



May 2022

MILITARY DEPOTS

DOD Strategy for Addressing Deteriorating Facilities and Equipment Is Incomplete

This report was revised on May 10, 2022 to include DOD's signed cover letter on page 63.

GAO Highlights

Highlights of [GAO-22-105009](#), a report to congressional committees

Why GAO Did This Study

The Department of Defense (DOD) operates industrial installations known as depots to maintain, overhaul, and repair its weapon systems and equipment. Depots are crucial to supporting readiness by repairing critical systems and returning them to the warfighter. GAO found in 2019 that the poor condition of depot facilities and equipment contributed to a decline in depot performance. This adversely affected readiness and incurred hundreds of millions in extra costs.

The National Defense Authorization Act for Fiscal Year 2020 included a provision for GAO to assess DOD and service depot improvement plans. This report (1) describes changes to the condition of depot infrastructure since 2017; and evaluates the extent to which (2) the military services address infrastructure challenges, and (3) the DOD depot improvement plan included all required elements. GAO analyzed depot metrics from fiscal years 2016 through 2020 and DOD and service guidance and plans. GAO also interviewed service depot, sustainment, and budget officials.

What GAO Recommends

GAO recommends that DOD include the missing elements of its infrastructure strategy in a timely manner. DOD concurred. GAO also recommends that DOD annually report minimum investments needed to prevent further infrastructure deterioration. DOD partially concurred and stated it would provide this information via other, currently required actions. However, these actions do not require reporting amounts needed to prevent further deterioration. GAO stands by its recommendation.

View [GAO-22-105009](#). For more information, contact Diana Maurer at (202) 512-9627 or maurerd@gao.gov.

May 2022

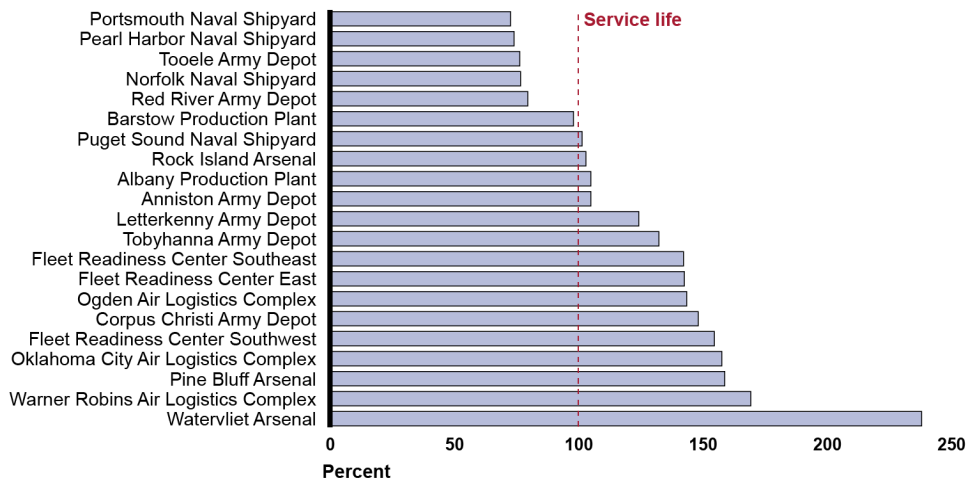
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What GAO Found

Since fiscal year 2016, the condition of the depots' infrastructure—their facilities and equipment—generally has remained in the fair-to-poor range and has not improved. Though facility condition ratings at some depots have increased, backlogs of facility projects grew by \$3.1 billion. Further, most depot capital equipment remains past its service life (see figure).

Depot Capital Equipment Age as a Percent of Expected Service Life, FY 2020



Source: GAO analysis of service equipment age data. | GAO-22-105009

To respond to the depots' infrastructure challenges, the military departments have met statutory investment levels since 2007 and developed improvement plans. In fiscal year 2007, a law was enacted requiring the military departments to invest a minimum amount in their depots every year. The departments have generally met this requirement and have invested \$20 billion in their depots since then. However, the law measures investment by department, which allows some depots to remain under the minimum. For example, the Marine Corps, within the Department of the Navy, first reached the 6 percent level in fiscal year 2018, 11 years after the law was enacted. Further, the services do not report on investment needed to prevent further infrastructure deterioration. The services' improvement plans call for almost doubling investment over fiscal year 2020 levels, but it is too early to tell whether the services will be able to do so.

In 2019, DOD was required by statute to develop a depot infrastructure improvement strategy with three elements: (1) an assessment of depot conditions; (2) a business case analysis of investment scenarios; and (3) a plan to oversee improvements. However, GAO found that DOD's strategy addressed the assessment, but did not include the business case analysis or improvement plan. DOD expects to include the missing elements in future updates. However, officials do not expect the strategy to be fully complete until 2024. Without a completed strategy addressing all mandated elements, DOD will face difficulties in overseeing the services' efforts to address the depots' challenges.

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Abbreviations

DASD/MR	Deputy Assistant Secretary of Defense for Materiel Readiness
DOD	Department of Defense
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Systems Command
NAVSEA	Naval Sea Systems Command
OSD	Office of the Secretary of Defense
SIOP	Shipyards Infrastructure Optimization Plan

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May 9, 2022

Congressional Committees

The Department of Defense (DOD) operates public industrial installations that maintain, overhaul, and repair its multitude of complex weapon systems and equipment. This mix of weapon systems and their maintenance needs is continually changing as DOD replaces and modifies its older weapon systems with newer and better technologies. To maintain these systems and equipment, DOD uses a combination of private-sector contractors and public industrial installations that are government owned and operated. These public industrial installations, known as depots, employ over 80,000 civilians, and support readiness by maintaining and repairing critical weapon systems for use in training and operations.¹ DOD annually requests appropriations from Congress for infrastructure investments. From fiscal year 2007 to fiscal year 2020, the Army, Navy, Air Force, and Marine Corps have collectively invested over \$20 billion in their depots.²

In 2017, we reported that poor conditions at the Navy shipyards contributed to the shipyards' inability to meet the Navy's operational needs.³ We reported in 2019 that poor conditions across the service depots were hindering their performance, although the services did not track the extent of the disruption.⁴ At that time, we recommended that DOD develop an approach for managing service depot investments that included management monitoring and regular reporting to decision

¹The term "depots" used in this report refers to 21 installations explicitly referred to as "covered depots" in title 10, United States Code, section 2476. Specifically, that law requires the military departments to invest a minimum amount in the capital budgets of their respective covered depots. This includes Army depots and arsenals, Navy shipyards and fleet readiness centers (FRCs), Air Force air logistics complexes (ALCs), and the Marine Corps' production plants. There are other military installations that are termed depots, but as they are not considered "covered depots" by the minimum investment law, we have not included them in this review.

²Adjusted for inflation using fiscal year 2020 constant dollars.

³GAO, *Naval Shipyards: Actions Needed to Improve Poor Conditions That Affect Operations*, [GAO-17-548](#) (Washington, D.C.: Sept. 12, 2017).

⁴GAO, *Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency*, [GAO-19-242](#) (Washington, D.C.: Apr. 29, 2019).

makers and Congress on progress. The department did not concur with the recommendation, stating it could not develop such an approach until the services had finalized and resourced their own depot improvement plans.

Section 359 of the National Defense Authorization Act for Fiscal Year 2020 included a provision requiring DOD to produce a comprehensive strategy for improving the depot infrastructure of the military services.⁵ It also included a provision for us to assess DOD's strategy.⁶ The objectives of this report are to: 1) describe how the condition of depot infrastructure has changed since 2017; 2) assess the extent to which the services have addressed depot infrastructure challenges; and 3) assess the extent to which the DOD depot improvement strategy included all required elements directed under the statutory mandate.

To address our objectives, we analyzed service infrastructure metrics for the 21 depots from fiscal year 2016 through fiscal year 2020. These metrics included facility condition ratings, facility restoration and modernization backlogs, and equipment age. We also reviewed DOD and service guidance; analyzed the services' depot improvement plans; and assessed DOD's depot infrastructure improvement strategy to evaluate whether it included the three elements outlined in section 359. In addition, we interviewed service depot, sustainment, and budget officials to obtain an understanding of how they manage the depot investment process; any challenges they identified in developing, managing, and implementing improvement plans; and any potential data reliability concerns. We used data from six information systems. By analyzing the data for errors and discussing system operating procedures, we determined the data from these systems to be sufficiently reliable for the purposes of summarizing trends in the selected facility, equipment, and performance metrics reported. We interviewed representatives of the 21 depots, the service materiel commands, and the Office of the Deputy Assistant Secretary of Defense for Materiel Readiness. A more detailed discussion of our scope and methodology is in appendix I.

⁵Pub. L. No. 116-92, § 359 (2019).

⁶Section 359 also included a provision for GAO to assess the services' implementation of DOD's depot improvement strategy once submitted to Congress. DOD submitted the department-wide Depot Infrastructure Strategy in November 2021. It is too soon to assess the services' implementation of DOD's strategy. However, since DOD's strategy largely relies on the individual service depot improvement plans, we reviewed the implementation of the services' plans as an alternative.

