3007G, *Department of Defense Standard Practice: Unified Facilities Criteria, Facilities Criteria and Unified Facilities Guide Specifications* (Nov. 1, 2019).

<sup>5</sup>For the purposes of this report, we excluded military construction projects where the Air Force Civil Engineer Center served as the DOD construction agent because the Corps and NAVFAC serve as the DOD construction agent for military construction worldwide, except for the British Isles.

audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

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### Legislative Requirement for Facility Design Criteria

According to Military Standard 3007G, House Report 105-247 accompanying the Military Construction Appropriations Act, 1998 directed DOD and the military services to establish procedures for unification of facilities criteria.<sup>6</sup> The three military departments, under the auspices of the Office of the Secretary of Defense (OSD), established a working group to address unification issues. The working group surveyed procedures, criteria, and guide specifications; evaluated criteria uniformity; identified areas where greater uniformity was practical; analyzed management options for a uniform guidance system; and submitted a framework to the congressional defense committees. DOD developed and published Military Standard 3007G to implement that framework.<sup>7</sup>

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### DOD's Criteria Framework

According to guidance, DOD's criteria framework was designed to standardize and streamline the process for developing, maintaining, and disseminating criteria across the department.<sup>8</sup> The framework provides facility planning, design, construction, operation and maintenance, sustainment, restoration, and modernization criteria for DOD-owned facilities. In addition, DOD relies on industry standards to facilitate the implementation, management, and execution of criteria to the maximum extent practicable.<sup>9</sup> DOD's criteria framework consists of the following:

- **Unified Facilities Criteria (UFC)** provide DOD facility design requirements. "Core" UFC documents consist of those UFC that address general building requirements, high-performance building mandates,

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<sup>6</sup>DOD Military Standard 3007G; see H.R. Rep. No. 105-247, at 8 (1997).

<sup>7</sup>See DOD Military Standard 3007G. According to Corps officials, the first iteration of Military Standard 3007G, now superseded, was published as Military Standard 3007 in 2000.

<sup>8</sup>DOD Military Standard 3007G.

<sup>9</sup>See DOD Military Standard 3007G. According to the standard, the unification process for the criteria maximizes the use of nongovernment standards in accordance with law and guidance. Specifically, the National Technology Transfer and Advancement Act of 1995 requires all federal agencies and departments, with some exceptions, to use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments. Pub. L. No. 104-113, § 12(d) (1996) (as amended). Additionally, Office of Management and Budget Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities* (Jan. 27, 2016), directs agencies to use voluntary consensus standards in lieu of government-unique standards except where inconsistent with law or otherwise impractical.



and discipline-specific systems found in most buildings.<sup>10</sup> The core UFC address building code compliance, life safety, legislation compliance, and performance.<sup>11</sup> The core UFC provide requirements for the majority of traditional building systems prevalent on DOD facility construction projects. UFC 1-200-01, DOD Building Code, is the foundational document of the UFC program. It provides general building requirements and overarching criteria; establishes the use of consensus building codes and standards; establishes criteria implementation rules and protocols (including core UFC); and identifies unique military criteria.<sup>12</sup> It serves as the bridge between industry standards and DOD criteria.

- **Facilities Criteria (FC)** define functional requirements for specific types of facilities within a military service. Such facilities include child development centers, barracks, or dining facilities. Requirements are established by the service regulatory or functional authority rather than the technical community of architects and engineers. FC are nonunified criteria and address a service's unique requirements.
- **Unified Facilities Guide Specifications (UFGS)** provide common facility specifications, standards and engineering practices for the DoD and other supported agencies. UFGS are, according to NAVFAC officials, for the purpose of translating design criteria into construction contract requirements. The officials stated that UFGS are edited by the designer of record for use on each specific project as the basis of construction contract documents. UFGS that are frequently used but specialized (tied to a mission, such as runways, or specialized components or systems) are considered 'specialty' UFGS. See figure 1 below.

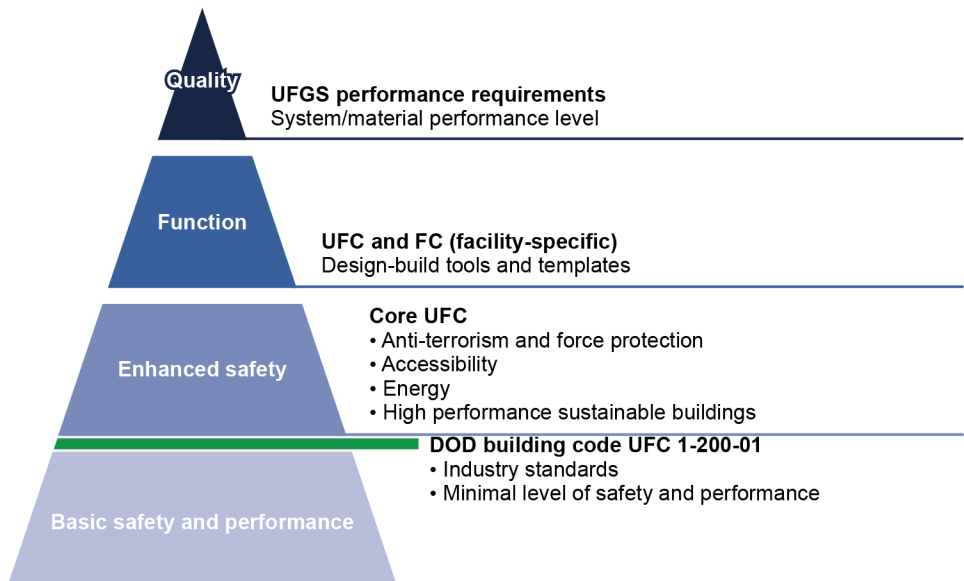
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<sup>10</sup>The term "high-performance building" means a building that integrates and optimizes on a life-cycle basis all major high-performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations. The term "high-performance green building" means a high-performance building that, during its life cycle, as compared with similar buildings, reduces energy, water, and material resource use and reduces negative impacts on the environment throughout the life cycle of the building, among other things. See 42 U.S.C. § 17061.

<sup>11</sup>DOD Military Standard 3007G.

<sup>12</sup>DOD, Unified Facilities Criteria (UFC) 1-200-01, *DOD Building Code* (Sept. 1, 2022) (incorporating change 3, effective Feb. 26, 2024).

Figure 1: Overview of DOD's Criteria Framework



FC Facilities Criteria  
UFC Unified Facilities Criteria  
UFGS Unified Facilities Guide Specifications

Source: Department of Defense (DOD) information. | GAO-24-106499

## Military Construction Process and Key Project Stakeholders

The military construction process ranges from facility planning (conducted at each installation that has a requirement for new facilities); through project programming and budgeting (in DOD component commands and headquarters); to project design and construction (via the department's designated design and construction agents—the Corps and NAVFAC).

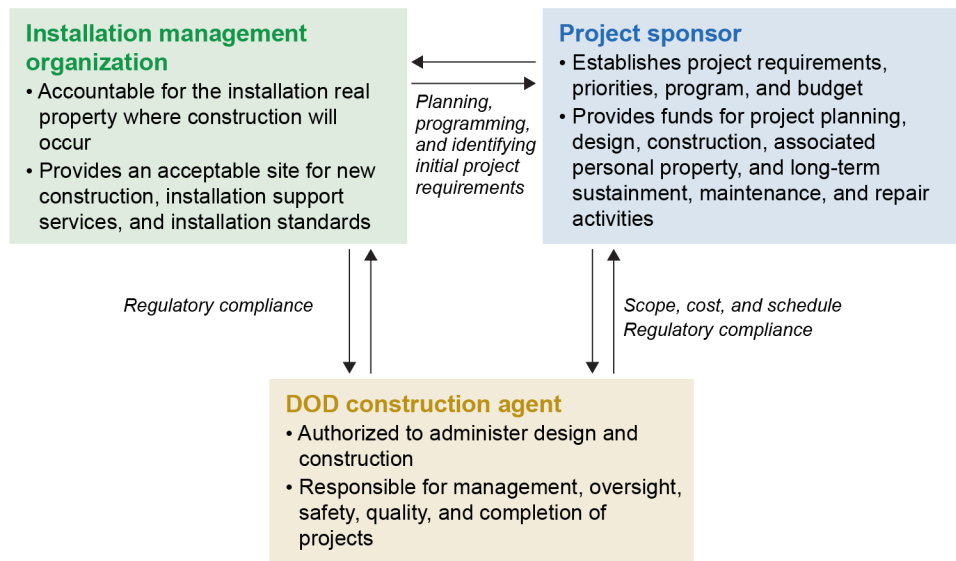
OSD exercises general oversight over the military construction program. Specifically, the Office of the Assistant Secretary of Defense for Energy, Installations, and Environment is responsible for monitoring the program to ensure that construction agents execute projects in the most efficient, expeditious, and cost-effective manner possible.<sup>13</sup>

Each military construction project has three primary types of stakeholders, as shown in figure 2.<sup>14</sup>

<sup>13</sup>See DOD Directive 4270.05. The directive assigns these responsibilities to the Deputy Under Secretary of Defense for Installations and Environment. According to DOD officials, this position no longer exists and military construction program oversight duties are currently performed by the Assistant Secretary of Defense for Energy, Installations, and Environment.

<sup>14</sup>Principal Deputy Assistant Secretary of Defense for Energy, Installations, and Environment Memorandum, *Military Construction Project Key Stakeholders and Responsibilities* (Mar. 25, 2022). For any given project, each project stakeholder may be a different DOD component, but nothing prohibits a single DOD component serving as one or more project stakeholders for the same project. DOD components include the following: OSD; the Chairman of the Joint Chiefs of Staff and the Joint Staff; the military departments, the defense agencies; DOD field activities; the Combatant Commands; and Washington Headquarters Services.

**Figure 2: Overview of Military Construction Key Stakeholder Responsibilities**



Source: Department of Defense (DOD) information. | GAO-24-106499

- Installation management organization.** The military department (or Washington Headquarters Services with respect to the Pentagon Reservation) with custody and accountability for the physical infrastructure and real property of the military installation on which construction will occur. It has a variety of responsibilities including provision and characterization of an acceptable site for new construction, provision of installation support services, and governance of installation standards—such as installation-specific architectural and design requirements. It also coordinates with the project sponsor and tenant organization.
- Project sponsor.** The DOD component that establishes the project requirements, priorities, program, and budget. The project sponsor’s responsibilities include developing the project (including planning and preliminary design); providing funds for project planning, design, construction, associated personal property (including collateral equipment), and long-term sustainment, maintenance, and repair activities; and establishing, advocating for, and defending (before OSD and Congress) the project requirements, scope, budget, schedule, justification, and funding source. Further, the project sponsor is responsible for fiscal compliance within the scope of its duties, including congressional notifications and reprogramming actions.
- DOD construction agent.** The DOD organization authorized, according to DOD guidance, pursuant to section 2851 of title 10, U.S. Code, and DOD policy, to administer design and construction contracts for DOD facilities projects in accordance with applicable laws and regulations.<sup>15</sup> The DOD construction agent is responsible for administration, management, oversight, safety, quality, and completion of in-house and contracted facilities design and construction activities.<sup>16</sup> It is also responsible for ensuring facilities design and construction are consistent with authorized project scope and conform with DOD UFC and project sponsor requirements. Typically, the Corps is the construction agent for Army-funded military construction projects and NAVFAC is the construction agent for Navy and Marine Corps-funded military construction

<sup>15</sup>Principal Deputy Assistant Secretary of Defense for Energy, Installations, and Environment Memorandum, *Military Construction Project Key Stakeholders and Responsibilities* (Mar. 25, 2022).

<sup>16</sup>In-house design refers to when the Corps or NAVFAC officials create construction project design documents.

projects. The Department of the Air Force may either use the Corps or NAVFAC as the construction agent for its projects.