We conducted this performance audit from February 2021 to May 2022 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 audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

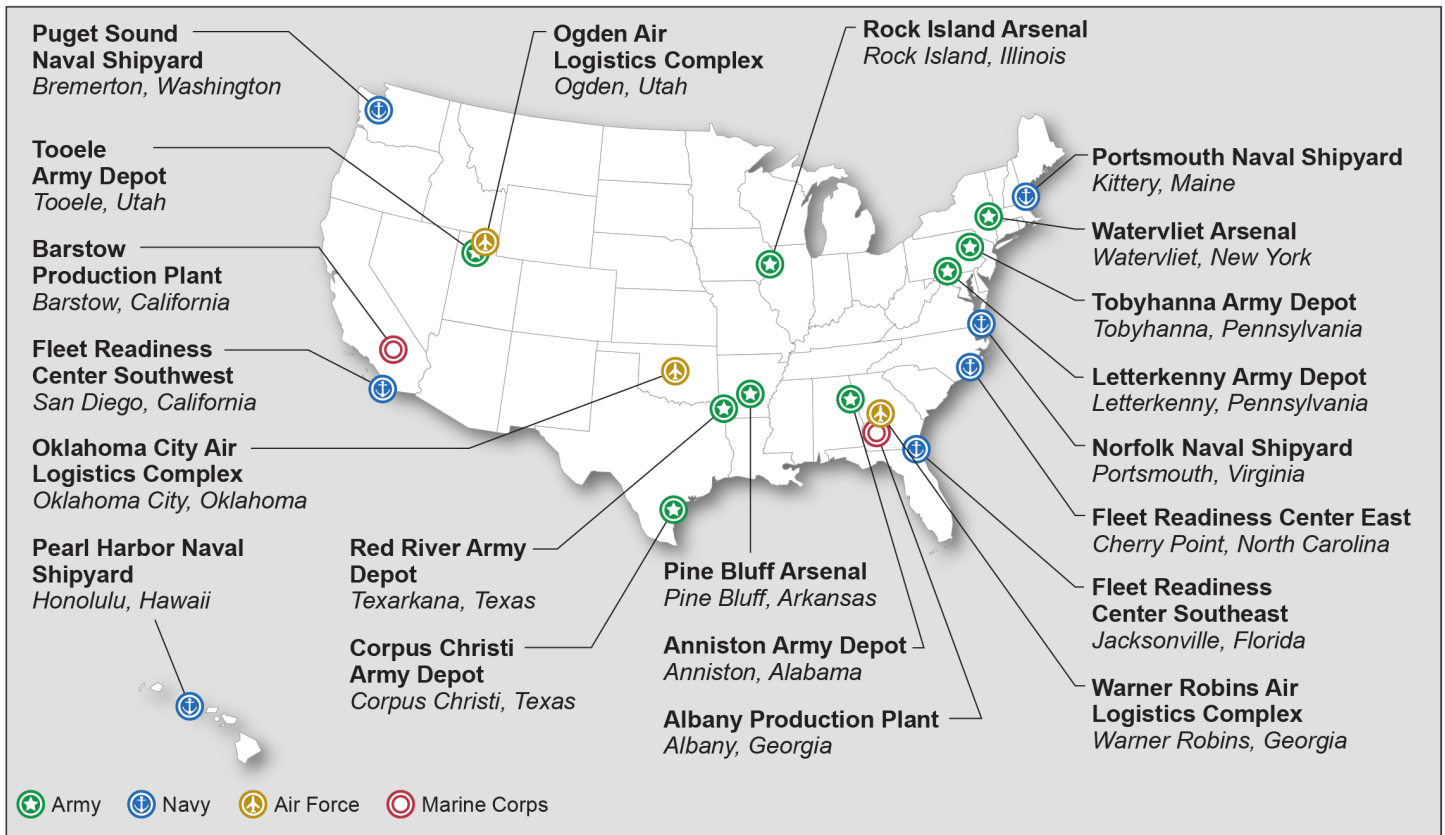
Background

Depots and Related Organizations

Depots are government-owned, government-operated industrial installations that maintain, overhaul, and repair a multitude of complex military weapons systems and equipment for the Department of Defense. These depots are essential to maintaining readiness for DOD, and they have a key role in sustaining weapon systems and equipment in both peacetime and during mobilization, contingency, or other emergency. There are 21 depots operated by the military services that are subject to a minimum investment requirement.⁷ Four are Naval Shipyards, three are Navy Fleet Readiness Centers, two are Marine Corps Production Plants, three are Air Force Air Logistics Complexes, and nine are Army Depots and Arsenals. Figure 1 shows the location of these 21 depots across the United States.

⁷Section 2476 of title 10, United States Code states that each fiscal year, the Secretary of a military department shall invest in the capital budgets of the covered depots of that military department a total amount equal to not less than 6 percent of the average total combined maintenance, repair, and overhaul workload funded at all the depots of that military department for the preceding 3 fiscal years. This is known as the “6-percent rule”. In this report, “military departments” includes the departments of the Army, Navy (which includes the Marine Corps), and Air Force (which includes Space Force). Current depot investment minimums apply to the military departments. For the purposes of this report the term military services refers to the Army, Navy, Air Force, and Marine Corps. The Space Force does not operate a military depot.

Figure 1: Military Service Covered Depots, as Identified in 10 U.S.C. §2476



Source: GAO analysis of Department of Defense documents. | GAO-22-105009

Note: Covered depots are those requiring a minimum level of annual investment from their respective military departments.

The depots are part of a larger, DOD-wide logistics enterprise that involves a number of different organizations. Key organizations include:

The Office of the Under Secretary of Defense for Acquisition and Sustainment advises the Secretary of Defense for all matters relating to acquisition and sustainment in DOD. This includes installation maintenance, management and resilience, and materiel readiness, among other areas. The Under Secretary’s responsibilities also include establishing policies to ensure robust, secure, and resilient national industrial base capabilities.

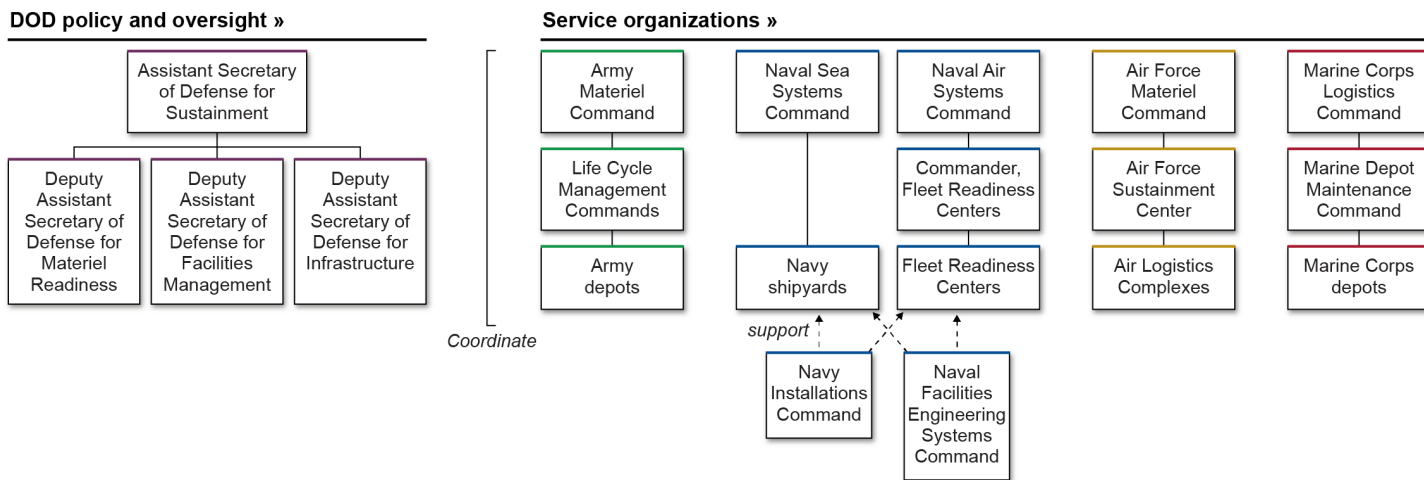
The Assistant Secretary of Defense for Sustainment serves as the principal assistant and advisor to the Under Secretary of Defense for

Acquisition and Sustainment on material readiness. Among other responsibilities, the Assistant Secretary prescribes policies and procedures on maintenance, materiel readiness and sustainment support.

The Office of the Deputy Assistant Secretary of Defense for Materiel Readiness advises the Assistant Secretary of Defense for Sustainment in the oversight of DOD’s maintenance program. The Assistant Secretary is also responsible for developing policies and procedures to ensure the department meets statutory requirements to provide core depot-level maintenance support of major weapon systems, military equipment, and commodities.

Service logistics or materiel command components are responsible for providing logistics and maintenance support within the service, as well as day-to-day management and oversight of the depots (see fig. 2).

Figure 2: Military Depots and Supporting Organizations



Source: GAO analysis of Department of Defense (DOD) and service documentation. | GAO-22-105009

Additional details on the services’ responsibilities appear below.

- **Army.** Army Materiel Command is located at Redstone Arsenal, Alabama. It develops and delivers materiel support to maintain combat equipment and is the overarching command managing Life Cycle Management Commands and Installation Management Command for the Army.

-
- **Navy.** Naval Sea Systems Command is located in the Washington Navy Yard, District of Columbia. It is responsible for the operation of the four naval shipyards. Naval Sea Systems Command also has technical authority for ship maintenance operations. Meanwhile, Naval Air Systems Command provides full life-cycle support of naval aviation, weapons, and systems. It is responsible for operation of the three Fleet Readiness Centers. Naval Facilities Engineering Systems Command serves as the military construction execution agent for the Department of the Navy and the technical authority for construction and facility engineering programs.
 - **Air Force.** The Air Force Sustainment Center is located at Tinker Air Force Base, Oklahoma. It is responsible for the sustainment of air and space weapon system readiness through depot maintenance, supply chain management, and installation support. The center directs the operations of the three Air Logistics Complexes.
 - **Marine Corps.** Logistics Command is located in Albany, Georgia. It directs Marine Depot Maintenance Command in repairing, rebuilding, and modifying all ground combat equipment and combat support and combat service support equipment.

Depot Maintenance Process and the Effects of Maintenance Delays

The military services perform depot maintenance on vehicles, ships, aircraft, weapon systems, or other equipment. This maintenance involves complex structural, mechanical, and electrical repairs, and can include major repair, overhaul, or complete rebuilding of systems needed for all weapons systems to reach their expected service lives. Depot-level maintenance requires specialized facilities, tooling, and support equipment; personnel with higher technical skill; and processes beyond the scope or capacity of the intermediate maintenance activities or unit level maintenance. Depot maintenance across the services generally involves three primary steps: planning, disassembly, and rebuilding. During each step, the depots rely on their facilities and equipment to ensure that they can conduct the large number of activities needed to repair DOD's complex weapon systems and return them to the warfighter. Repair duration for each system varies according to the complexity of the repair and the type of use the system has experienced since the last overhaul. Because repair times vary, demands on depot facilities and equipment also vary.

Delays in depot maintenance can directly affect the services' readiness by hindering their ability to conduct training and operations using these weapon systems. For example, we reported since 2018 that:

-
- Maintenance overruns on aircraft carrier repairs from fiscal year 2014 through 2020 resulted in 1,179 days of maintenance delay—days that ships were not available for operations. This was the equivalent of losing the use of nearly 0.5 aircraft carriers each year.⁸ During the same timeframe, maintenance overruns on submarine repairs resulted in a total of 9,568 days of maintenance delay. This was the equivalent of losing the use of almost four submarines each year.
 - The Army's depots, which conduct reset and recapitalization to extend the life of the Patriot surface-to-air missile system, often returned equipment to Patriot units late, which affected unit training. Specifically, we found that of the seven Patriot battalions that underwent reset from fiscal years 2014 through 2017, one received its equipment within 180 days in accordance with Army policy.⁹
 - Depot maintenance delays, among other challenges, limit DOD's ability to keep aviation units ready by reducing the number of aircraft that are available for conducting operations.¹⁰
 - The naval shipyards cannot support 68 of the 218 maintenance periods—almost a third—that aircraft carriers and submarines will require through 2040, because they lacked sufficient dry dock capacity.¹¹
 - Limited depot repair capacity on the Marine Corps' light attack helicopters was a challenge to rebuilding its readiness.¹²
 - Capacity challenges at depots will continue to contribute to the number and percentage of non-mission capable F-35 aircraft. Specifically, as of August 2020, average repair times were 131 days,

⁸GAO, *Navy and Marine Corps: Services Continue Efforts to Rebuild Readiness, but Recovery Will Take Years and Sustained Management Attention*, [GAO-21-225T](#) (Washington, D.C.: Dec. 2, 2020). We reported that this does not mean that the Navy is missing presence in a given area because the Navy has other options to mitigate maintenance delays—such as extending another ship's deployment.

⁹GAO, *Military Readiness: Analysis of Maintenance Delays Needed to Improve Availability of Patriot Equipment for Training*, [GAO-18-447](#) (Washington, D.C.: June 20, 2018).

¹⁰GAO, *Weapon System Sustainment: Aircraft Mission Capable Rates Generally Did Not Meet Goals and Cost of Sustaining Selected Weapon Systems Varied Widely*, [GAO-21-101SP](#) (Washington, D.C.: November 2020).

¹¹GAO, *Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations*, [GAO-20-64](#) (Washington, D.C.: Nov. 25, 2019).

¹²GAO, *Military Readiness: Department of Defense Domain Readiness Varied from Fiscal Year 2017 through Fiscal Year 2019*, [GAO-21-279](#) (Washington, D.C.: Apr. 7, 2021).

above the program's 60-90 day program objective. We reported that, according to program officials, part repair times lagged because the depots did not yet have the capacity to meet program repair time goals.¹³

Depot maintenance delays also cause the services to incur costs for which they receive no capability. For example, we reported in November 2018 that the Navy was incurring significant costs associated with maintenance delays on attack submarines.¹⁴ We estimated that from fiscal years 2008 to 2018, the Navy had spent more than \$1.5 billion—in fiscal year 2018 constant dollars—to crew, maintain, and support attack submarines that provided no operational capability. This was a result of the submarines sitting idle and being unable to conduct normal operations while waiting to enter the shipyards, and from delays in completing their maintenance at the shipyard. These idle times have continued to persist. Our analysis in August 2020 showed that submarines that began maintenance from 2015 through 2019 incurred nearly 2,800 days of idle time.¹⁵

Facilities and Equipment Are Essential for Depot Maintenance

Our previous work has identified multiple factors that can affect depot performance. These factors included the size and skill of the depot workforce, the condition of weapon systems upon arrival at the depot, accuracy of maintenance planning, the availability of spare parts, and the condition of the depot's facilities and equipment.

Depots rely on working and efficient facilities and equipment to complete repairs and overhauls. DOD maintenance officials have stated that any underlying conditions – such as leaks, lack of capacity, inefficient layouts, or breakdowns – require workarounds. We have previously noted that workarounds are additional efforts to complete the task that can delay maintenance, negatively affect productivity, and increase costs of depot maintenance.








¹³GAO, *F-35 Sustainment: DOD Needs to Cut Billions in Estimated Costs to Achieve Affordability*, [GAO-21-439](#) (Washington, D.C.: July 7, 2021).

¹⁴GAO, *Navy Readiness: Actions Needed to Address Costly Maintenance Delays Facing the Attack Submarine Fleet*, [GAO-19-229](#) (Washington, D.C.: Nov. 19, 2018).

¹⁵GAO, *Navy Shipyards: Actions Needed to Address the Main Factors Causing Maintenance Delays for Aircraft Carriers and Submarines*, [GAO-20-588](#) (Washington, D.C.: Aug. 20, 2020).

DOD defines a facility as a building, structure, or linear structure (such as a fence or railway).¹⁶ Equipment includes all nonexpendable items needed to outfit or equip an organization. For the depots, that includes items used by depot personnel to conduct depot-level maintenance, such as tools, test equipment, machining equipment, and test stands. Functioning depot facilities and equipment are essential to a number of depot processes, as shown in figure 3.

Figure 3: Examples of Depot Facilities and Equipment Supporting Maintenance Activity

		
<p>A drydock allows maintainers to work on the hull of a submarine.</p>	<p>A specialized paint facility allows for temperature and humidity control during the painting process.</p>	<p>A facility can support the power needs of specialized tools.</p>
<p>Facilities  Equipment</p>		
		
<p>X-ray machines can allow non-destructive tests of weapon systems to determine what kinds of repairs are needed.</p>	<p>Industrial equipment allows maintainers to fabricate parts or perform metalworking.</p>	<p>Test stands allow maintainers to conduct repairs more safely and effectively.</p>

Source: GAO site visits and interviews with service officials; U.S. Navy and Defense Visual Information Distribution Service (photos). | GAO-22-105009

¹⁶DOD Instruction 4165.14, *Real Property Inventory (RPI) and Forecasting* (Jan. 17, 2014) (incorporating Change 2, Aug. 31, 2018).

These facilities and equipment often require significant investment to plan, construct, install, repair, and modernize. For example, new DOD depot facilities can cost millions of dollars and are generally expected to last decades, though facilities can, through restoration and modernization efforts, operate significantly longer. Equipment generally lasts for a shorter length of time. However, equipment used to repair weapon systems can be expected to last 10 years or more and can be costly. Because these facility and equipment investments can take years to plan and require significant resources, a depot's decision to invest often takes place well in advance of the specific need for the facility or equipment. Other factors that the depots may consider when planning investments include topography, flood plains, environmental and historic preservation needs, roads and parking, utilities, and the effect on depot operations in progress. This makes careful planning and management of these investments important for ensuring that critical capabilities are available when needed.

In fiscal year 2007, a statute was enacted that required the military departments to provide a minimum level of depot investment annually.¹⁷ According to the law, each fiscal year, the Secretary of a military department shall invest in the capital budgets of the covered depots of that military department a total amount equal to not less than 6 percent of the average total combined maintenance, repair, and overhaul workload funded at all the depots of that military department for the preceding 3 fiscal years. This is known as the 6-percent rule.

Recognizing that existing depot facilities may not be configured to effectively support the services' readiness needs, the Senate Armed Services Committee directed the Secretaries of the Army, Navy, and Air Force to submit engineering master plans. The goal of these plans was to optimize facilities and capital equipment, as well as provide an investment strategy addressing the facilities, capital equipment and infrastructure requirements of the service depots.¹⁸ Optimal placement of facilities is important because depots are large, city-like operations, and travel times between locations ultimately affects maintenance durations for equipment. Having an investment strategy to guide planning and execution of multi-million dollar construction projects can help with

¹⁷Pub. L. No. 109-364, § 332(a) (2006), codified at 10 U.S.C. § 2476.

¹⁸S. Rep. No. 115-262, at 237-38 (2018). Throughout this report, we refer to these plans as "optimization plans." Capital equipment refers to any equipment acquired at \$250,000 or more.

addressing the scope and timing of projects, along with identifying available funding options.

Depot Infrastructure Conditions Have Generally Not Improved since 2016

The condition of infrastructure—facilities and equipment—at the military depots generally remains in the fair to poor range and has not improved since 2016. Of three measures of infrastructure health—condition of facilities, backlog of facility projects, and age of equipment—one has shown signs of improvement for the military services from fiscal year 2016 through fiscal year 2020.¹⁹ Data from the four services on facility condition shows improved facility condition ratings. However, we were unable to determine whether the change reflects facility improvements or more accurate assessments, since the services modified their assessment methodology during this time. The other two measures have generally worsened over the same time period. The cost to address the backlog of facility projects at the depots increased by nearly 50 percent—\$3.18 billion—since fiscal year 2017. In addition, most capital equipment at the depots remains past its expected service life.

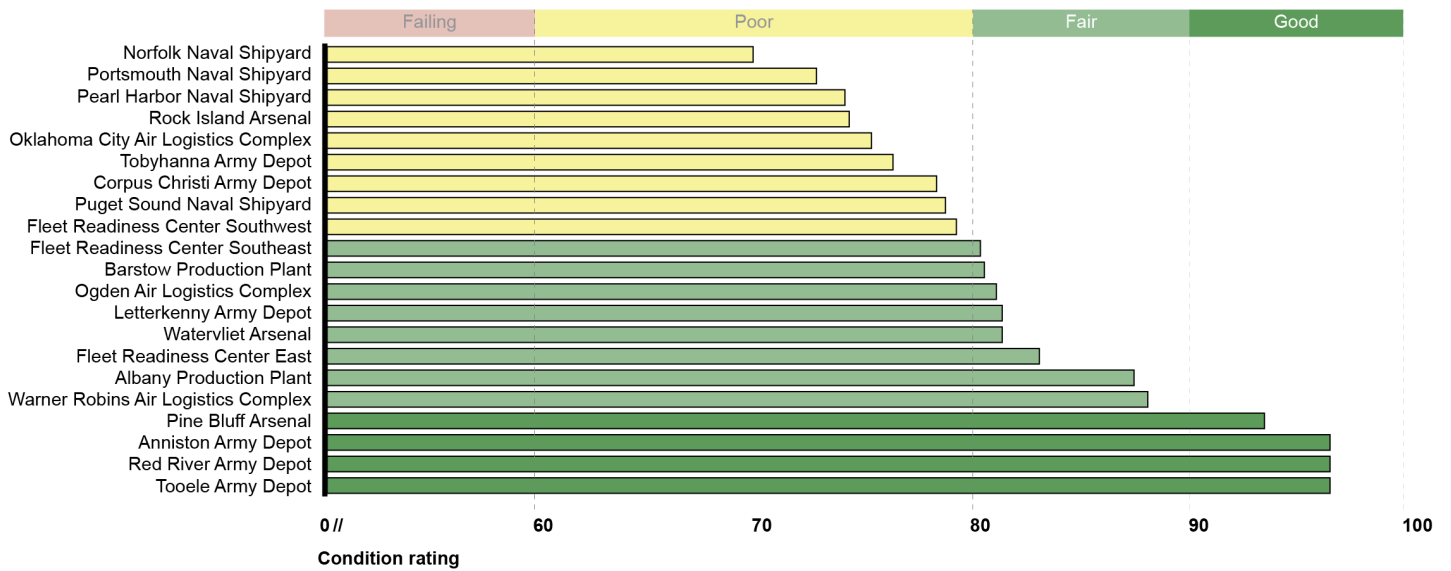
Depot Facility Condition Ratings Show Some Improvement since Fiscal Year 2016