- **Corps.** The Corps' military missions area includes military construction and is organized geographically into eight divisions that are assigned to the military construction mission.<sup>17</sup> These are broken down into 25 military programs districts. Districts produce various products including design documents, studies, and programming estimates.
- **NAVFAC.** NAVFAC comprises two regional commands—NAVFAC Atlantic in Norfolk, Virginia, and NAVFAC Pacific in Pearl Harbor, Hawaii. NAVFAC Atlantic aligns operationally with the Navy's Atlantic Fleet and oversees four Facilities Engineering Commands (FEC).<sup>18</sup> FECs are responsible for the integration of planning, programming, and delivery of NAVFAC capabilities and functions to supporting commands. NAVFAC Pacific aligns operationally with the Navy's Pacific Fleet and oversees five FECs.<sup>19</sup>
- **Air Force Civil Engineer Center.** The Air Force Civil Engineer Center is the designated DOD construction agent for military construction projects in the British Isles. Also, in some cases, the Air Force Civil Engineer Center may design and construct Air Force projects where the Air Force and the commander of the assigned construction agent agree it is the most efficient, expeditious, and cost-effective means to complete the project.

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## Design Process

Under DOD guidance and criteria, design may occur through in-house professional staff or through a contract with an architect-engineering (A&E) firm. The designer of record is responsible for architectural and engineering aspects of the project and for the design work for each design discipline (e.g., electrical, mechanical). The Corps or NAVFAC is the DOD construction agent for military construction projects, unless, according to DOD officials, otherwise designated by the Assistant Secretary of Defense for Energy, Installations, and Environment. In cases of in-house design, the Corps or NAVFAC is also the designer of record. In cases when DOD contracts with an A&E firm, the firm is the designer of record.

The design process includes the development of design plans, design specifications, design submittals, cost estimates, and extensive site investigation.<sup>20</sup> The preliminary design phase is normally the critical point in design and is called the '35-percent' stage because the project design should provide sufficient detail to define the scope, criteria, and cost estimates for budget consideration by the time it is 35 percent complete. Additionally, under Corps guidance, design documents are reviewed typically at the 35-percent completion, 65-percent completion, and 95-percent completion final design stages.<sup>21</sup> NAVFAC design submissions, including

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<sup>17</sup>These are the Northwestern Division, South Pacific Division, Southwestern Division, Great Lakes and Ohio River Division, North Atlantic Division, South Atlantic Division, Pacific Ocean Division, and the Transatlantic Division.

<sup>18</sup>The FECs that are aligned with NAVFAC Atlantic are NAVFAC Europe Africa Central, NAVFAC Mid-Atlantic, NAVFAC Southeast, and NAVFAC Washington.

<sup>19</sup>The FECs that are aligned with NAVFAC Pacific are NAVFAC Far East, NAVFAC Hawaii, NAVFAC Marianas, NAVFAC Northwest, and NAVFAC Southwest.

<sup>20</sup>See DOD 7000.14-R, *Financial Management Regulation*, vol. 3, ch. 17, *Accounting Requirements for Military Construction Projects*, Appx. 1 (July 2021).

<sup>21</sup>Army Engineer Regulation 1110-3-12, *Military Engineering and Design: Quality Management* (Mar. 25, 2021).

quality control reviews, are to occur at points when the design is typically about 35-percent to 50-percent complete, 100-percent pre-final phase, and final design.<sup>22</sup> According to DOD guidance, DOD initiates the final design phase after thorough review of design submissions to ensure that preliminary design documents properly addressed requirements and criteria.

NAVFAC and Army Corps officials said that if an A&E firm is designing the project, then the firm provides quality control on their design deliverables at each submittal phase and NAVFAC or Corps designers provide quality assurance over those deliverables.<sup>23</sup> In contrast, according to the officials, if the project is an in-house NAVFAC or Corps design, then NAVFAC or the Corps provides quality assurance and quality control over their own design submittals, with separate teams for each type of review.

The design phase typically can take from 1 to 2.5 years. According to the DOD Financial Management Regulation, upon completion of the work drawings, contract specifications, and bidding documents, the project is ready to be advertised for construction.<sup>24</sup> According to the regulation, major construction projects require both congressional authorization and appropriation before a construction contract can be awarded.<sup>25</sup> Figure 3 summarizes this process.

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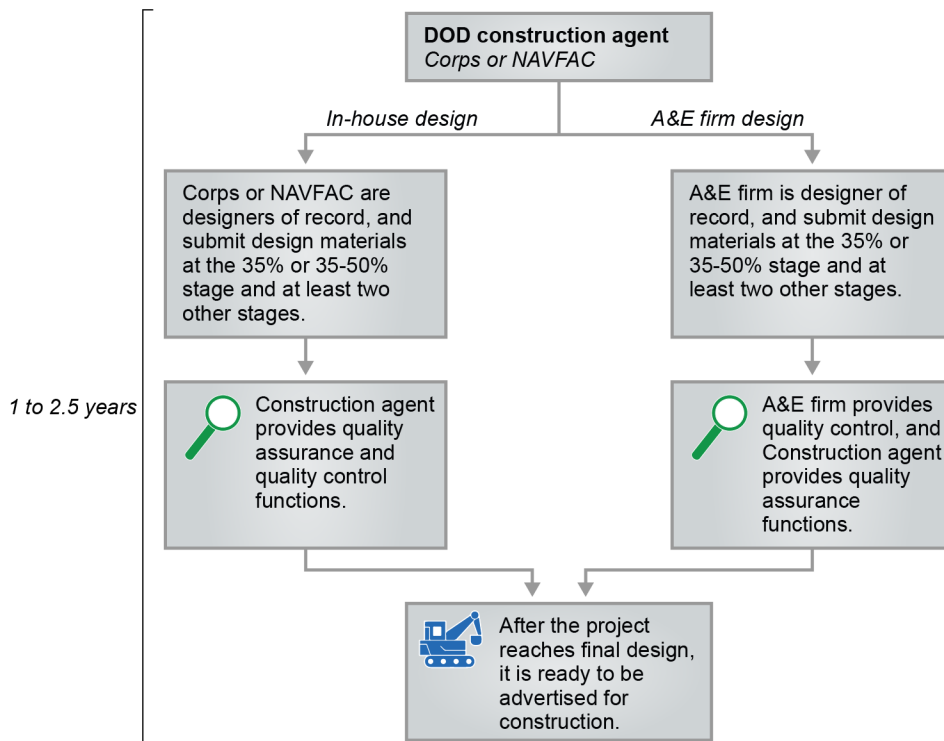
<sup>22</sup>DOD Facilities Criteria (FC) 1-300-09N, *Navy and Marine Corps Design Procedures* (May 17, 2024). The 100-percent design submittal is the pre-final stage during which the intent is to provide a complete set of design deliverables.

<sup>23</sup>The Corps states that quality control includes processes to ensure that project performance meets agreed-upon stakeholder requirements that are consistent with law, regulations, policies, sound technical criteria, schedule, and budget. Quality assurance includes those processes to ensure that quality control activities are being accomplished and are effective in producing a product that meets required quality metrics. Army Engineer Regulation 1110-3-12.

<sup>24</sup>DOD 7000.14-R, vol. 3 ch. 17.

<sup>25</sup>The regulation states that major military construction projects include all acquisition or construction, additions, expansions, extensions, conversions, alterations, or replacements of facilities with costs in excess of a certain amount (\$9 million as of July 2024) or any project, regardless of cost, approved as a specific line item in the military construction budget request. See DOD 7000.14-R, vol. 3, ch. 17.

**Figure 3: Overview of Typical Military Construction Design Process**



A&E Architect and engineering  
 Corps U.S. Army Corps of Engineers  
 NAVFAC Naval Facilities Engineering Systems Command

Source: Department of Defense (DOD) information; GAO (icons). | GAO-24-106499

## Statutory Reporting Requirements

Section 2851 of title 10, U.S. Code, requires the Secretary of Defense to maintain an internet site with information on military construction projects, such as those military construction projects or military family housing projects that have been specifically authorized by an act of Congress.<sup>26</sup> Specifically, the provision requires the Secretary of Defense to provide the following information for each project:

- The solicitation date and award date (or anticipated dates) for each contract entered into (or to be entered into) by the United States in connection with the project.
- The contract recipient, contract award amount, construction milestone schedule proposed by the contractor, and construction completion date stipulated in the awarded contract.

<sup>26</sup>10 U.S.C. § 2851. Other projects for which the Secretary of Defense is required to maintain information on the internet site are (1) each project carried out with funds authorized for the operation and maintenance of military family housing; (2) each project carried out with funds authorized for the improvement of military family housing units; (3) each unspecified minor construction project carried out under the authority of section 2805(a) of title 10, U.S. Code; (4) each military department project with a total cost in excess of \$15 million for Facilities Sustainment, Restoration, and Modernization; and (5) each military construction project, military department Facilities Sustainment, Restoration, and Modernization project, or military family housing project regarding which a statutory requirement exists to notify Congress.

- The most current DOD Form 1391, Military Construction Project Data, for the project.
- The progress of the project, including the percentage of construction currently completed and the current estimated construction completion date.
- The current contract obligation of funds for the project, including any changes to the original contract award amount.
- If funds appropriated for the project have been diverted for use in another project, the project to which the funds were diverted and the amount so diverted.
- For accounts such as planning and design, unspecified minor construction, and family housing operation and maintenance, detailed information regarding expenditures and anticipated expenditures under these accounts and the purposes for which the expenditures are made.

The provision requires the Secretary of Defense to update the information as promptly as practicable, but not less frequently than once a month, to ensure that the information is available in a timely manner. Additionally, the provision requires the Secretary of Defense to submit to the Committees on Armed Services of the House of Representatives and Senate annual reports on each military construction project or military family housing project for which, as of the end of the most recent fiscal year, the estimated completion date of the project is more than 1 year later than the date proposed at the time DOD awarded the contract.

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## Multiple DOD Entities Manage the UFC Program and DOD Has Largely Incorporated NDAA Provisions

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### OSD and the Military Departments Collectively Manage DOD's UFC Program

OSD and the military departments work together to manage the UFC program. Within the program, working groups comprising representatives from offices within OSD and the Departments of the Army, Navy, and Air Force develop and maintain UFC documents. Working groups can either be "discipline" (meaning they align with the disciplines of architecture and engineering, such as electrical and mechanical disciplines) or "functional" (meaning they align with functional or operational areas such as sustainability and aviation). We refer to both types as "working groups" in this report and list all identified working groups in appendix II.