Data from the four services shows some increases in facility condition ratings since fiscal year 2016. As of fiscal year 2020, service data categorized four depots in “good” condition, eight in “fair” condition, and nine in “poor” condition (see fig. 4). A facility’s condition rating represents the service’s assessment of the physical condition of the facility, with a rating from 0 (which denotes that the facility’s physical condition is failing) to 100 (which denotes that the facility is in good physical condition).²⁰

¹⁹We selected these three metrics because they have been used by all the services for many years. The services also use other metrics for infrastructure health, such as facility age and cost of facility replacement. We reviewed facility condition data from 2016 to 2020, and restoration and modernization project backlogs and equipment age from 2017 to 2020.

²⁰According to DOD documentation, facilities with a rating between 100 and 90 are “good”, those between 80 and 89 are considered “fair”, those between 60 and 79 are considered “poor,” and those with a rating below 60 are considered “failing”.

Figure 4: Average Weighted Condition Rating at Military Service Depots, Fiscal Year 2020

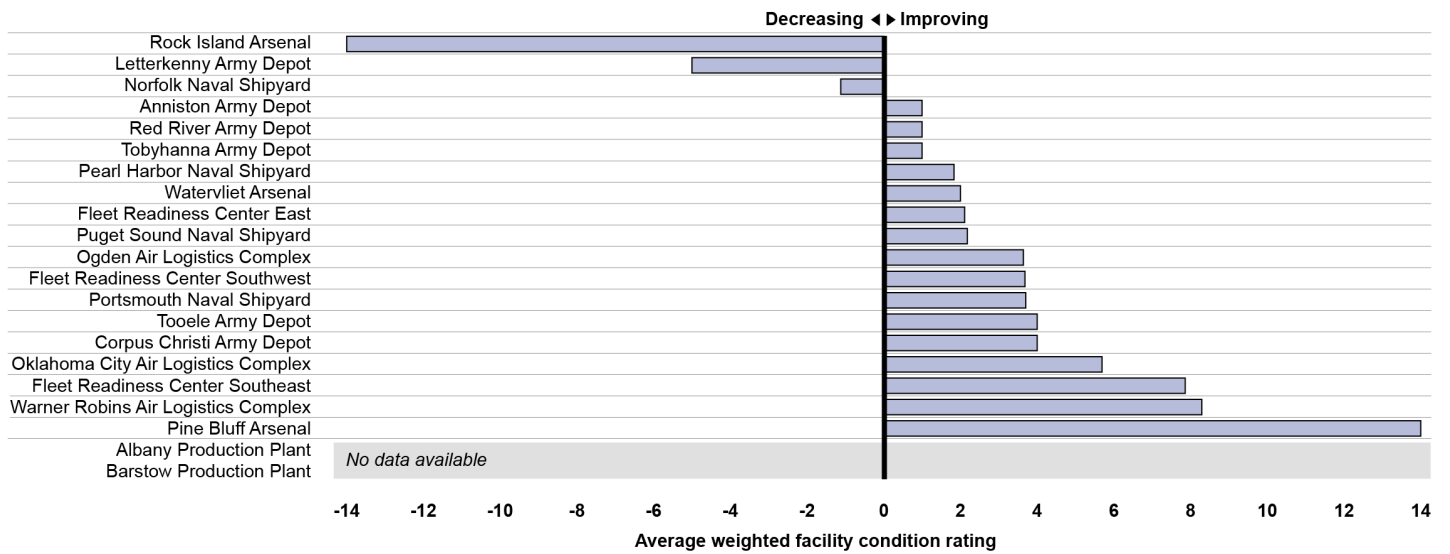


Source: GAO analysis of service facility condition data. | GAO-22-105009

Note: For this analysis, we weighted the condition ratings by the replacement cost of the facility, also known as the plant replacement value. This is to ensure that costlier facilities are weighted more heavily in the condition ratings, so that, for example, an expensive shop plant is weighted as more important than an inexpensive guard shack. This is the same method used by the Navy to calculate its condition averages. Barstow Production Plant and Albany Production Plant reported fiscal year 2021 data. Air Force officials said that they use only three categories “good”, “fair”, and “poor”. For the purposes of comparison, we are presenting this data with the categories used by most of the services.

The increasing scores were driven primarily by improvement at Air Force and Navy depots (see fig. 5).

Figure 5: Change in Average Weighted Facility Condition Rating at Military Service Depots, Fiscal Years 2016–2020

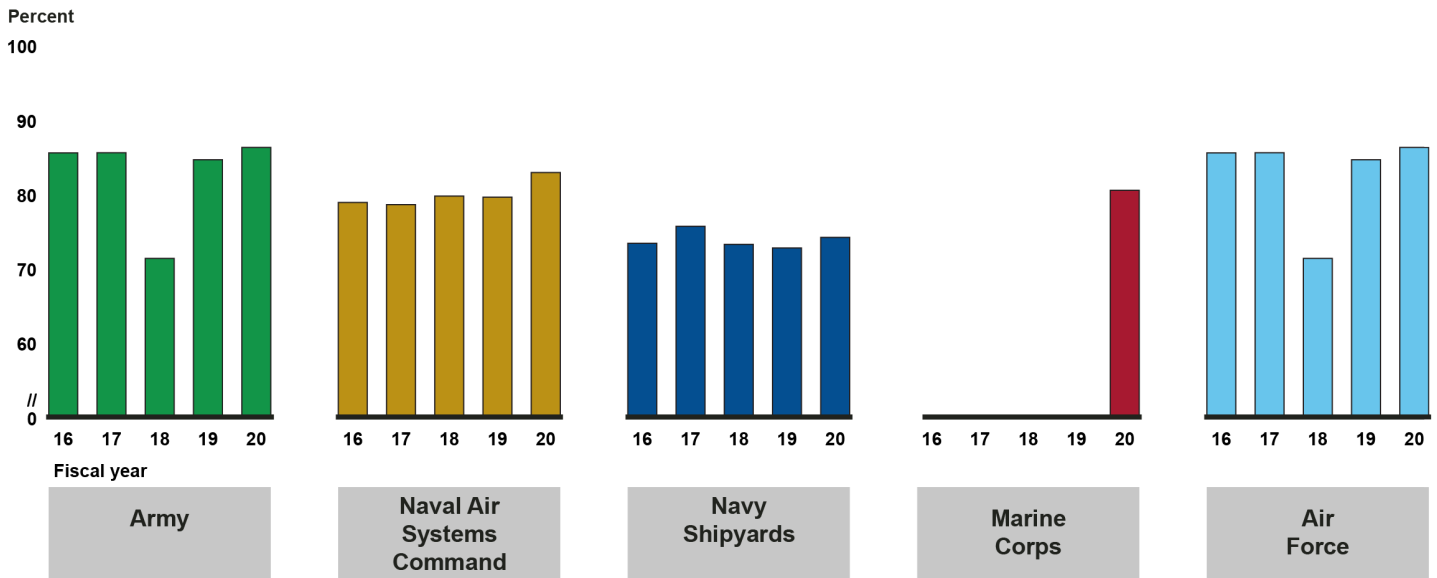


Source: GAO analysis of service facility condition data. | GAO-22-105009

Ratings for mission critical facilities showed some improvements from fiscal year 2016 through fiscal year 2020.²¹ According to service data, average facility condition ratings for mission-critical depot facilities generally increased during this time (see fig. 6).

²¹Mission critical facilities are those designated essential for completing the depot's mission, such as production facilities or hangars.

Figure 6: Military Service Average Weighted Facility Rating for Mission-Critical Depot Facilities, Fiscal Years 2016 through 2020



Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: Air Force, Navy and Marine Corps define all facilities with a mission dependency index (MDI) greater than or equal to 85 as mission-critical facilities. Army uses a tier rating system, with ratings equal to T1 as mission-critical facilities. Average facility condition ratings for mission-critical facilities were not available for Corpus Christi Army Depot. The Marine Corps did not provide data for fiscal years 2016 through 2019; Marine Corps personnel told us their system does not store data from previous years.

These increases in reported facility conditions coincided with the services transitioning to a new data collection and inspection system for facilities—the Sustainment Management System. The Sustainment Management System is intended to replace and standardize the different methods used across DOD to assess facility condition.²² In addition, the system used the results of on-site visual condition assessments to forecast when systems such as roofs and plumbing will need major repairs and replacement. Service officials describe the new process as more detailed than the previous assessments, but also more time- and personnel-intensive to

²²See GAO, *Defense Infrastructure: DOD Should Better Manage Risks Posed by Deferred Facility Maintenance*, [GAO-22-104481](#) (Washington, D.C.: Jan. 31, 2022). DOD currently uses a Facilities Sustainment Model to estimate its annual facility sustainment funding requirements, relying on cost factors instead of actual condition. As of October 2021, the Sustainment Management System implementation was 3 years behind schedule and, according to officials, completion is not expected until 2025 at the earliest. Once the transition to the Sustainment Management System is complete, DOD intends to use the system for determining sustaining funding requirements in the future.

conduct. While we were unable to determine how much of this improvement is related to the implementation of the system versus actual facility improvement, DOD’s transition to a more accurate method of facility condition data collection will likely provide more detailed data in the future.