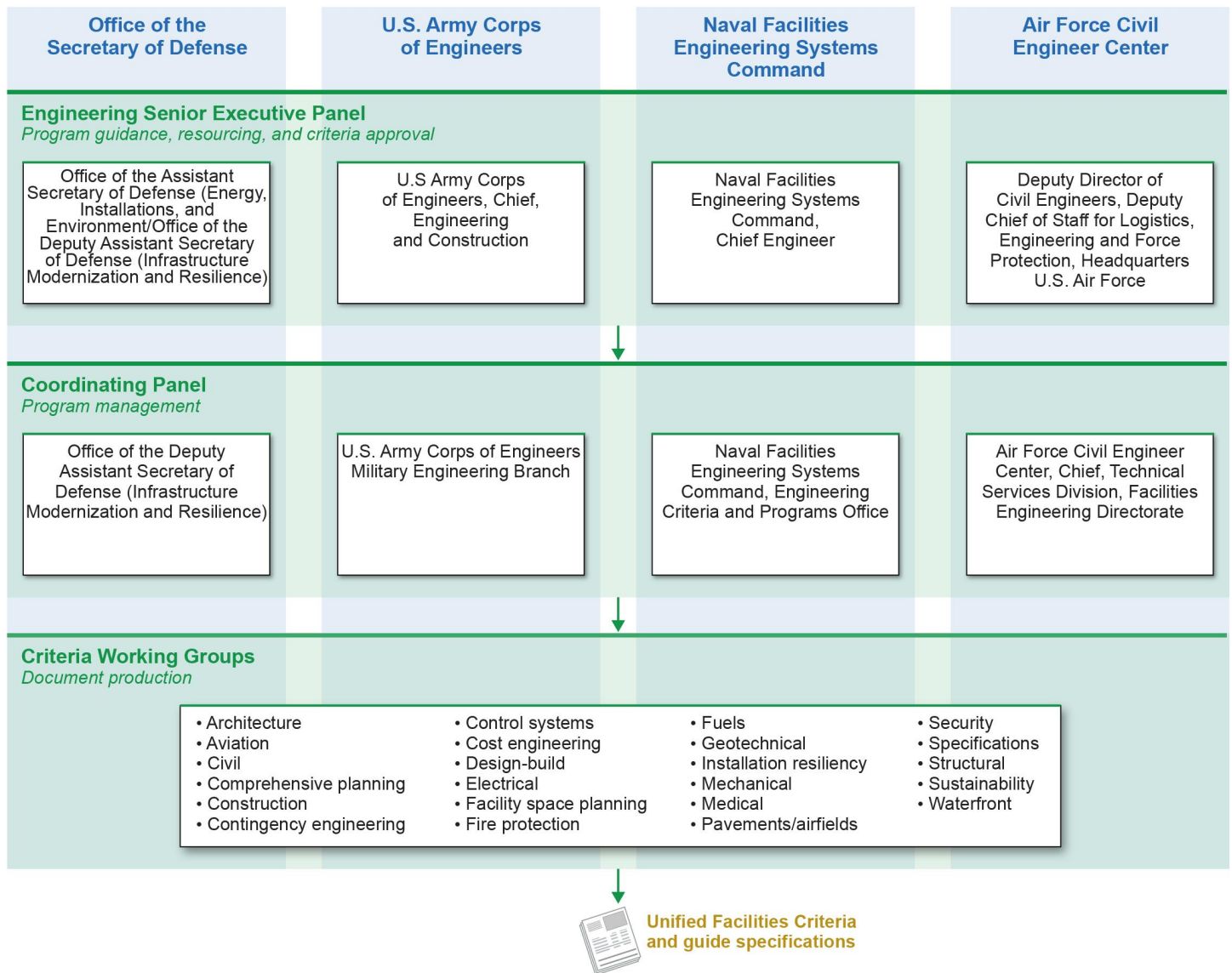
The Engineering Senior Executive Panel is responsible for directing and funding the UFC program, while the Coordinating Panel oversees the day-to-day operations of the UFC program and the working groups.<sup>27</sup> Working groups are responsible for a portfolio of UFC documents within their respective areas of expertise, as illustrated in figure 4.<sup>28</sup>

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<sup>27</sup>The Engineering Senior Executive Panel is a four-member panel composed of a Senior Executive Service representative from each military department and OSD. The Coordinating Panel is a separate four-member panel composed of a senior representative of each military department and OSD.

<sup>28</sup>The Engineering Senior Executive Panel approves UFC issuances and reissuances. Officials told us that the Engineering Senior Executive Panel has delegated responsibility for approving UFGS changes to the working groups.

**Figure 4: Overview of Unified Facilities Criteria Program Management**



Source: Department of Defense information; GAO (art). | GAO-24-106499

DOD can revise or change UFC documents. For example, according to DOD officials, UFC-1-200-01, DOD Building Code, is required to be revised every 3 years. Revisions require Engineering Senior Executive Panel review and approval. Working groups can make changes to UFC documents, requiring less internal review than revisions.<sup>29</sup> Revisions and changes are required to be incorporated into military construction projects up until 35 percent of design completion, and in other certain cases, such as in some circumstances when there is

<sup>29</sup>The Coordinating Panel approves changes to UFC documents.



a delay of more than 18 months between design completion and the solicitation of offers for construction.<sup>30</sup> Working group officials also stated that UFC document changes that affect life and safety may still be incorporated later in the project. Overall, from the time DOD changes or updates a UFC it could take several years before a completed construction project reflects the new criteria.

According to working group officials, the three main inputs for DOD to create new criteria or update existing criteria are as follows:

- **Laws, regulations, and policy.** Officials told us the Coordinating Panel tasks working groups with providing comments on draft legislative language and implementing enacted NDAA provisions by making changes to criteria documents. Officials told us that comments on previous draft legislative language have been incorporated into enacted NDAA provisions. Additionally, officials told us that executive orders and federal government regulations, such as those issued by the Department of Energy, are incorporated into criteria.
- **Change in industry standards.** Industry standards are nongovernment standards prepared by nationally and internationally recognized technical, professional, and industry associations and societies. Officials told us they are aware of, and prepare for, industry standard issuance cycles.<sup>31</sup> Officials also told us they work with industry representatives to ensure UFC reflect the most up-to-date industry codes. For example, the structural working group officials told us they worked with American Concrete Institute representatives to develop a new code for concrete slabs to address challenges DOD was facing.
- **Criteria change request.** A criteria change request, also referred to as a CCR, is a requested change or revision to UFC, UFGS, or FC from anyone, including industry representatives or DOD personnel. Criteria change requests are submitted electronically and are automatically routed for adjudication to the appropriate criteria managers within working groups. In fiscal year 2023, approximately 1,500 criteria change requests were submitted to DOD for consideration. Working group officials told us they discuss the requests and consult subject matter experts, if necessary, during their adjudication deliberations. For example, electrical working group officials told us they asked the mechanical and fire protection working groups for input on criteria change requests related to UFC 3-520-05, Stationary And Mission Batteries, because the change requests involved fire protection and ventilation for battery areas. Additionally, electrical working group officials told us they provided input to the mechanical working group on criteria change requests related to the control of electronically controlled motors for heating, ventilation, and air conditioning (HVAC) systems.

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## DOD Has Largely Incorporated Provisions for Fiscal Years 2018–2022 and Plans to Incorporate Policy-Related Provisions

We found that, based on information from DOD, DOD incorporated 13 provisions and partially incorporated two provisions of the 16 relevant NDAA provisions from fiscal year 2018 through fiscal year 2022 into UFC

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<sup>30</sup>DOD Military Standard 3007G. Specifically, the standard requires projects with a delay of more than 18 months to be re-evaluated to determine if any design revision is necessary due to changes in criteria or site infrastructure.

<sup>31</sup>Officials told us industry standards are updated and reissued on a recurring basis, such as every 3 years.

documents, other guidance, or processes; and is planning to address one provision.<sup>32</sup> For example, DOD incorporated NDAA provisions pertaining to issuing criteria for installing microgrids (i.e., networks of standby power systems in the event of commercial power system failure) and criteria to include the consideration for solar roofing into UFC documents.<sup>33</sup>

For the two partially incorporated NDAA provisions, DOD plans to take additional actions beyond those completed to date.<sup>34</sup> For example, DOD officials stated that although the military services have guidance on the consideration of potential long-term adverse environmental effects, DOD officials plan to create a new UFC document by February 2025 that will more comprehensively incorporate section 2805 of the NDAA for Fiscal Year 2020. Specifically, this section requires certain modifications to DOD Form 1391, Military Construction Project Data—which DOD submits to Congress in support of funding requests for military construction projects—certifying that proposed military construction projects consider certain potential long-term adverse environmental effects.

DOD has not incorporated one NDAA provision related to the determination of, and notification to Congress about, when executive orders will affect the cost or scope of work for military construction projects.<sup>35</sup> Officials told us that they have plans to issue policy to address the provision and are working to determine a methodology for identifying how to isolate the information within a military construction project. See appendix III for relevant excerpts from and our full analysis of the 16 relevant NDAA provisions from fiscal years 2018 through 2022.

OSD officials told us some NDAA provisions can have unintended consequences. For example, these officials stated that a provision requiring, with some exceptions, a specific type of airfield runway lighting resulted in the lights being regularly damaged during snow plowing.<sup>36</sup> They also told us some NDAA provisions requiring changes to the UFC would be better implemented through DOD policy instead of a technical change. For example, OSD officials told us an NDAA for Fiscal Year 2022 provision requiring a UFC be amended to require the inclusion of lactation rooms in military construction planning and design would be better addressed in policy because the provision is unrelated to building specifications or codes.<sup>37</sup>

To address congressionally mandated UFC changes that are policy oriented, OSD officials told us they started to develop a requirements-based UFC document in fiscal year 2024 that will eventually serve as a repository for all project-related requirements that do not contain technical design criteria. According to the officials,

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<sup>32</sup>For purposes of this report, relevant NDAA provisions were those enacted provisions either requiring specific changes to UFC or related documents, or other changes to DOD documents or policy that were being implemented through UFC amendments. UFC documents include UFC and UFGS documents.

<sup>33</sup>See James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263, §§ 2810-11 (2022). Specifically, DOD officials told us that the microgrid provision was incorporated through the publication of UFC 3-550-04, *Resilient Installation Microgrid Design* (Mar. 1, 2024) and UFGS 26 37 13, *Microgrid Control System* (February 2024), while the solar roofing provision was incorporated in the February 2024 change to UFC 1-200-01.

<sup>34</sup>These two provisions include section 2805 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232 (2018) and section 2805 of the National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019).

<sup>35</sup>See James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263, § 2812 (2022).

<sup>36</sup>See National Defense Authorization Act for Fiscal Year 2018, Pub. L. No. 115-91, § 2872 (2017).

<sup>37</sup>See National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81, § 2841 (2021).

installation planners will use this document to ensure Congress' intent for specific building features can be included in the initial facility requirement documents.

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## DOD Does Not Fully Monitor the Execution of Its Military Construction Program and Projects

OSD gathers some information on military construction projects, but it does not have information on all projects that would better enable it to fully monitor the program. In addition, DOD construction agents do not consistently document and share observations and lessons learned as they monitor military construction projects.

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### OSD Is Limited in Its Ability to Monitor Military Construction Program Execution

In overseeing military construction program execution, OSD gathers detailed information on some portfolios and high-profile projects. OSD also gathers limited information on all other projects to meet congressional reporting requirements. However, OSD does not have sufficient relevant information on all military construction projects that would better enable it to conduct meaningful oversight over the program.

OSD oversees selected military construction portfolios and high-profile projects through periodic information gathering and briefings. OSD officials stated that they collect information based on factors such as congressional interest and high-value projects. Specifically, as of July 2024 OSD collects detailed information on two military construction portfolios: the Energy Resilience Conservation Investment Program and Indo-Pacific Command based projects. Additionally, DOD collects information on two other projects: the Presidential Aircraft Replacement Hangar and the Joint Intelligence Analysis Center in the United Kingdom.<sup>38</sup>

For these selected areas, OSD collects military construction project information that includes the DOD construction agent responsible for the project, the authorized construction amount, and current working construction estimate. OSD also collects project milestone information, such as the completion date of the 35-percent design phase, construction start date, and challenges that may cause project delays.

However, according to DOD officials, the information OSD gathers for all other military construction projects is limited to what it is required to report and is less detailed than what the office collects for overseeing selected portfolios and high-profile projects. Specifically, DOD is required to publicly report the status of certain ongoing military construction projects monthly.<sup>39</sup> Officials told us they only use this information to meet DOD's reporting requirement and do not use the information to conduct oversight.

To obtain information for reporting, OSD requires project sponsors to submit military construction data monthly. Reported data include the project sponsor and location as well as the original and current estimated construction completion date and contract amounts. OSD publicly reports these data on the internet. In addition to these monthly reports, OSD compiles these data into a required annual report for Congress on

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<sup>38</sup>OSD also collects information on host-country-funded projects within the Republic of Korea and Japan. Officials told us they collect this information due to the importance of the projects to the respective combatant commands.

<sup>39</sup>10 U.S.C. § 2851(c).

military construction projects with construction schedule delays over 365 days past the original construction completion date.<sup>40</sup> The annual report includes additional narrative describing the reason(s) for delays.

According to the monthly report from September 2023, there were approximately 598 ongoing military construction projects at the end of fiscal year 2023 worth over \$28 billion. Further, according to DOD’s fiscal year 2023 annual report on military construction delays, there were 158 military construction projects delayed at least 365 days. This report states that project delays were caused by multiple factors including residual supply chain delays and shortages caused by the COVID-19 pandemic, poor initial planning for utility connections, design errors, delayed government approvals, refinement of customer requirements, and contractor issues such as poor performance. The report also said that several projects were delayed for multiple reasons.

DOD has consistently categorized the top three contributors of project delays as (1) unforeseen conditions, (2) contractor issues, and (3) poor initial planning, as shown in table 1.<sup>41</sup>

**Table 1: Top Reported Contributors to Military Construction Project Delays, Fiscal Years 2019–2023**

na	na	Top three contributors to military construction project delays (one of three)	Top three contributors to military construction project delays (two of three)	Top three contributors to military construction project delays (three of three)
Fiscal year	Total projects delayed 365 days or more	Unforeseen conditions	Contractor issues or delays	Poor initial planning
2023	158	42%	32%	26%
2022	109	53%	22%	25%
2021	116	44%	28%	28%
2020	97	47%	29%	24%
2019	73	17%	24%	22%

Source: Department of Defense annual reports on delayed military construction projects from fiscal years 2019–2023. | GAO-24-106499

Note: Top three contributors do not equal 100 percent in fiscal year 2019. In DOD’s fiscal year 2019 annual report on military construction delays DOD reported that most projects appeared to have unique circumstances associated with each delay with no attributable overarching category or trends associated with the delay. According to DOD’s fiscal year 2022 report, unforeseen delays include environmental mitigation and supply chain or material shortages. Poor initial planning includes factors that could have been reasonably addressed before a delay occurred, such as the need for utility connections, design errors, insufficient planning for government approvals, and further specification of customer requirements. Contractor issues include poor performance. The projects listed by fiscal year are not mutually exclusive. The same project could be listed in in multiple years.

DOD Directive 4270.5 indicates that the Assistant Secretary of Defense for Energy, Installations, and Environment should monitor the execution of the military construction program to ensure the most efficient, expeditious, and cost-effective accomplishment of the program by DOD construction agents.<sup>42</sup> In addition,

<sup>40</sup>10 U.S.C. § 2851(e). Specifically, the statute states that the Secretary of Defense shall submit to the Committees on Armed Services of the House of Representatives and Senate a report by March 1 annually on each military construction project or military family housing project for which, as of the end of the most recent fiscal year, the estimated completion date is more than 1 year later than the completion date proposed at the time the contract for the project was awarded.

<sup>41</sup>According to DOD’s fiscal year 2022 annual report, unforeseen delays include environmental mitigation and supply chain or material shortages. Poor initial planning includes factors that could have been reasonably addressed before a delay occurred, such as the need for utility connections, design errors, insufficient planning for government approvals, and further specification of customer requirements. Contractor issues include poor performance.

<sup>42</sup>See DOD Directive 4270.5.

Standards for Internal Control in the Federal Government states that management should use quality information to achieve an entity's objectives. Such information is appropriate, current, complete, accurate, accessible, and provided on a timely basis. To do this, the standards state that management obtains relevant data from reliable internal and external sources in a timely manner and processes the obtained data into quality information. It uses this information to make informed decisions and evaluate the entity's performance in achieving key objectives and addressing risks, as OSD would do as part of its program oversight.

However, we found that OSD is limited in its ability to oversee the entire military construction program because it does not have sufficient relevant information on all projects that would enable it to make informed decisions and adequately address risks. As discussed above, OSD collects detailed information on some military construction portfolios and projects, which it selects based on factors such as congressional interest, high-value projects, and projects with significant or extraordinary challenges. OSD officials stated that they rely on the Corps and NAVFAC to monitor the performance of all other military construction projects. OSD also collects limited information on all other military construction projects to meet congressional reporting requirements. However, officials told us that they do not use the monthly reports and annual reports for oversight purposes and the reports do not have the relevant data they would need to identify trends within the military construction program to take corrective actions.

For example, OSD does not collect information on the DOD construction agent responsible for each military construction project, planning and design milestones, or detailed data on funds spent—information that it collects for selected military construction portfolios and projects. OSD officials stated that the types of information collected for these selected projects are helpful in conducting their program oversight responsibilities. For example, officials stated that when significant challenges arise on a project, OSD helps determine a workable way forward. Having sufficient relevant information could help OSD inform its oversight approach and ensure that it is adequately identifying and addressing risks and challenges.

As shown in the annual reports on military construction delays, over the previous 5 fiscal years, poor initial planning factors that could have been reasonably addressed before a delay occurred (including design errors) contributed to delays in approximately 25 percent of the military construction projects delayed for at least a year. Given the significant number of military construction delays and the potential for increased costs, a proactive oversight approach would benefit OSD.

OSD already collects data from project sponsors monthly and as a result, it could use existing methods to collect more detailed and relevant information to better enable monitoring of the military construction program. By issuing guidance to require reporting of more relevant information, OSD would have better visibility into projects and could better address individual project and systemic issues as they arise. OSD will also be better able to conduct program-level trend analysis to help ensure military construction projects are completed in an efficient, expeditious, and cost-effective manner. Further, OSD will be better able to identify program-level issues that contribute to the significant number of projects delayed at least a year.

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## Corps and NAVFAC Inconsistently Document and Share Lessons Learned When Monitoring Projects

### Corps

We found that the Corps does not consistently document and share observations and lessons learned from its military construction projects.<sup>43</sup> An after-action review documents the overall performance or level of success achieved on a project at the end of each critical phase of a project to determine if objectives have been met.<sup>44</sup> This allows the organization or team to identify gaps and corrective actions and develop lessons learned.

- Documenting observations. We observed at three out of the four Corps site visits that officials did not consistently document project observations. For example, during our site visit for the delayed Wright-Patterson Air Force Base Firehouse/Crash Rescue Station project, a Corps official told us officials did not complete an after-action review during the project or after it was completed. Corps documentation showed that this project was delayed 287 days due to design errors and associated revisions for a pre-engineered metal building. DOD's fiscal year 2022 annual report to Congress on military construction delays also cited these design delays in addition to manufacturer shipping delays. Corps officials said that other delays were due to labor shortages and material supply chain delays from COVID-19. This project began construction in May 2020 and was scheduled to complete construction in September 2021. However, the actual construction completion date was in November 2022.

According to Corps officials, the construction contractors discovered errors and submitted a request for information to the Corps in February 2021, expressing concern about the snow and wind drift deflection calculations as referenced in the Structural Engineering UFC.<sup>45</sup> As a result, officials concluded that the building design was stiffer than required and the contractors expressed concern about the performance of the construction due to building movements. Corps officials said that the design did not consider the flexibility of the metal building with shifting wind conditions and that this could eventually cause the building to collapse. As a result, Corps officials said that they had to issue a contract modification to create a second design for the Firehouse/Crash station project, resulting in increased cost of around \$1 million and in schedule delays (see fig. 5).

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<sup>43</sup>According to Army Regulation 11-33, a lesson learned is a resolved issue or best practice that improves operations or activities and results in an internalized change to capability, process, or procedure. Army Regulation 11-33, *Army Lessons Learned Program* (July 28, 2022).

<sup>44</sup>See Army Engineer Manual 5-1-11, *Project Delivery Business Process* (Sept. 1, 2022). The major phases of a military project where after-action reviews must be performed are planning charrette, design, construction, and 9-month post completion inspection. Army Engineer Regulation 1110-3-12, *Military Engineering and Design Quality Management* (Mar. 25, 2021).

<sup>45</sup>See UFC 3-301-01, *Structural Engineering* (Apr. 11, 2023) (incorporating change 1, effective Oct. 2, 2023). Officials told us that when construction contractors believe they have discovered a discrepancy in design documentation, the contractors generally contact the DOD construction agent to seek clarification and a solution, if needed.

**Figure 5: Fire/Crash Rescue Station Project under Construction**

**Fire/Crash Rescue Station**



**Location:** Wright-Patterson Air Force Base, OH

**Construction start date:** May 2020

**Original planned construction completion date:** September 2021

**Actual construction completion date:** November 2022

**Original construction amount:** Approximately \$6.6 million

**Current obligation amount:** Approximately \$7.8 million

**Scope of project:** The project is a fire/crash rescue station that supports emergency response to 445 Airlift Wing C-17 aircraft operations. The building has two adjacent vehicle bays and additional areas for operations, training, sleeping, dining, and recreation.

**Reasons for schedule delays:** The fire/crash rescue station's schedule delays are attributed to design errors and factors related to its re-design, labor shortages, and material supply chain delays from COVID-19.

Source: GAO analysis of Department of Defense information; Air Force Materiel Command (photo). | GAO-24-106499

- **Sharing lessons learned.** Corps officials told us that after-action reviews and lessons learned are shared at the district level and regional level, but not across the Corps. For example, an after-action review was completed for the Special Operations Forces Training Command Building at Fort Liberty—a project we reviewed during a site visit. However, designers on this project said that they were not using the Corps' database, the Military Mission Lessons Learned System, that could share this project's observations and lessons learned across the Corps. According to reports, the Special Operations Forces Training Command Building at Fort Liberty was delayed for over 3 years due to design errors and according to officials, other factors.<sup>46</sup>

For example, according to Corps documentation, designers incorrectly assumed a wind load exposure category as outlined in the Structural Engineering UFC, and designers did not include all loading for the building's roof.<sup>47</sup> Design revisions were made in response to design errors, which resulted in increased costs. This included an approximately \$2.1 million contract modification for, among other things, revisions for the building's existing structural steel—including beams, columns, and studs. Corps after-action review documentation cites poor coordination during design and a lack of oversight during the quality control process, causing missed opportunities to catch design errors (see fig. 6).<sup>48</sup> The responsible district subsequently took corrective actions to improve its quality control process, including issuing design quality control checklists and revising the quality management plan for projects within the district.

<sup>46</sup>Corps officials said that other factors such as personnel turnover and changing customer requirements also led to schedule delays.

<sup>47</sup>According to documentation, the wind load exposure category should have been designated as a Category C instead of Category B. Also, an analysis of the building's structural system found that roof beams had deflections that exceeded code limits.

<sup>48</sup>See U.S. Army Corps of Engineers South Atlantic Division, *Organizational and Process Changes by Savannah District Engineering Division to Address Design Quality Issues*.

**Figure 6: Special Operations Forces Training Command Building under Construction**

**Special Operations Forces (SOF) Training Command Building**



**Location:** Fort Liberty, NC

**Construction start date:** March 2017

**Original planned construction completion date:** February 2019

**Actual construction completion date:** July 2022

**Original construction amount:** Approximately \$38.7 million

**Current obligation amount:** Approximately \$54.3 million

**Scope of project:** The SOF Training Command Building is a three-story, 138,355 square foot facility for the John F. Kennedy Special Warfare Center and School. The building includes administrative and operations space, classrooms, and a library.

**Reasons for schedule delays:** The SOF Training Command building's schedule delays are attributed to design errors and insufficient quality control processes, personnel turnover, and changing customer requirements.

Source: GAO analysis of Department of Defense information; U.S. Army Corps of Engineers (photo). | GAO-24-106499

The Corps has also acknowledged issues with documenting and sharing observations and lessons learned across the enterprise. Corps documentation and officials said that observations and lessons learned are not published in a way that makes them accessible to others. For example, Corps documentation states that the archived database containing after-action reviews and lessons learned for military construction projects was accessed by fewer than 60 users from August 2022 through August 2023.