Backlogs of Facility Projects Have Increased

The depots’ backlog of restoration and modernization projects has grown by nearly 50 percent since fiscal year 2017 (see table 1). The depots use restoration and modernization projects to restore a facility to workable condition, or bring it up to modern standards. These projects can be planned maintenance activities, such as a roof replacement and repairing heating and cooling systems. Backlogs of restoration and modernization projects reflect the cost for the service to address the accumulation of deferred facility repairs.

Table 1: Backlog of Restoration and Modernization Projects at the Service Depots (dollars in millions)

Military service	Fiscal year 2017	Fiscal year 2020	Increase	Increase (percentage)
Army ^a	195	1,322	1,127	578
Navy shipyards	5,401	7,063	1,662	31
Navy fleet readiness centers ^b	375	744	369	99
Marine Corps ^c	14	16	2	16
Air Force	553	575	22	4
Total	6,538	9,720	3,182	49

Source: GAO analysis of military service information. | GAO-22-105009

Note: Each department defines backlogged restoration and modernization projects differently. The Army’s backlog reflects the near-term projects to address immediate repairs to address life, health and safety issues and mission critical repairs of failing infrastructure until development of the Army’s long-term capital investment strategy. The Navy categorizes these projects as efforts that have been identified but not yet funded. The Air Force backlog is calculated as the difference between programmed requirements and funded requirements.

^aRed River Army Depot provided a backlog amount of \$38.3 million for fiscal year 2020, but did not provide any amount for fiscal year 2017. Rock Island Arsenal did not provide restoration and modernization backlogs for 2017 or 2020.

^bNavy Fleet Readiness Centers provided fiscal year 2021 data.

^cBarstow Production Plant had a backlog amount of \$2 million in fiscal year 2017, but did not provide a backlog of projects for fiscal year 2020.

The service numbers are internally comparable, but they cannot be compared across services because the services use different methods for measuring their backlog of restoration and modernization projects. For example, the Air Force includes those projects that have been approved, but not funded. Marine Corps officials said the Marine Corps counts all

restoration projects that they are aware will be needed, even if they have not yet been approved. The Navy categorizes these projects as efforts that have been identified but not funded.

Officials from the four military services also told us that the services consistently prioritize other programs—such as weapon system acquisitions—over facility sustainment. For example, Navy officials stated that aircraft, submarine, and ship acquisition initiatives consistently receive priority over facility sustainment because of their perceived greater importance in performing the Navy’s assigned missions. Service depot personnel also attributed the increases in the backlog to reduced sustainment, restoration, and modernization funding.²³

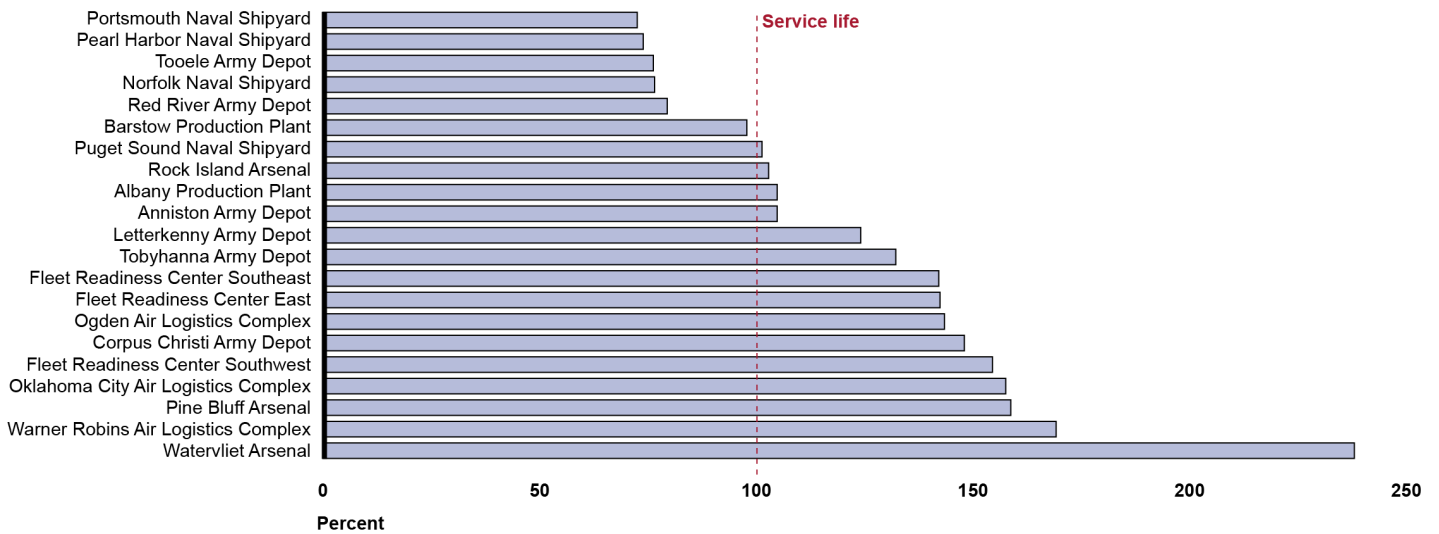
Depot Capital Equipment Remains in Use Past Expected Service Life

Equipment generally exceeded its expected useful life at 15 of the 21 military depots in our review. Six depots had equipment that is, on average, within its useful life (see fig. 7). Additionally, depot equipment age shows no significant improvement since we last examined this issue in fiscal year 2017. Each piece of capital equipment has an expected service life, which indicates the number of years that the manufacturer or depot expects the equipment to operate. Depots can operate equipment past its expected service life, but these items can pose an increased risk for maintenance delays or higher maintenance costs, affecting the depots’ ability to conduct work. As we have previously reported, aging equipment can present a number of challenges, such as more frequent breakdowns, less effective or efficient operation, and safety hazards.²⁴

²³This is consistent with our prior findings about DOD facility sustainment funding. Our prior analysis determined that the fiscal year 2020 deferred maintenance total for facilities across the six military components was \$130 billion and represented more than 1,000 percent of the components’ aggregated fiscal year 2020 budget request for facility sustainment (\$11.1 billion). This was equivalent to almost 12 years of facility sustainment funding at fiscal year 2020 levels. See [GAO-22-104481](#).

²⁴[GAO-17-548](#).

Figure 7: Depot Capital Equipment Age as a Percentage of Expected Service Life, Fiscal Year 2020



Source: GAO analysis of service equipment age data. | GAO-22-105009

Furthermore, when taken as a whole, more than half of all the capital equipment used at the 21 service depots is beyond its expected service life (see table 2).

Table 2: Average Age of Depot Capital Equipment by Service, as of Fiscal Year 2020

	Average age of capital equipment (in years)	Capital equipment beyond expected service life (percentage)
Army	15.8	54
Air Force ^a	16.6	65
Navy shipyards	23.6	57
Navy fleet readiness centers	22.7	60
Marine Corps	9.4	42

Source: GAO analysis of military service information. | GAO-22-105009

^aAir Force officials told us that they conducted their own equipment age analysis after we had requested their equipment data. They told us that the results of this analysis showed the same average age, but that the percentage of equipment beyond its expected service life was 38 percent. However, we were unable to conduct an assessment on the reliability of the Air Force analysis. As a result, the Air Force data included in this analysis is based on the financial depreciation of the equipment.

Services maintain data on equipment age, which is one indicator of its condition. DOD officials have noted that condition assessments, usage, and the criticality of the item to the maintenance process are additional

indicators that would be helpful in assessing the need for items to be replaced.²⁵ According to Sustainment Management System guidance, assessments of equipment items can be a time consuming and laborious process and the services have not developed alternate means to measure equipment age.²⁶

Some service officials noted that using equipment beyond its expected service life could reflect that the depots are getting the most use out of existing equipment before buying new equipment. Also, officials noted that depots can sometimes restore capital equipment for less cost than buying new equipment, thereby making the age past its service life an imperfect indicator of equipment condition. However, it can also suggest that the equipment remains in use because the service has had to prioritize other missions and been unable to replace specialized equipment. For example, according to Navy officials, one unique piece of equipment—used to create submarine hatches—is over 70 years old, but is used only a handful of times a year. This makes it difficult to prioritize over other equipment needs, even though officials have told us that it could take years to replace if it ever fails.

Services Address Depot Infrastructure Challenges through Investment and Planning

The military services address depot infrastructure challenges through investments in facilities and equipment, as well as by developing long-term improvement plans. Since fiscal year 2007, the military departments have regularly met or exceeded statutory minimum infrastructure investment requirements.²⁷ However, the statute specifies calculating minimum investment by military department, and some depots have consistently received investment below the 6-percent level over the same period. The military services have also developed plans to guide future infrastructure investment, which they are in the process of updating. According to these plans, the services plan to spend significantly more on

²⁵See, for example, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) and Office of the Under Secretary of Defense (Comptroller), *Military Equipment Useful Life Study–Phase II* (May 30, 2008).

²⁶U.S. Army Corps of Engineers, *Army BUILDERTM SMS Inventory and Assessment Guide* (June 1, 2019).

²⁷10 U.S.C. § 2476. In this report, military departments includes the departments of the Army, Navy (which includes the Marine Corps), and Air Force (which includes Space Force). Current depot investment minimums apply to the military departments. For the purposes of this report the term military services refers to the Army, Navy, Air Force, and Marine Corps. The Space Force does not operate a military depot.

depot infrastructure over the next few years than they have in recent years.

The Military Departments Have Met Minimum Infrastructure Investment Requirements

The military departments have invested about \$20 billion in the 21 depots from fiscal year 2007 through fiscal year 2020.²⁸ In fiscal year 2007, a law was enacted requiring each military department to invest in the capital budgets of its depots no less than 6 percent of the average total dollar value of the combined maintenance, repair, and overhaul workload of its depots for the preceding 3 fiscal years.²⁹ The capital budget of a depot includes funds to modernize or improve the efficiency of depot facilities, equipment, work environment, or processes in direct support of depot operations. Military departments have met the statutory minimum investment laid out in section 2476 of title 10, United States Code (section 2476), nearly every year since fiscal year 2007 (see fig. 8).