Army Engineer Regulation 1110-3-12 states that lessons learned from after-action reviews should be documented at the conclusion of each of the four phases of a military construction project and shared regionally.<sup>49</sup> Further, Department of the Army guidance states that lessons-learned program fundamentals include a formal lessons-learned policy letter or standard operating procedure and recurring training for staff, personnel, and students on the lessons-learned program.<sup>50</sup> Additionally, Army Regulation 11-33 states that an effective lessons-learned program prevents mistakes and repeats successes, which leads to saving resources.<sup>51</sup>

However, the Corps does not have a framework in place that ensures that after-action reviews take place and that lessons learned are documented and shared across the enterprise because it has not issued needed guidance and implemented an operational enterprise-wide lessons-learned system. Additionally, it has not developed training that would be needed to implement an enterprise-wide lessons-learned system.

- The Corps does not provide detailed guidance for how military construction project observations and lessons should be validated, captured, or shared. The Corps concluded in fiscal year 2023 that there is no policy or strategy for capturing lessons learned at the enterprise level, and any observations are captured on an ad-hoc basis. Corps officials stated that they have guidance that requires personnel to document after-action reports and lessons learned. Specifically, Army Engineer Regulation 1110-3-12 discusses the goals of an after-action report and when it is required to be completed—such as when there is a design

<sup>49</sup>Army Engineer Regulation 1110-3-12.

<sup>50</sup>Department of the Army Pamphlet 11-33, *Guide to the Army Lessons Learned Program* (July 28, 2021).

<sup>51</sup>Army Regulation 11-33.



schedule slippage of 30 days or more.<sup>52</sup> However, the guidance does not provide detail for how to capture and validate project lessons learned from after-action reports or how personnel should share observations and lessons learned at the enterprise level, such as through a standard operating procedure.

Corps officials stated that they share documents and presentations regarding projects at the district or regional level and within discipline communities of practice. For example, the Louisville district completed an after-action report in October 2022 that includes project lessons learned, successes, and challenges.<sup>53</sup> A Louisville district official said that this after-action report was conducted across the district and was also shared with some regional officials. However, sharing information on an ad-hoc basis with only the district and region does not ensure that all individuals who may need to know will have access. It also does not ensure that project participants have documented guidance for how best to capture and share information.

- The Corps does not have an operational enterprise-wide lessons-learned system that could better enable staff to share and access information across the agency. The current system for housing after-action reviews, the Military Mission Lessons Learned System, is not operational and users are not able to enter lessons learned into the system for vetting. Corps officials told us that they would like to transition this system into a new, more user-friendly system, but that this transition is on hold pending decisions on an enterprise-wide lessons-learned system (discussed below).
- The Corps provides some training to personnel for documenting after-action reports, validating lessons learned, and sharing best practices. However, additional training would be needed if it updates its guidance and implements an enterprise-wide system for lessons learned. Corps headquarters officials also emphasized that personnel need training for reviewing and learning how to vet lessons learned and share best practices.

The Corps is taking steps to improve its program and address these challenges. For example, it is drafting a lessons-learned strategy that is intended to provide a guideline for the Corps to capture and share lessons and best practices in support of future projects' execution.<sup>54</sup> The Corps is also in the process of developing an implementation plan for its strategy. The Corps' draft strategy and implementation plan include information on developing lessons-learned policy, implementing an enterprise-wide system for sharing lessons learned, and training for Corps personnel.

However, officials told us that their plans are in draft, with a potential target of finalizing the draft by fiscal year 2025. Additionally, the draft strategy includes a fiscal year 2027 enterprise-wide implementation milestone. Corps officials told us that a process where Corps employees actively share and access observations and lessons learned in the near term, including a functional database to enable this, would be beneficial and would lead to military project design and construction that is better, faster, cheaper, and safer.

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<sup>52</sup>Specifically, the guidance states that after-action reviews must be performed when an innovation has resulted in a significant project success or an error or other significant change causes one or more of these conditions to occur: a cost increase of 5 percent or more, a design schedule slippage of 30 days or more, a construction time growth of 60 days or more, or a consequent reduction in project quality. Army Engineer Regulation 1110-3-12.

<sup>53</sup>U.S Army Corps of Engineers, *Louisville District Military & IIS Project Management Branch After Action Review* (Oct. 12, 2022).

<sup>54</sup>Officials told us that as part of their effort to develop a lessons-learned strategy, they reviewed the Corps' lessons-learned process and program with input from senior leaders and officials across the Corps. In addition, the Corps is developing an implementation plan to describe how it will execute its strategy. According to draft documentation, the Corps has a goal of full implementation in fiscal year 2027.

By developing and issuing guidance for documenting after-action reviews and capturing and validating lessons learned, the Corps could help personnel learn how to effectively document these reviews at various stages of a military construction project. Additionally, implementing in an expedient manner an enterprise-wide system to share lessons learned and project best practices, including a functional database, could allow Corps personnel to more consistently use project observations generated from past projects to inform current projects. Finally, developing training could enable the Corps to better implement an enterprise-wide approach to documenting observations and validating lessons learned. As noted above, annual reports to Congress on military construction delays over the previous 5 fiscal years show that approximately 25 percent of delayed projects were due to poor initial planning—which includes factors that could have been reasonably addressed before a delay occurred. Therefore, a system that could store and share project observations from past projects may help prevent the Corps from committing design errors on current and future projects, which in turn may help prevent schedule delays and cost overruns.

### NAVFAC

NAVFAC officials stated although NAVFAC does not yet have a lessons-learned program, it has taken initial steps to create an enterprise-wide program. For the four projects we reviewed, we found that NAVFAC did not conduct after-action reviews. For example, the design manager of NAVFAC's delayed Road Construction and Repair Project at Camp Lejeune told us there was not an after-action review completed for this project and the project manager was unsure of any formal processes for documenting lessons learned. This project began construction in September 2020 and was originally scheduled to be completed in April 2022. According to NAVFAC officials, it was completed in June 2024.

According to DOD's fiscal year 2022 annual report to Congress on military construction delays and a NAVFAC report, this project was delayed due to design errors and unforeseen conditions, such as underground utilities that were in disrepair (see fig. 7).<sup>55</sup> For example, NAVFAC officials said that there was not a survey completed in the initial design with data for utilities. In addition, the design did not include information about a 24-inch water line that was discovered during construction. According to the officials, this resulted in a contract modification of about \$170,000 to reinforce the existing water main. NAVFAC officials emphasized that a lesson learned from this project could be to invest more money into quality surveys at the beginning of the project rather than dealing with issues during construction.

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<sup>55</sup> According to a NAVFAC report, a significant amount of rainfall and utility strikes in the area also led to delays.

**Figure 7: Road Construction and Repair Project under Construction**

**Road construction and repair**



**Location:** Camp Lejeune, NC

**Construction start date:** September 2020

**Original planned construction completion date:** April 2022

**Actual construction completion date:** June 2024

**Original construction amount:** Approximately \$17.6 million

**Current obligation amount:** Approximately \$18.5 million

**Scope of project:** The project includes road improvements—including construction of a service and access road, widening of an existing road, creation of jogging trails, and installation and movement of utility poles.

**Reasons for schedule delays:** The roadwork's schedule delays are attributed to design errors, unforeseen conditions such as underground utilities that were in disrepair, significant rainfall and utility strikes by contractors.

Source: GAO analysis of Department of Defense information; Military & Federal Construction Company, Inc (photo). | GAO-24-106499

In addition, construction of NAVFAC's Communications/Crypto Facility at Joint Base Pearl Harbor-Hickam was delayed due to design errors, material delays, and issues with the Direct Digital Control System for the HVAC system. This project began construction in July 2019 and was originally scheduled to be completed in April 2021. As of June 2024, officials said that the project is not yet complete. Also, NAVFAC officials said that there is no after-action review for this project.

According to NAVFAC documentation, design errors that led to schedule delays and cost growth for the project included the failure to provide the Hazardous Material Survey Report and reroofing plans in the final design submission.<sup>56</sup> As a result, contract modifications were made for almost \$3.6 million to remove hazardous materials and approximately \$2.3 million to repair the roof. However, NAVFAC officials said that it was NAVFAC's responsibility to provide quality assurance over the contracted architecture and engineering firm to ensure that the necessary documents were included in the design. In addition, the project was delayed for 942 days, and a contract modification was made for approximately \$4.8 million in July 2019 to replace the HVAC Direct Control System to meet cybersecurity requirements (see fig. 8).<sup>57</sup> NAVFAC project managers also emphasized that the design for renovation projects can be more complex than new projects and noted that this project also contained a Sensitive Compartmented Information Facility, which contains many technical requirements.

<sup>56</sup>Naval Facilities Engineering Systems Command, Pacific Memorandum, *Contract N62742-13-D-0004, Task Order 009, FY18 Project P-013, Communications/Crypto Facility, Wahiawa, Joint Base Pearl Harbor Hickam, Pearl Harbor, Hawaii; Letter of Concern* (Feb. 26, 2020).

<sup>57</sup>NAVFAC issued an instruction in June 2019 that requires the standardization of facility-related controlled systems—including HVAC Control Systems—to improve cybersecurity and increase operational effectiveness, among other things. Commander, NAVFAC Instruction 11000.2, *Facility Related Control System Standardization* (June 3, 2019). In October 2019, NAVFAC Hawaii conducted a business case analysis which recommended the standardization of a HVAC programmable controller from a single manufacturer. NAVFAC officials said that the original design for the project in 2017 did not include plans for this specific type of HVAC programmable controller, which led to delays. However, NAVFAC officials said that the switch to the required HVAC programmable controller will be more cost-effective overall because their public works personnel have the expertise to work on them.

**Figure 8: Communications/Crypto Facility Project**

**Communications/Crypto Facility**



**Location:** Joint Base Pearl Harbor Hickam, HI

**Construction start date:** July 2019

**Original planned construction completion date:** April 2021

**Actual construction completion date:** To be determined

**Original construction amount:** Approximately \$49.8 million

**Current obligation amount:** Approximately \$124.0 million

**Scope of project:** The project consists of renovations to include converting a communications building into a Sensitive Compartmented Information Facility. It also includes replacing existing power and Heating Ventilation and Air Conditioning (HVAC) systems and renovating existing walls, ceilings, and doors to meet secure area requirements.

**Reasons for schedule delays:** The Communication/Crypto facility's schedule delays are attributed to design errors, material delays, and issues regarding an HVAC Direct Digital Controller.

Source: GAO analysis of Department of Defense information; Naval Facilities Engineering Systems Command (photo). | GAO-24-106499

Navy and Marine Corps FC state that during various design stages, the quality control review must include, among other things, verifying current criteria and incorporating lessons learned.<sup>58</sup> Additionally, according to Navy guidance on the Navy Lessons Learned Program, Echelon II shore commanders, such as the commander of NAVFAC, should, among other things, designate a lesson manager to oversee the lessons-learned program, standardize and publish lessons-learned processes and procedures, and establish and operate an issue resolution process to rapidly adapt best practices. The Navy guidance also states that Echelon III shore commanders, or the commanders of NAVFAC Atlantic or NAVFAC Pacific, should provide training and guidance to subordinate commands on the collection and reporting of observations following various activities. Finally, it states that Navy organizations should conduct comprehensive after-action reviews to ensure the Navy learns from its experiences.<sup>59</sup>

A recent Naval Safety Command assessment of NAVFAC's risk processes from June 2023 also found that its processes did not comply with the Navy's Lessons Learned Program.<sup>60</sup> The report states that there is not a lessons-learned program that promotes continual learning across all functional areas. NAVFAC concurred with this finding and has created a corrective action plan. The corrective action plan states that NAVFAC should create lessons-learned processes and procedures by February 2024; and that NAVFAC should institutionalize and train personnel in accordance with these processes and procedures by April 2024. However, NAVFAC has not met these milestones. Officials told us they are in the initial stages of developing a policy to comply with the Navy's Lessons Learned Program guidance, which may take several months to finalize.

NAVFAC officials stated that they share information regarding projects through technical discipline communities of practice. However, sharing information on an ad-hoc basis does not ensure that all individuals who may need to know will have access. NAVFAC officials also told us that a system where NAVFAC employees actively share and access observations and lessons learned is needed to help close information

<sup>58</sup>FC 1-300-09N, *Navy and Marine Corps Design Procedures* (May 17, 2024).

<sup>59</sup>Office of the Chief of Naval Operations Instruction 3500.37E, *Navy Lessons Learned Program* (Jan. 25, 2024).

<sup>60</sup>Naval Safety Command, *Commander, Naval Facilities Engineering Systems Command Assurance Assessment 23-11* (July 18, 2023).

gaps and to prevent mistakes that could occur again in the future. A NAVFAC official and documentation said that they plan to use the Joint Lessons Learned Information System in the future to share lessons learned, but there are no details on a plan for using the system.<sup>61</sup> A NAVFAC official also said that they need to first assign and conduct training for lessons-learned managers.

NAVFAC does not provide guidance for how project observations and lessons should be captured or shared. In addition, NAVFAC does not provide training or support to personnel for validating lessons learned or sharing best practices. NAVFAC officials agreed that guidance is required for personnel to capture project observations lessons learned and that training is needed for personnel to validate lessons learned.

Developing and issuing guidance for after-action reviews and lessons learned could help NAVFAC personnel learn how to effectively document these reviews at various stages of a military construction project. In addition, by implementing a process or mechanism to share observations and lessons learned, NAVFAC could help personnel consistently use observations generated from past projects to inform current projects. Finally, developing training for personnel could enable NAVFAC to consistently document project observations and validate lessons learned as a further means to inform current projects. DOD's annual reports to Congress on military construction delays over the previous 5 fiscal years show that approximately 25 percent of projects delayed were due to poor initial planning—which includes factors that could have been reasonably addressed before a delay occurred. The use of past project observations may help prevent NAVFAC from committing design errors on current and future projects, which in turn may help prevent schedule delays and cost overruns.

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## Conclusions

Proper planning of military construction projects is critical to avoid design errors that could lead to project schedule delays and increased costs. Within DOD, the significant number of military construction projects delayed at least a year or more underscores the importance of military construction program oversight. The execution of DOD's military construction program relies on general oversight from offices within OSD, and on project oversight by DOD construction agents. However, OSD does not fully monitor the military construction program because it does not collect relevant information to enable effective oversight of all projects, such as the DOD construction agent responsible for the project, planning and design milestones, and details on funds spent. Requiring project sponsors to report more relevant information would better position DOD to conduct oversight and monitor the execution of projects to ensure the most efficient, expeditious, and cost-effective accomplishment of the military construction program.

Moreover, although documenting and sharing lessons learned do not guarantee that future mistakes will not occur, such practices can help organizations prevent mistakes and save resources. However, the Corps and NAVFAC do not consistently document and share military construction project lessons learned. Developing guidance, a system or process for sharing lessons learned, and training could help both the Corps and NAVFAC to use past project observations and lessons learned to inform their current and future military

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<sup>61</sup>The Joint Lessons Learned System is the DOD system of record for gathering, developing, and disseminating joint lessons learned for the armed forces. The system facilitates the collection, tracking, management, sharing, dissemination and archiving of information to improve the development, design, and readiness of the joint force. Chairman of the Joint Chiefs of Staff Instruction 3150.25H, *Joint Lessons Learned Program* (Dec. 30, 2021) (incorporating change 1, effective Apr. 5, 2024).

construction projects. Taking these steps may also help prevent the Corps and NAVFAC from committing design errors, which may reduce schedule delays and cost overruns.

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## Recommendations for Executive Action

We are making a total of seven recommendations, including one to DOD, three to the Army, and three to the Navy. Specifically:

The Secretary of Defense should ensure that the Assistant Secretary of Defense (Energy, Installations, and Environment) issues guidance requiring project sponsors to report relevant information necessary to monitor the execution of the military construction program. Such information could include the DOD construction agent responsible for the project, planning and design milestones, and details on funds spent. (Recommendation 1)

The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers develops and issues guidance for documenting after-action reviews and validating lessons learned of military construction projects at the enterprise level. (Recommendation 2)

The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers implements in an expedient manner an enterprise-wide system, including a functional database, to share lessons learned and project best practices within the U.S Army Corps of Engineers for military construction projects. (Recommendation 3)

The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers develops training for personnel to capture and validate lessons learned and best practices for military construction projects. (Recommendation 4)

The Secretary of the Navy should ensure that the Commander, NAVFAC develops and issues guidance for documenting after-action reviews and validating lessons learned of military construction projects within NAVFAC. (Recommendation 5)

The Secretary of the Navy should ensure that the Commander, NAVFAC, implements a process or mechanism to share lessons learned and project best practices for military construction projects within NAVFAC. (Recommendation 6)

The Secretary of the Navy should ensure that the Commander, NAVFAC develops training for personnel to capture and validate lessons learned and best practices for military construction projects. (Recommendation 7)

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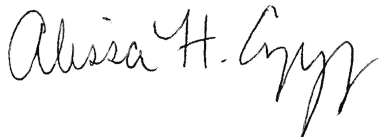
## Agency Comments

We provided a draft of this report to DOD for review and comment. In its written comments, reproduced in appendix IV, DOD concurred with all of our recommendations and stated that it is taking action to implement them.

DOD also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense and the Secretaries of the Army, Navy, and Air Force. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3058 or [czyza@gao.gov](mailto:czyza@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix V.



Alissa H. Czyz  
Director  
Defense Capabilities and Management

# Appendix I: Organizations and Military Construction Projects GAO Contacted

To obtain information for our review, we interviewed officials from the following organizations and military construction projects.

-Office of the Secretary of Defense

- Office of the Under Secretary of Defense for Acquisition and Sustainment, Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience

-Department of the Air Force

- Air Force Civil Engineer Center

-Department of the Navy

- Assistant Secretary of the Navy (Energy, Installations and Environment)
- Naval Facilities and Engineering Systems Command, Engineering Criteria and Programs Office
- Naval Facilities Engineering Systems Command Atlantic
- Naval Facilities Engineering Systems Command Pacific
- Naval Facilities Engineering Systems Command Hawaii
  - Communications/Crypto Facility, Joint Base Pearl Harbor, Hawaii
  - Waterfront Improvements Wharves, Joint Base Pearl Harbor, Hawaii
- Naval Facilities Engineering Systems Command Mid-Atlantic
  - Road Construction and Repair, Camp Lejeune, North Carolina
- Naval Facilities Engineering Systems Command Northwest
  - Undersea Vehicle Maintenance Facility, Naval Base Kitsap, Washington
- Marine Corps Installations Command

-Department of the Army

- Assistant Secretary of the Army (Installations, Energy and Environment)
- Headquarters, U.S. Army Corps of Engineers
- U.S. Army Corps of Engineers South Atlantic Division
- U.S. Army Corps of Engineers Great Lakes and Ohio River Division
- U.S. Army Corps of Engineers Baltimore District
- U.S. Army Corps of Engineers Savannah District and Wilmington District



- Special Operations Forces Training Command Building, Fort Liberty, North Carolina
- U.S Army Corps of Engineers Louisville District
  - Fire/Crash Rescue Station, Wright-Patterson Air Force Base, Ohio
- U.S Army Corps of Engineers Mobile District
  - Aircraft and Flight Equipment Building, Redstone Arsenal, Alabama
- U.S Army Corps of Engineers Sacramento District
  - Missile Motor Receipt/Storage Facility, Utah Test and Training Range, Utah

-Criteria Working Groups

- Structural Working Group
- Mechanical Working Group
- Architecture Working Group
- Electrical Working Group
- Sustainability Working Group

# Appendix II: Working Groups

According to Department of Defense (DOD) Military Standard 3007G, Department of Defense Standard Practice: Unified Facilities Criteria, Facilities Criteria, and Unified Facilities Guide Specifications, discipline and functional working groups (working groups) are established or eliminated depending on current or projected criteria program management needs.<sup>1</sup> The Coordinating Panel recommends the establishment or elimination of working groups to the Engineering Senior Executive Panel for concurrence and approval. As of March 2024, approved working groups are as listed in table 2 below.

**Table 2: Working Groups Approved by the Engineering Senior Executive Panel**

Discipline working group	Functional working group
Architecture	Aviation
Civil	Comprehensive Planning
Cost Engineering	Construction
Electrical	Contingency Engineering
Fire Protection	Control Systems
Geotechnical	Design-Build
Mechanical	Facility Space Planning
Pavements/Airfields	Fuels
Structural	Installation Resiliency
	Medical
	Security
	Specifications
	Sustainability
	Waterfront

Source: Department of Defense information. | GAO-24-106499

<sup>1</sup>Department of Defense Military Standard 3007G, *Department of Defense Standard Practice: Unified Facilities Criteria, Facilities Criteria, and Unified Facilities Guide Specifications* (Nov. 2019).

# Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

**Table 3: Department of Defense’s (DOD) Incorporation of UFC-Related NDAA Provisions, Fiscal Years 2018–2022**

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2018, Pub. L. No. 115-91 (2017)	(1) Sec. 2872: Modification of Department of Defense Guidance on Use of Airfield Pavement Marking	<p>(a) Modification required.— Except as provided in subsection (b), the Secretary of Defense shall require such modifications of Unified Facilities Guide Specifications (UFGS) for pavement markings (UFGS 32 17 23.00 20, Pavement Markings; UFGS 32 17 24.00 10 Pavement Markings), Air Force Engineering Technical Letter 97–18, Guide Specification for Airfield and Roadway Marking, and any other DOD guidance on airfield pavement markings as may be necessary to prohibit the use of Type I glass beads or any glass beads with a 1.6 refractive index or less from use on airfield markings on airfields under the control of the Secretary.</p> <p>(b) EXCEPTION.— Subsection (a) shall not apply if the Secretary of the Air Force submits a certification to the congressional defense committees that, whenever a proposed contract for airfield pavement markings includes the use of Type I and Type III glass beads, the assessment of the life-cycle costs associated with the use of such beads appropriately considers the local site conditions, life-cycle cost maintenance, environmental impact, operational requirements, and the safety of flight. . . .</p>		Under the statute, the modifications required under subsection (a) were to apply with respect to procurements occurring after September 30, 2018

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2018, Pub. L. No. 115-91 (2017)	(2) Sec. 2875: Permitting Machine Room-less Elevators in Department of Defense Facilities	<p>a) In general—The Secretary of Defense shall issue modifications to all relevant construction and facilities specifications to ensure that machine room-less elevators (MRL) are not prohibited in buildings and facilities throughout DOD, including modifications to the UFGS, the Naval Facilities Engineering Command Interim Technical Guidance, and the Army Corps of Engineers Engineering and Construction Bulletin.</p> <p>(b) Conforming to best practices. —In addition to the modifications required under subsection (a), the Secretary may issue further modifications to conform generally with commercial best practices as reflected in the safety code for elevators and escalators as issued by the American Society of Mechanical Engineers.</p>	provision incorporated	<p>This provision was implemented in UFGS 14 21 23.</p> <p>DOD officials stated the terms machinery space (MS) and elevator control room (CR) within UFGS 14 21 23 only apply to MRLs.</p>

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2018, Pub. L. No. 115-91 (2017)	(3) Sec. 2878: Report on Hurricane Damage to Department of Defense Assets.	<p>(a) In general.—Not later than 90 days after the date of the enactment of this Act, the Secretary of Defense shall submit to the congressional defense committees a report on damage to DOD assets and installations from hurricanes during 2017.</p> <p>(b) Elements.—The report required under subsection (a) shall include the following elements:</p> <p>...</p> <p>(4) An adaptation plan to ensure military installations funded with taxpayer dollars are constructed to better withstand flooding and extreme weather events.</p>	provision incorporated	<p>DOD submitted this report in January 2019 and stated that when DOD constructs a new facility or renovates an older facility, structural upgrades, building envelope materials, and service systems are specially selected to help guard against the effects of hurricanes by applying UFC criteria more stringent than International Code published by the International Code Council. DOD cites UFC 3-301-01 Structural Engineering, UFC 4-023-10, Safe Havens, and UFC 4-150-06 Military Harbors and Costal Facilities as examples.</p>