Figure 8: Military Departments' Success Meeting Required Depot Improvements Investments, per Section 2476

Fiscal year	Army	Air Force	Navy
2007	✓	✓	✓
2008	✓	✓	✓
2009	✓	✓	✓
2010	✓	✓	✓
2011	✗	✓	✓
2012	✓	✓	✓
2013	✗	✓	✓
2014	✓	✓	✓
2015	✓	✓	✓
2016	✓	✓	✓
2017	✓	✓	✓
2018	✓	✓	✓
2019	✓	✓	✓
2020	✓	✓	✓

✓ Met
✗ Not met

Source: GAO analysis of Department of Defense information. | GAO-22-105009

Note: Section 2476 requires the secretary of each military department to invest in the capital budgets of the military department a total amount equal to not less than 6 percent of the average total

²⁸Adjusted for inflation using fiscal year 2020 constant dollars.

²⁹Pub. L. No. 109-364, § 332, codified at 10 U.S.C. § 2476.

combined maintenance, repair, and overhaul workload funded at the covered depots for the preceding 3 fiscal years. The law allowed a 2-year phase-in for the Departments of the Army and the Navy to reach the required 6-percent investment level to reach full implementation in 2009. The term “covered depot” refers to 21 Army, Navy, Air Force, Marine Corps depots, and Army arsenals. Fiscal year 2007 was the first year that statutorily required summary reports on the level of investment made by each military department became available. The reports contain information regarding any impediments to achieving 6-percent investment; a description of benchmarks and measurement methods for investment at each depot; and an explanation and action plan if a military department falls below the 6-percent requirement. Fiscal year 2020 is the latest year these reports are available.

Calculating Investment by Military Department Leaves Some Depots under 6 Percent

The military departments regularly meet the 6-percent minimum investment, which the statute specifies is calculated across the entire department. This means that in any given year, some elements of a department—such as individual depots or the Marine Corps (which is part of the Department of the Navy)—might not receive 6 percent. Our analysis shows that 10 depots have not received investment at the 6-percent level for most of the last 10 years (fig. 9).

Figure 9: Extent to Which Individual Depot Investments Met 6 Percent of Maintenance, Repair, and Overhaul Revenue

Service	Depot	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Air Force ^a	Oklahoma City Air Logistics Complex	-	✓	-	✗	✓	✓	✓	✗	✓	✗
	Ogden Air Logistics Complex	-	✓	-	✓	✓	✓	✓	✓	✓	✓
	Warner Robins Air Logistics Complex	-	✗	-	✗	✗	✗	✗	✗	✓	✓
Naval Air Systems Command	Fleet Readiness Center East	✗	✓	✓	✗	✓	✗	✗	✓	✓	✓
	Fleet Readiness Center Southeast	✗	✗	✗	✗	✗	✓	✗	✓	✗	✓
	Fleet Readiness Center Southwest	✗	✓	✗	✗	✗	✗	✓	✗	✓	✓
Naval Sea Systems Command	Pearl Harbor Naval Shipyard	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Puget Sound Naval Shipyard	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Portsmouth Naval Shipyard	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Norfolk Naval Shipyard	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓
Marine Corps	Albany Production Plant and Barstow Production Plant ^b	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
Army	Anniston Army Depot	✗	✗	✗	✗	✓	✓	✓	✗	✗	✗
	Corpus Christi Army Depot	✗	✗	✗	✓	✓	✓	✗	✗	✗	✓
	Letterkenny Army Depot	✗	✗	✓	✗	✗	✗	✗	✓	✗	✓
	Red River Army Depot	✗	✗	✗	✗	✓	✗	✗	✓	✗	✗
	Tobyhanna Army Depot	✗	✓	✗	✓	✗	✗	✗	✗	✓	✓
	Pine Bluff Arsenal	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓
	Rock Island Arsenal	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓
	Watervliet Arsenal	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓
Tooele Army Depot ^c	-	✓	✓	✓	✓	✓	✗	✓	✓	✗	

✓ Met
✗ Not met

Source: GAO analysis of Department of Defense information. | GAO-22-105009

^aThe Air Force did not break out its investment by individual depots in fiscal years 2011 and 2013.

^bThe Marine Corps does not separate budget data by production plant.

^cTooele Army Depot was not subject to section 2476 until fiscal year 2012.

For example, the Department of the Navy as a whole met its minimum investment requirement every year from fiscal year 2007 through fiscal

year 2020. The department's reported investments include those for the Navy's four shipyards and three fleet readiness centers, and the two Marine Corps depots. When viewed independently, only the shipyards regularly met the minimum investment level. We previously reported that the shipyards accounted for 76 percent of Navy depot investment from fiscal year 2007 through fiscal year 2017.³⁰ From fiscal year 2017 through fiscal year 2020, shipyards similarly accounted for about 71 percent of Navy depot investment. While both fleet readiness centers and the Marine Corps depots have met the 6- percent investment level in recent years, the \$21 billion shipyard infrastructure optimization plan will place pressure on the department's infrastructure investments in the future. The effect on the department's ability to invest in the Marine Corps depots and fleet readiness centers is not yet known. DOD officials stated that the minimum capital investment required by section 2476 was not adequate to address DOD's individual depot infrastructure needs.

Similarly, the Departments of the Air Force and Army as a whole met their minimum investment requirements in almost every fiscal year between 2007 and fiscal year 2020.³¹ However, when viewed independently, none of the Army's nine depots invested at least 6 percent across all fiscal years. In addition, the Air Force's Warner Robbins Air Logistics Complex met the 6-percent level for the first time in fiscal year 2019.

In light of the disparity in investment funding provided to the various depots and their continuing infrastructure challenges, we discussed several potential changes to the minimum investment approach with DOD officials who identified advantages and disadvantages with each.

- **Calculating investment by Navy command.** This change would apply only to the depots in the Department of the Navy, and would require naval shipyards, aviation depots, and the Marine Corps depots to be counted as separate entities for the purposes of meeting the 6-

³⁰See GAO, *Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency*, [GAO-19-242](#) (Washington, D.C.: Apr. 29, 2019).

³¹The Department of the Air Force met the minimum requirements in all fiscal years. The Department of the Army fell short of 6 percent in fiscal years 2011 and 2013. In a previous report, Army officials said they missed the fiscal year 2011 minimum by around \$21 million due to a software project that was scheduled to execute in fiscal year 2011, but was unable to execute and moved to fiscal year 2012 instead. An Army official attributed the difference in fiscal year 2013, which was over \$68 million, to the effects of fiscal year 2013 sequestration, which generally reduced funding available to the services. See [GAO-19-242](#).

percent minimum investment requirement. This would ensure that Navy aviation and the Marine Corps regularly receive the 6-percent minimum, which has often not been the case. However, Navy officials stated that this could reduce the Navy's flexibility to fund other shipyard priorities, such as expensive dry dock projects.

- **Calculating investment by depot.** This approach would involve applying the 6-percent minimum investment to each individual depot, rather than to the military departments as a whole. In other words, each of the 21 depots would have a minimum investment amount calculated based on that depot's revenue. While this would ensure that depots do not repeatedly fall beneath the 6-percent minimum, service officials noted that this method could reduce department flexibility to fund higher priority needs at other depots. In addition, officials raised concerns that it could lead to depots receiving funding that is not required.
- **Increasing the minimum investment.** While raising the minimum investment percentage would result in additional depot investment, service officials stated that the 6-percent investment serves as a floor, not a ceiling to depot investment, and the services may choose to provide greater levels of investment under the current approach. For example, the Navy shipyards already regularly receive well over 6 percent in most years. Furthermore, the services continue to lack metrics to assist them in prioritizing their infrastructure investments to ensure they are targeted to provide the greatest benefit.³²

The 6-percent minimum investment level does not necessarily prevent further deterioration at the depots. For example, of the four depots with the largest decrease in facility condition between fiscal years 2016 and 2020, two depots—Watervliet and Norfolk—received the 6-percent minimum investment nearly every year. Similarly, the backlog of restoration and modernization projects increased at nearly every depot, regardless of whether those depots received the 6-percent minimum. In part, this is because investment funds are separate from sustainment funds, which are used for the regular upkeep of facilities. However, the two elements are related, as a facility that does not receive sustainment will eventually need restoration, modernization, or replacement to continue operating. In addition, having a predictable level of investment

³²We have previously made recommendations that the services develop metrics that allow them to tie maintenance delays to facility and equipment problems, which would help with identifying investment priorities. The services concurred with these recommendations, and have in some cases begun developing these metrics. However, except for the Navy aviation depots, the metrics have not yet been implemented. See [GAO-19-242](#).

makes it easier for depots to plan improvement projects over several years, according to depot officials.

Military service and DOD officials stated that keeping investment calculations at the department level would provide the most flexibility for the department. While we agree that this would allow for the most flexibility, it is not clear that the services have been using their existing flexibility as intended. For example, in the last decade, 10 of the 21 depots received less than 6-percent investment for most years. The Marine Corps depots didn't receive 6-percent investment until 11 years after the law was enacted. Investment below the 6-percent level contributed in part to the depots' capital equipment age exceeding its service life, increasing backlogs of facility projects. Also, only four of 21 depots rated their facility conditions as "good". Further, OMB guidance requires agencies to establish a disciplined capital programming process that addresses project prioritization between new assets and maintenance of existing assets.³³ This process should provide agency management with accurate information on acquisition and life-cycle costs, schedules, and performance of current and proposed capital assets.

While flexibility is important and critical requirements are not spread equally across the depots, the 6-percent requirement was established to provide a floor beneath which the depots would not fall. Despite this, the condition of several infrastructure metrics has continued to decline. Furthermore, the services' depot budget submissions do not include information on the levels of investment needed to prevent deterioration. Identifying the minimum level of annual investment that would prevent further deterioration at the depots—such as facility condition, backlog of restoration and modernization projects, and equipment age—could help the services assess the implications of potential resource trade-offs when developing annual budget requests for investments for the depots. In addition, it would provide Congress with information to help determine if the services are prioritizing the depots at a level commensurate with their effect on readiness.

³³OMB, *Capital Programming Guide v 3.1: Planning, Budgeting, and Acquisition of Capital Assets* (August 2021), (supplement to OMB Circular A-11, *Preparing, Submitting, and Executing the Budget* (August 2021)).