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

<p>John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232 (2018)</p>	<p>(4) Sec. 2805: Updates and Modifications to Department of Defense Form 1391, Unified Facilities Criteria, and Military Installation Master Plans (as amended)</p>	<p>(a) Flood risk disclosure for military construction.—</p> <p>(1) In general.—The Secretary of Defense shall modify DOD Form 1391 to require, with respect to any proposed major or minor military construction project requiring congressional notification or approval—</p> <p>(A) disclosure whether a proposed project will be sited within or partially within a 100-year floodplain or a 500-year floodplain if outside a 100-year floodplain, according to the most recent available Federal Emergency Management Agency flood hazard data, or will be impacted by projected current and future mean sea level fluctuations over the lifetime of the project; and</p> <p>(B) if the proposed project will be sited within or partially within a floodplain described in subparagraph (A) or will be impacted by projected current and future mean sea level fluctuations over the lifetime of the project, the specific risk mitigation plan.</p> <p>(2) Delineation of floodplain.—To the extent that Federal Emergency Management Agency flood hazard data are not available for a proposed major or minor military construction site, the Secretary concerned shall establish a process for delineating the 100-year floodplain using risk analysis that is consistent with the standards used to inform federal flood risk assessments.</p> <p>(3) Reporting requirements.—For proposed projects that are to be sited within or partially within a 100-year floodplain or are to be impacted by projected</p>	<p>provision partially incorporated</p>	<p>DOD officials told us that UFC amendments to address subsection (b) relating to DOD Form 1391 are currently being drafted and project that DOD may be ready to approve such amendments by the end of 2024.</p>
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current and future mean sea level fluctuations over the lifetime of the project, the Secretary concerned shall submit to the congressional defense committees a report with the following:

(A) An assessment of flood vulnerability for the proposed project using hydrologic, hydraulic, and hydrodynamic data, methods, and analysis that integrate current and projected changes in flooding based on climate science over the anticipated service life of the facility and future forecasted land use changes.

(B) Any information concerning alternative construction sites that were considered, and an explanation of why those sites do not satisfy mission requirements.

(C) A description of planned flood mitigation measures.

(D) A description of how the proposed project has taken into account projected current and future flood risk and mean sea level fluctuations over the lifetime of the project.

(4) Minimum flood mitigation requirements.— When mitigating the flood risk of a major or minor military construction project within or partially within the 100-year floodplain or that will be impacted by projected current and future mean sea level fluctuations over the lifetime of the project, the Secretary concerned shall require any mitigation plan to assume—

(A) an additional 2 feet above the base flood elevation for non-mission critical buildings, as

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determined by the Secretary;

(B) 3 feet above the base flood elevation for mission critical buildings, as determined by the Secretary; and

(C) any additional flooding that will result from projected current and future flood risk and mean sea level fluctuations over the lifetime of the project.

(b) Disclosure requirements for DOD Form 1391.—Not later than 30 days after the date of the enactment of this Act, the Secretary of Defense shall amend DOD Form 1391 to require, for each requested military construction project—

(1) disclosure whether the project was included in the prior year's future-years defense program submitted to Congress pursuant to section 221 of title 10, U.S. Code; and

(2) inclusion of an energy study or life cycle analysis.

(c) Incorporation of changing environmental condition projections in military construction design and modifications.—

(1) Fiscal year 2019. Not later than 30 days after the date of the enactment of this Act, the Secretary of Defense shall amend section 3–5.6.2.3 of UFC 1–200–01 and UFC 1–200–02 (or any similar successor regulations) to provide that in order to anticipate changing environmental conditions during the design life of existing or planned new facilities and infrastructure, projections from reliable and authorized sources such as the Census Bureau (for population projections), the National Academies of Sciences (for land use change projections and

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climate projections), the U.S. Geological Survey (for land use change projections), and the U.S. Global Change Research Office and National Climate Assessment (for climate projections) shall be considered and incorporated into military construction designs and modifications.

(2) Fiscal year 2020.

(A) Amendments required. Not later than 30 days after the date of the enactment of the National Defense Authorization Act for Fiscal Year 2020, the Secretary of Defense shall amend the UFC as follows:

(i) To require that installations of the DOD assess the risks from extreme weather and related effects, and develop plans to address such risks.

(ii) To require in the development of such Criteria the use of—

(I) land use change projections through the use of land use and land cover modeling by the U.S. Geological Survey; and

(II) weather projections—

(aa) from the U.S. Global Change Research Program, including in the National Climate Assessment; or

(bb) from the National Oceanic and Atmospheric Administration, if such projections are more up-to-date than projections under item (aa).

(iii) To require the Secretary of Defense to provide guidance to project designers and master planners on how to use weather projections.

(iv) To require the use throughout the Department of the Naval Facilities

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Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
		Engineering Command Climate Change Installation Adaptation and Resilience planning handbook, as amended (or similar publication of the Army Corps of Engineers).		
National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019)	(5) Sec. 2804: Amendment of Unified Facilities Criteria to Promote Military Installation Resilience, Energy Resilience, Energy and Climate Resiliency, and Cyber Resilience	<p>(a) Amendment required.—</p> <p>(1) In general.—Not later than September 1, 2020, the Secretary of Defense shall amend the UFC relating to military construction planning and design, to ensure that building practices and standards of DOD promote military installation resilience, energy resilience, energy and climate resiliency, and cyber resilience.</p> <p>(2) Considerations and consultations.—In preparing amendments pursuant to paragraph (1), the Secretary of Defense—</p> <p>(A) shall take into account historical data, current conditions, and sea level rise projections; and</p> <p>(B) may consult with the heads of other federal departments and agencies with expertise regarding military installation resilience, energy resilience, energy and climate resiliency, and cyber resilience.</p>	provision incorporated	The statute stated that any DOD Form 1391 submitted to Congress after September 1, 2020, shall comply with the UFC, as amended pursuant to this section

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019)	(6) Sec. 2805: Modification to Department of Defense Form 1391 Regarding Consideration of Potential Long-term Adverse Environmental Effects	<p>(a) Modification.—</p> <p>(1) Certification requirement.—The Secretary of Defense shall modify DOD Form 1391 to require, with respect to any proposed major or minor military construction project requiring congressional notification or approval, the inclusion of a certification by the Secretary of Defense or the secretary of the military department concerned that the proposed military construction project takes into consideration—</p> <p>(A) the potential adverse consequences of long-term changes in environmental conditions, such as increasingly frequent extreme weather events, that could affect the military installation resilience of the installation for which the military construction project is proposed; and</p> <p>(B) building requirements in effect for the locality in which the military construction project is proposed and industry best practices that are developed to withstand extreme weather events and other consequences of changes in environmental conditions.</p> <p>(2) Elements of certification.—As part of the certification required by paragraph (1) for a proposed military construction project, the secretary concerned shall identify the potential changes in environmental conditions, such as increasingly frequent extreme weather events, considered and addressed under subparagraphs (A) and (B) of paragraph (1).</p> <p>...</p>	provision partially incorporated	<p>DOD officials stated that the military services currently have guidance, and that DOD intends to fund the creation of a new UFC to house this requirement because it does not contain technical design criteria.</p> <p>GAO is tracking progress on DOD's actions, which currently have a target completion date of February 2025.</p>
William M. (Mac) Thornberry National	(7) Sec. 2805: Congressional Project	(a) Replacement of notice and wait authority.—	provision incorporated	DOD officials noted they implemented this

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

<p>Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283 (2021)</p>	<p>Authorization Required for Military Construction Projects for Energy Resilience, Energy Security, and Energy Conservation</p>	<p>Section 2914 of title 10, United States Code, is amended to read as follows:</p> <p>“§ 2914. Military construction projects for energy resilience, energy security, and energy conservation”</p> <p>“(b) (1) Submission of project proposals. As part of DOD Form 1391 submitted to the appropriate committees of Congress for a military construction project covered by subsection (a), the Secretary of Defense shall include the following information:</p> <p>“(A) The project title.</p> <p>“(B) The location of the project.</p> <p>“(C) A brief description of the scope of work.</p> <p>“(D) The original project cost estimate and the current working cost estimate, if different.</p> <p>“(E) Such other information as the Secretary considers appropriate.</p> <p>“(2) In the case of a military construction project for energy conservation, the Secretary also shall include the following information:</p> <p>“(A) The original expected savings-to-investment ratio and simple payback estimates and measurement and verification cost estimate.</p> <p>“(B) The most current expected savings-to-investment ratio and simple payback estimates and measurement and verification plan and costs.</p> <p>“(C) A brief description of the measurement and verification plan and planned funding source.</p> <p>“(3) In the case of a military construction project for energy resilience or energy security, the Secretary also</p>	<p>provision when submitting the relevant forms.</p> <p>The requirements for DOD Form 1391 stipulated in the amended 10 U.S.C. § 2914 applied to certain military construction projects for fiscal year 2023 and thereafter.</p>
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Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
		shall include the rationale for how the project would enhance mission assurance, support mission critical functions, and address known vulnerabilities.”		
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(8) Sec. 2805: Flood Risk Management for Military Construction	<p>. . .</p> <p>(d) Conforming amendment of Unified Facilities Criteria.—</p> <p>(1) Amendment required.— Not later than September 1, 2022, the Secretary of Defense shall amend the UFC relating to military construction planning and design to ensure that building practices and standards of DOD incorporate the minimum flood mitigation requirements of section 2805(a) of the Military Construction Authorization Act for Fiscal Year 2019 (division B of Public Law 115–232; 132 Stat. 2262; 10 U.S.C. 2802 note), as amended by this section.. .</p>	provision incorporated	The statute states that any DOD Form 1391 submitted to Congress after Sept. 1, 2022, is to comply with the UFC as amended by this statute

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(9) Sec. 2841: Amendment of Unified Facilities Criteria to Require Inclusion of Private Nursing and Lactation Space in Certain Military Construction Projects	<p>(a) Amendment required.—The Secretary of Defense shall amend UFC 1–4.2 (Nursing and Lactation Rooms) of the UFC/DOD Building Code (UFC 1–200–01) to require that military construction planning and design for buildings likely to be regularly frequented by nursing mothers who are members of the uniformed services, civilian employees of DOD, contractor personnel, or visitors include a private nursing and lactation room or other private space suitable for that purpose.</p> <p>(b) Deadline.—The Secretary of Defense shall complete the amendment process required by subsection (a) and implement the amended UFC 1–4.2 not later than one year after the date of the enactment of this Act.</p>	provision incorporated	
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(10) Sec. 2842: Revisions to Unified Facilities Criteria Regarding Use of Variable Refrigerant Flow Systems	(a) Publication and comment period requirements.—The Under Secretary of Defense for Acquisition and Sustainment shall publish any proposed revisions to the UFC regarding the use of variable refrigerant flow systems in the Federal Register and shall specify a comment period of at least 60 days.	provision incorporated	In January 2024 DOD updated UFC 3-410-01, Heating, Ventilating, and Air Conditioning Systems, which provides criteria for the use of variable refrigerant flow systems. The UFC states that no revision will be made to it without Federal Register notification.