Services Created Preliminary Long-Term Improvement Plans to Address Depot Challenges

In response to congressional direction, each of the services created preliminary plans for improving conditions at their depots. In 2017, the Department of the Navy was directed to develop a depot improvement plan for shipyards.³⁴ In February 2018, NAVSEA published the Shipyard Infrastructure Optimization Plan (SIOP). Additionally, Senate Report 115-262 directed all military services to develop depot improvement plans similar to the SIOP that would reduce their maintenance backlog and lead to higher readiness rates.³⁵ In response, military services developed the depot improvement plans described in table 3.

Table 3: Goals of the Military Service Depot Improvement Plans

Department	Service plan name	Plan goals
Department of the Army	Master Plan for the Army's Organic Industrial Base Infrastructure July 2019	<ul style="list-style-type: none"> Mitigate risks to operational continuity Improve manufacturing efficiency Increase cost reductions and cost avoidance Improve product quality Improve safety deficiencies Increase energy conservation
Department of the Air Force	Master Plan for Organic Industrial Base Infrastructure February 2019	<ul style="list-style-type: none"> Provide capacity to support readiness levels for legacy and next-generation weapon systems Provide flexibility to support contingency operations Provide state-of-the-art infrastructure that enables continuous productivity improvement Improve infrastructure resilience to natural disasters
Department of the Navy	Fleet Readiness Centers Infrastructure Optimization Plan Assessment for Depot-Level FRCs January 2019 [Naval Air Systems Command]	<ul style="list-style-type: none"> Construct facilities for new and existing capabilities Recapitalize existing facility infrastructure Optimize industrial plant equipment and transition advanced technology
	Shipyard Infrastructure Optimization Plan February 2018 [Naval Facilities Engineering Systems Command]	<ul style="list-style-type: none"> Recapitalize dry docks to provide capacity for 67 of the 68 maintenance periods the Navy projects it will be unable to perform over the next 20 years Optimize facility layout to reduce length of ship availabilities Modernize capital equipment Improve facility condition
	United States Senate Report on the Readiness of the Marine Corps Organic Industrial Base July 2019	<ul style="list-style-type: none"> Restore facilities in poor condition Renovate facilities to improve functionality Consolidate less flexible facilities to alleviate process constraints Construct new flexible and modern facilities

Source: GAO analysis of military service depot improvement plans. | GAO-22-105009

³⁴S. Rep. No. 115-130, at 7-9 (2017).

³⁵S. Rep. No. 115-262, at 237-238 (2018).

noting that they were intended to be a first step, not the final result. The services are in the process of developing more complete plans to address depot infrastructure challenges.

Army. Army officials told us that they were working on a replacement for their 2019 plan. In March 2021, Army Materiel Command began developing a modernization implementation plan for all of its 23 depots, including the nine depots subject to the 6-percent investment requirement.³⁶ Army officials describe the Army's implementation plan as a long-term strategy to consider emerging requirements for facilities, land, energy, water resiliency, equipment modernization, information technology, security, and capital requirements. According to Army officials, Army Materiel Command established a task force in September 2021 to synchronize coordination across depots and tie the modernization implementation plan to overall Army requirements rather than individual depot plans. According to Army Materiel Command officials, the preliminary investment estimate for implementing this strategy is \$16 billion over 15 years. Army officials stated that they expected to issue the implementation plan in April 2022 in time to inform investments in the 2024-2028 program objective memorandum.

Air Force. The Air Force's 2019 plan outlined a 20-year, \$26.4 billion effort intended to improve and sustain readiness. The Air Force expects to issue its updated plan in the spring of 2022 and to include a revised cost estimate. The plan identifies current readiness challenges, outlines future projected requirements, and assesses potential investment alternatives intended to balance cost, performance, risk, and readiness considerations. The plan also details four essential dimensions for investment: 1) depot equipment and technology; 2) infrastructure and industrial software; 3) facilities for overhaul and final assembly; and 4) repair/manufacturing nodes and hidden infrastructure (e.g., utilities and transportation grid). The plan states that investments in each of the four dimensions is critical to the Air Force's ability to support mission-critical functions.

The costs of the 2019 strategy span four timeframes: immediately in fiscal year 2020 (\$442 million), near-term during fiscal years 2021 and 2022 (\$3.4 billion), mid-term, from fiscal year 2023 through fiscal year 2028 (\$11.2 billion), and long-term, from fiscal year 2029 through fiscal year

³⁶The Army manages 23 depots and arsenals. Only nine of those 23 are covered under section 2476.

2038 (\$11.4 billion). As of March 2022, the Air Force is in the process of validating and refining those costs.

Navy. The Department of the Navy has depot improvement plans focused on its aviation depots, shipyards, and the Marine Corps logistics installations. The Navy is in the process of updating these plans.

- Navy aviation depots: The Fleet Readiness Center Infrastructure Optimization Plan—managed by the Naval Air Systems Command (NAVAIR)—is a 10-year strategy that outlines \$3.5 billion in investments to modernize facilities and capital equipment at the Navy’s aviation depots. These investments comprise approximately \$1.5 billion in military construction projects, an estimated \$1 billion for sustainment, restoration, and modernization of facilities, and roughly \$1 billion for equipment recapitalization. Depot personnel stated that their existing long-term facility renovation plans cannot always accommodate emerging maintenance needs. For example, NAVAIR in 2021 directed one depot to repair almost five times as many power units for F-35 Joint Strike Fighter engines as originally planned, without providing adequate notice to secure funding to construct the additional facilities necessary to conduct the maintenance.
- Naval shipyards: The SIOP is a 20-year strategy—managed by Naval Facilities Engineering Systems Command (NAVFAC)—to address challenges at the four naval shipyards by building additional dry docks, upgrading existing dry docks, and improving depot facilities and equipment. When the Navy initially developed the SIOP in 2018, it planned to spend \$21 billion over the lifecycle of the plan. This included \$4 billion in improvements to dry docks, \$14 billion in infrastructure improvement including facility layout optimization, and \$3 billion in capital equipment improvement. Since then, the costs to improve dry docks have increased and facility layout optimization plans have experienced delays and potential scope changes. As of September 2021, the Navy estimated the dry docks would cost \$4 billion more than originally planned. Including those cost increases to the original plan would result in a total cost of over \$25 billion. Navy officials told us that NAVFAC expects to complete individual shipyard plans by fiscal year 2025, at which point it will update the cost estimate and scope of the SIOP.
- Marine Corps logistics facilities: The Marine Corps 2019 Organic Industrial Base Facilities Investment Strategy is a 25-year plan that outlines \$1.9 billion in investments across all three Marine Corps logistics installations: Marine Corps Logistics Base Albany, Marine Corps Logistics Base Barstow, and Marine Corps Support Facility

Blount Island.³⁷ The strategy includes three investment categories based on the immediacy of the need, and is intended to modernize equipment and facilities across the Marine Corps' depots. As of September 2021, officials said the Marine Corps completed a short-term project at Barstow providing new combat vehicle repair facilities. The Marine Corps was revising its strategy to accommodate force design changes, and planned to issue an updated strategy by fiscal year 2024.

According to DOD officials, Congress asked the services in May 2021 to produce schedules that provide a 5-year outlook for their respective optimization plans. Officials told us these schedules were due in March 2022.

Services Plan to Invest Significantly More to Improve Depot Infrastructure

To fully implement their depot plans, the services plan to spend significantly more to improve depot infrastructure in coming years than they have over the past 5 years. Though the depot improvement plans could ultimately be more or less expensive than the preliminary cost estimates, the plans as initially developed would require significantly more investment than the services have provided in prior years.³⁸ For example, in fiscal year 2020, the services spent over \$1.8 billion investing in the 21 depots covered under section 2476. However, the services collectively plan to spend more than twice that—over \$3.6 billion—to fund the cost estimates in the first year of their depot investment plans.

Service leadership have expressed support for the depot improvement plans. For example, in October 2021 senior officials from the Office of the Assistant Secretary of Defense for Sustainment and all three military departments testified during a House Armed Services Committee Readiness Subcommittee hearing to discuss these depot modernization and optimization plans.³⁹ The Acting Assistant Secretary of Defense for Sustainment stated that years of underinvestment have led to a significant degradation in the organic industrial base's infrastructure, and added that ongoing efforts to revitalize the organic industrial base infrastructure and modernize equipment will improve depot infrastructure

³⁷Of the three Marine Corps depots, two of them—logistics base Albany and logistics base Barstow—are subject to the 6 percent investment requirement in section 2476.

³⁸Depot investment is defined as funds spent to modernize or improve the efficiency of depot facilities, equipment, work environment, or processes in direct support of depot operations.

³⁹*Depot Modernization and Optimization; Hearing before the House of Representatives Committee on Armed Services Subcommittee on Readiness, 117th Cong. (2021).*