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(11) Sec. 2843: Amendment of Unified Facilities Criteria to Promote Energy efficient Military Installations	<p>(a) UFC amendment required.—To the extent practicable, the Secretary of Defense shall amend the UFC relating to military construction planning and design to ensure that building practices and standards of DOD incorporate the latest consensus-based codes and standards for energy efficiency and conservation, including the 2021 International Energy Conservation Code (IECC) and the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2019.</p> <p>(c) Reporting requirement.—Not later than February 1, 2024, the Secretary of Defense shall submit to the Committees on Armed Services of the House of Representatives and the Senate a report—</p> <p>(1) describing the extent to which the UFC, as amended pursuant to subsection (a), incorporate the latest consensus-based codes and standards for energy efficiency and conservation, including the 2021 IECC and the ASHRAE Standard 90.1-2019, as required by such subsection; and</p> <p>(2) in the case of any instance in which the UFC continues to deviate from such consensus-based codes and standards for energy efficiency and conservation, identifying the deviation and explaining the reasons for the deviation.</p>	provision incorporated	The statute stated that the amendment process described in section 2843(a) shall be completed in a timely manner so that any DOD Form 1391 submitted to Congress in connection with a fiscal year 2024 budget submission and thereafter complies with the UFC, as amended by this statute.



Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(12) Sec. 2844: Additional Department of Defense Activities to Improve Energy Resiliency of Military Installations	<p>(a) Consideration of including energy microgrid in military construction projects.—</p> <p>(1) Amendment of UFC Required.—The Secretary of Defense shall amend the UFC/DOD Building Code (UFC 1–200–01) to require that planning and design for military construction projects inside the United States include consideration of the feasibility and cost-effectiveness of installing an energy microgrid as part of the project, including intentional islanding capability of at least seven consecutive days, for the purpose of—</p> <p>(A) promoting on-installation energy security and energy resilience; and</p> <p>(B) facilitating implementation and greater use of the authority provided by subsection (h) of section 2911 of title 10, United States Code, as added and amended by section 2825 of the Military Construction Authorization Act for Fiscal Year 2021 (division B of Public Law 116– 283).</p>	provision incorporated	

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
National Defense Authorization Act for Fiscal Year 2022, Pub. L. No. 117-81 (2021)	(13) Sec. 2881: Clarification of Installation and Maintenance Requirements Regarding Fire Extinguishers in Department of Defense Facilities	Section 2861 of the Military Construction Authorization Act for Fiscal Year 2020 (division B of Public Law 116–92; 10 U.S.C 113 note; 133 Stat. 1899) is amended by striking “requirements of national model fire codes developed by the National Fire Protection Association (NFPA) and the International Code Council” and inserting “NFPA 1, Fire Code of the NFPA and applicable requirements of the international building code and international fire code of the International Code Council.”	provision incorporated	On 3 February 2020 DOD updated UFC 3-600-01, Fire Protection Engineering for Facilities to state that general purpose portable fire extinguishers must be provided where required by NFPA 101. DOD officials stated that this change had implemented the provision.
James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263 (2022)	(14) Sec. 2810: Consideration of Installation of Integrated Solar Roofing to Improve Energy Resiliency of Military Installations.	The Secretary of Defense shall amend the UFC/DOD Building Code (UFC 1–200–01) to require that planning and design for military construction projects inside the United States include consideration of the feasibility and cost-effectiveness of installing integrated solar roofing as part of the project, for the purpose of— (1) promoting on-installation energy security and energy resilience; (2) providing grid support to avoid energy disruptions; and (3) facilitating implementation and greater use of the authority provided by subsection (h) of section 2911 of title 10, U.S.Code	provision incorporated	

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

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James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263 (2022)	(15) Sec. 2811: Revision of Unified Facilities Guide Specifications and Unified Facilities Criteria to Include Specifications on Use of Gas Insulated Switchgear and Criteria and Specifications on Microgrids and Microgrid Converters	<p>(a) Gas insulated switchgear.—Not later than one year after the date of the enactment of this Act, the Under Secretary of Defense for Acquisition and Sustainment shall modify the UFGS to include a distinct specification for medium voltage gas insulated switchgear.</p> <p>(b) Microgrids.—Not later than one year after the date of the enactment of this Act, the Under Secretary of Defense for Acquisition and Sustainment shall—</p> <p>(1) modify the UFC to include criteria for microgrids; and</p> <p>(2) modify the UFGS to include specifications for microgrids and microgrid controllers.</p>	provision incorporated	<p>The medium voltage switchgear and gas insulation specification was published as UFGS 2613 32 on 1 November 2023.</p> <p>UFC 3-550-04, Resilient Installation Microgrid Design was published 1 March 2024.</p> <p>The microgrids and microgrid controllers guide specifications was formally published in the quarterly UFGS in February 2024.</p>

Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263 (2022)	(16) Sec. 2812: Determination and Notification Relating to Executive Orders That Impact Cost and Scope of Work of Military Construction Projects	<p>(a) Determination and update of DOD Form 1391.— Not later than 30 days after the date on which an executive order is signed by the President, the Secretary concerned shall—</p> <p>(1) determine whether implementation of the executive order would cause a cost or scope of work variation for a military construction project under the jurisdiction of the Secretary concerned;</p> <p>(2) assess the potential for life-cycle cost savings associated with implementation of the executive order for such a project; and</p> <p>(3) update DOD Form 1391 for each such project that has not been submitted for congressional consideration, where such implementation would affect such cost or scope of work variation, including—</p> <p>(A) projects to be commenced in the next fiscal year beginning after the date on which the executive order was signed; and</p> <p>(B) projects covered by the future-years defense program submitted under section 221 of title 10, United States Code.</p> <p>(b) Notification to Congress.—Not later than 10 days after determining under subsection (a)(1) that implementation of an executive order would cause a cost or scope of work variation for a military construction project, the Secretary concerned shall submit to the congressional defense committees a report indicating the estimated cost increases, scope of work increases, life-cycle costs, and any</p>	provision not incorporated	<p>DOD officials stated a finalized policy update would be issued by 30 March, 2024.</p> <p>DOD officials explained a separate policy for projects in the planning phase does not have a timeline for publication.</p>
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Appendix III: Incorporation of Relevant National Defense Authorization Act Provisions

National Defense Authorization Act (NDAA)	National Defense Authorization Act (NDAA) provision	Description or excerpt <sup>a</sup>	Incorporation into Unified Facilities Criteria (UFC), other guidance, or processes <sup>b</sup>	Note
		other impacts of such implementation.		

Legend:

- = The provision has been incorporated.
- ◐ = The provision has been partially incorporated.
- = The provision has not been incorporated.

Source: GAO analysis of NDAA and DOD documentation. | GAO-24-106499

<sup>a</sup>Portions of statutes not relevant to UFC modifications have been omitted from this table.

<sup>b</sup>Our review did not assess whether DOD implemented these statutes within time frames that may have been required by each statute.

# Appendix IV: Comments from the Department of Defense



ENERGY, INSTALLATIONS,  
AND ENVIRONMENT

**ASSISTANT SECRETARY OF DEFENSE**  
3400 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3400

August 23, 2024

Ms. Alissa Czyz  
Director, Defense Capabilities and Management  
U.A. Government Accountability Office  
441 G Street NW  
Washington, DC 20548

Dear Ms. Czyz:

This is the Department of Defense response to the GAO Draft Report, GAO-24-106499, "MILITARY CONSTRUCTION: Better Information Sharing Would Improve DoD's Oversight," dated July 19, 2024 (GAO Code 106499). The Department of Defense proposed response to the subject report is enclosed. My point of contact is Mr. Michael Rosenblatt, at michael.a.rosenblatt8.civ@mail.mil or (703) 571-9079.

Sincerely,

OWENS.BRE<sup>1</sup> Digitally signed by  
NDAN.M.1030 OWENS BRENDAN M.1  
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Date: 2024.08.23  
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Brendan M. Owens

Enclosure:  
As stated

cc:  
WHS GAO Affairs Division

GAO DRAFT REPORT DATED JULY 19, 2024  
GAO-24-106499 (GAO CODE 106499)

"MILITARY CONSTRUCTION: BETTER INFORMATION SHARING WOULD IMPROVE DOD'S OVERSIGHT"

DEPARTMENT OF DEFENSE COMMENTS

**RECOMMENDATION 1:** The Secretary of Defense should ensure that the Assistant Secretary of Defense (Energy, Installations, and Environment) issues guidance requiring project sponsors to report relevant information necessary to monitor the execution of the military construction program. Such information could include the DOD construction agent responsible for the project, planning and design milestones, and details on funds spent.

**DoD RESPONSE:** Concur. The Department sees value in common military construction (MilCon) terminology and updating reporting requirements to facilitate oversight of component military construction programs. DoD is currently developing policy to standardize MilCon terminology, an initial step required to provide a foundation for future enhanced MilCon information sharing.

It's also important to note that DoD conducts oversight at the project level on high risk and high interest projects and programs through a host of portfolio specific briefings and meetings that require components to gather substantial project level data including for the Indo Pacific, Europe, and the Energy Resilience and Conservation Investment Program and high profile individual projects such as the Air Force's Joint Intelligence Analysis Center and Presidential Aircraft Replacement Hangar to name a few. DoD captures relevant information to conduct oversight through these briefings.

**RECOMMENDATION 2:** The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers develops and issues guidance for documenting after-action reviews and validating lessons learned of military construction projects at the enterprise-level.

**DoD RESPONSE:** DoD concurs with this recommendation and agrees with the importance of institutionalizing lessons learned processes within the DoD Construction Agents.

**RECOMMENDATION 3:** The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers implements in an expedient manner an enterprise-wide system, including a functional database, to share lessons learned and project best practices within the U.S. Army Corps of Engineers for military construction projects.

**DoD RESPONSE:** DoD concurs with this recommendation and the benefit of a consistent mechanism for sharing lessons learned information. It's important to note that USACE currently documents and shares lessons learned through several means including but not limited to:

- Community of Practice meetings. This includes regular short form meetings around an hour briefly covering lessons learned, which typically occur monthly or quarterly, and long form meetings covering lessons learned in detail, which occur over multiple days occurring annually or biannually.
- Tri-service Discipline Working Group meetings through the UFC Program
- Facility standardization team meetings, which leverage the USACE Centers of Standardization to provide feedback to the Army Standards.

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**RECOMMENDATION 4:** The Secretary of the Army should ensure that the Commanding General of the U.S. Army Corps of Engineers develops training for personnel to capture and validate lessons learned and best practices for military construction projects.

**DoD RESPONSE:** DoD concurs with this recommendation. DoD concurs with this recommendation and the benefit of reviewing and revising existing training for documenting after action reviews and the validating and sharing of lessons learned in military construction projects.

**RECOMMENDATION 5:** The Secretary of the Navy should ensure that the Commander, Naval Facilities Engineering Systems Command (NAVFAC) develops and issues guidance for documenting after-action reviews and validating lessons learned of military construction projects within NAVFAC.

**DoD RESPONSE:** DoD concurs with this recommendation and agrees with the importance of institutionalizing lessons learned processes within the DoD Construction Agents.

**RECOMMENDATION 6:** The Secretary of the Navy should ensure that the Commander, NAVFAC implements a process or mechanism to share lessons learned and project best practices for military construction projects within NAVFAC.

**DoD RESPONSE:** DoD concurs with this recommendation and the benefit of processes that share lessons learned on military construction projects.

**RECOMMENDATION 7:** The Secretary of the Navy should ensure that the Commander, NAVFAC develops training for personnel to capture and validate lessons learned and best practices for military construction projects.

**DoD RESPONSE:** DoD concurs with this recommendation and the benefit of reviewing and revising existing training for documenting after action reviews and the validating and sharing of lessons learned in military construction projects.



# Accessible Text for Appendix IV: Comments from the Department of Defense

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As stated

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WHS GAO Affairs Division

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# Appendix V: GAO Contact and Staff Acknowledgments

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## GAO Contact

Alissa H. Czyz, (202) 512-3058 or [czyza@gao.gov](mailto:czyza@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, GAO staff who made key contributions on this report include Gina Hoffman (Assistant Director), Norris “Traye” Smith (Analyst in Charge), Nicholas Benne, Margaret Best, Elizabeth Field, Amie Lesser, Terry Richardson, Karen Vasquez-Romero, Carter Stevens, and Anne Thomas.



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