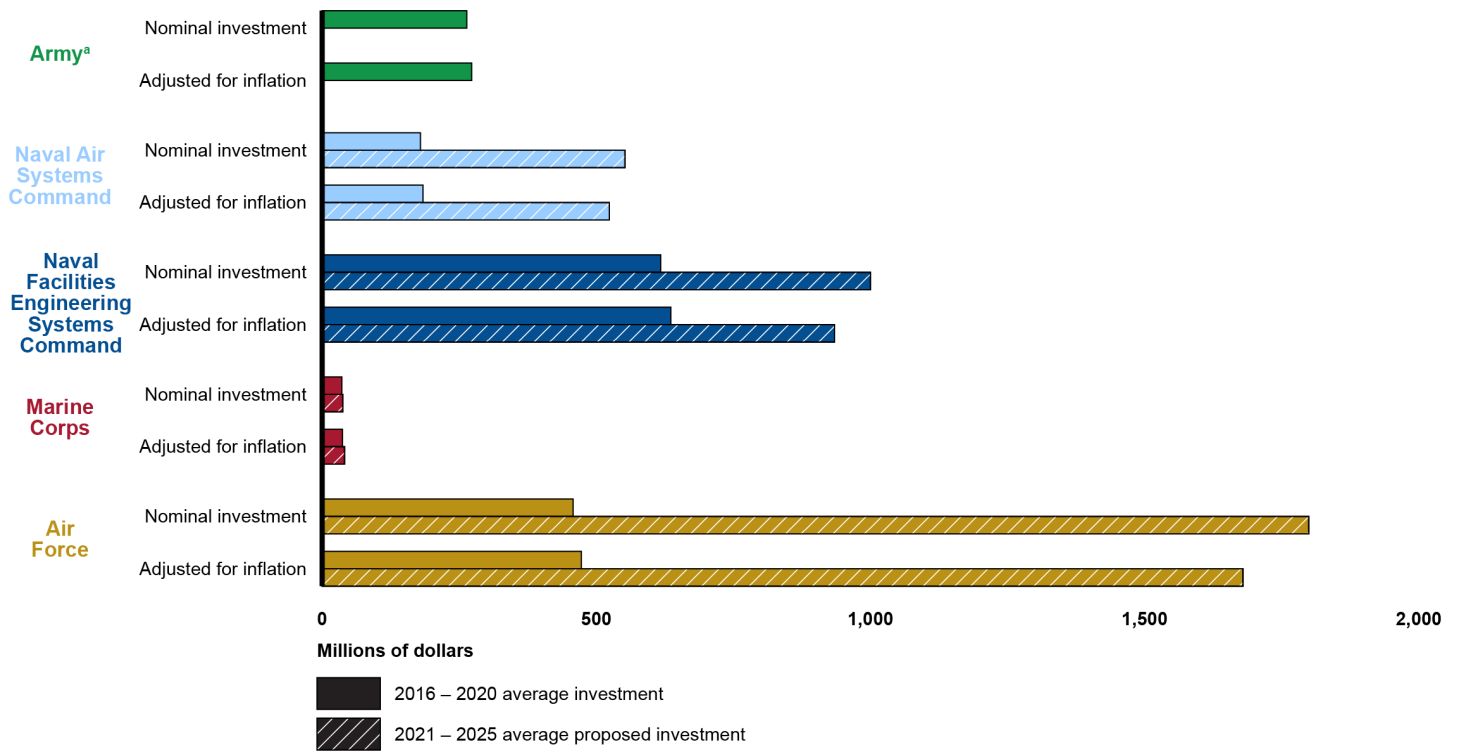
across the department. During the same hearing, senior officials from all three military departments agreed that leadership must address the fiscal resources required to improve depot infrastructure. While service leadership have expressed support for these depot improvement plans, it is too early to tell if the military departments would follow through with their plans for significantly higher levels of investment.

In general, the Air Force and Navy plan to spend significantly more during the first 5 years of their service plans than investments over the previous 5 years (see fig. 11).⁴⁰ The Marine Corps also plans to spend slightly more.⁴¹

⁴⁰We made this comparison using fiscal year 2020 constant dollars. Figure 11 is based on the sum of the services' planned investments in the first year of their plans—whether those years are nominal “Year Zero” estimates or specific fiscal years. It does not include the Army's first plan year of investment, because the Army was revising its plan and we were unable to determine the amount of funding that would be given to its organic versus contractor-owned depots.

⁴¹We were unable to compare the Army's previous investment with their planned investment, because the Army's revised plan was not completed for us to make this calculation. Specifically, we were unable to determine the amount of funding that would be given to the Army's organic vs. contractor-owned depots.

Figure 11: Comparison of Actual and Planned Average Annual Depot Investment



Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: For this figure, “nominal” means then-year dollars, expressed in the timeframes of the respective service plan. The inflation adjustment used constant fiscal year 2020 dollars.

^aWe were unable to calculate a proposed investment amount for the Army because it has not yet released the details of its 15-year, \$16 billion depot improvement plan. Specifically, we could not determine how much of the Army’s plan is intended for the Army’s depots and how much is intended for contractor-owned and operated depots.

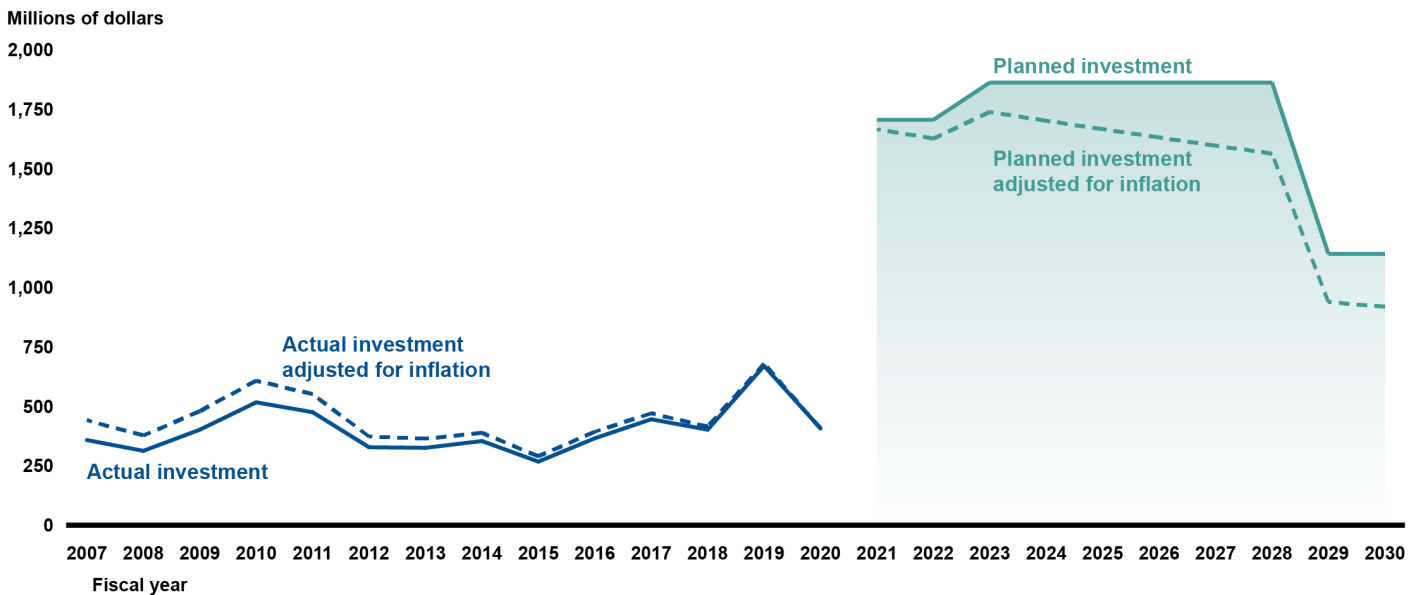
There are varying differences between the services’ actual prior depot investment and the investments outlined in their 2018-19 plans.

Air Force

Since fiscal year 2007 the Air Force has generally invested less than \$500 million annually in its depots. However, to implement its depot improvement plan, the Air Force plans to invest an average of over 250

percent more over the next 5 years than its average investment over the previous 5 years (see fig.12).⁴²

Figure 12: Air Force Actual and Planned Investment in Depot Infrastructure Improvements



Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: The Air Force’s planned investments were obtained from the February 2019 Master Plan for Organic Industrial Base Infrastructure and are adjusted for inflation and expressed in 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis.

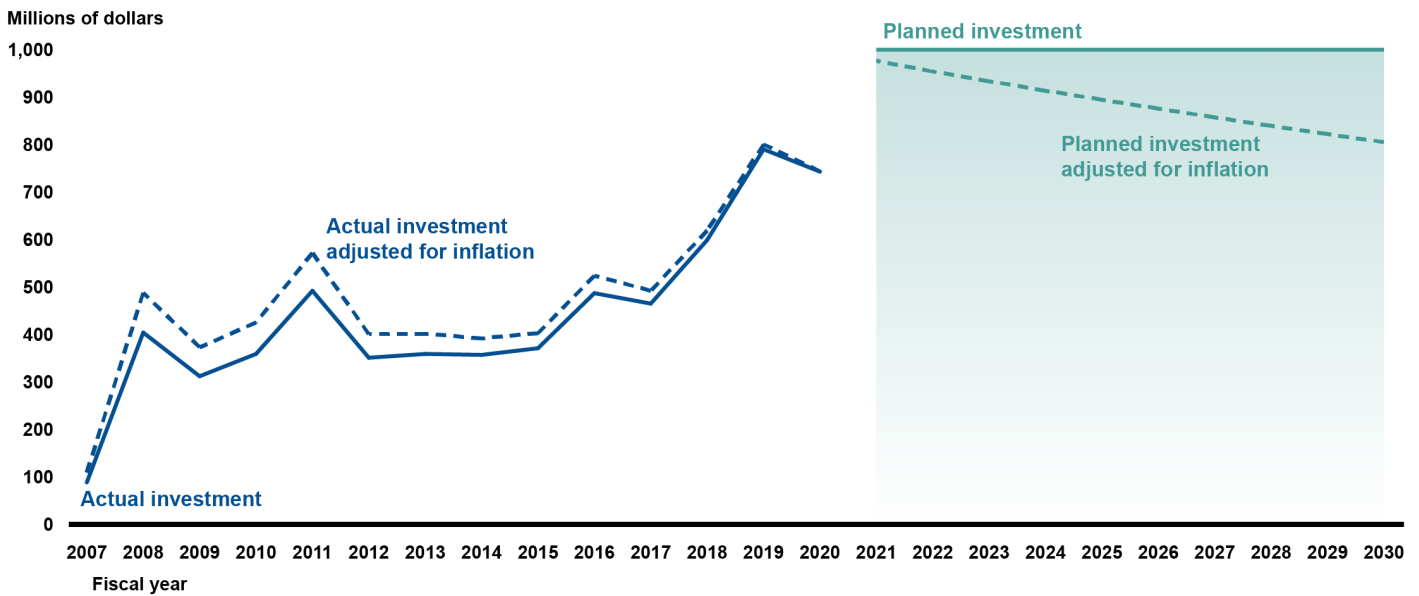
Navy

The Navy shipyards have consistently received investment above the 6-percent minimum level. Over time, shipyard investment has risen, with a marked increase after the SIOP went into effect in 2018. However, to fund the SIOP, the Navy plans to invest over 40 percent more during the next 5 years compared to its average depot investment over the previous 5 years (see fig.13).⁴³

⁴²Calculation is based on the 5-year inflation-adjusted investment average for fiscal years 2016 through 2020 compared against the 5-year inflation-adjusted average planned investment for fiscal years 2021 through 2025.

⁴³Calculation is based on the 5-year inflation-adjusted investment average for fiscal years 2016 through 2020 compared against the 5-year inflation-adjusted average planned investment for fiscal years 2021 through 2025.

Figure 13: Navy Shipyard Actual and Planned Investment in Depot Infrastructure Improvements



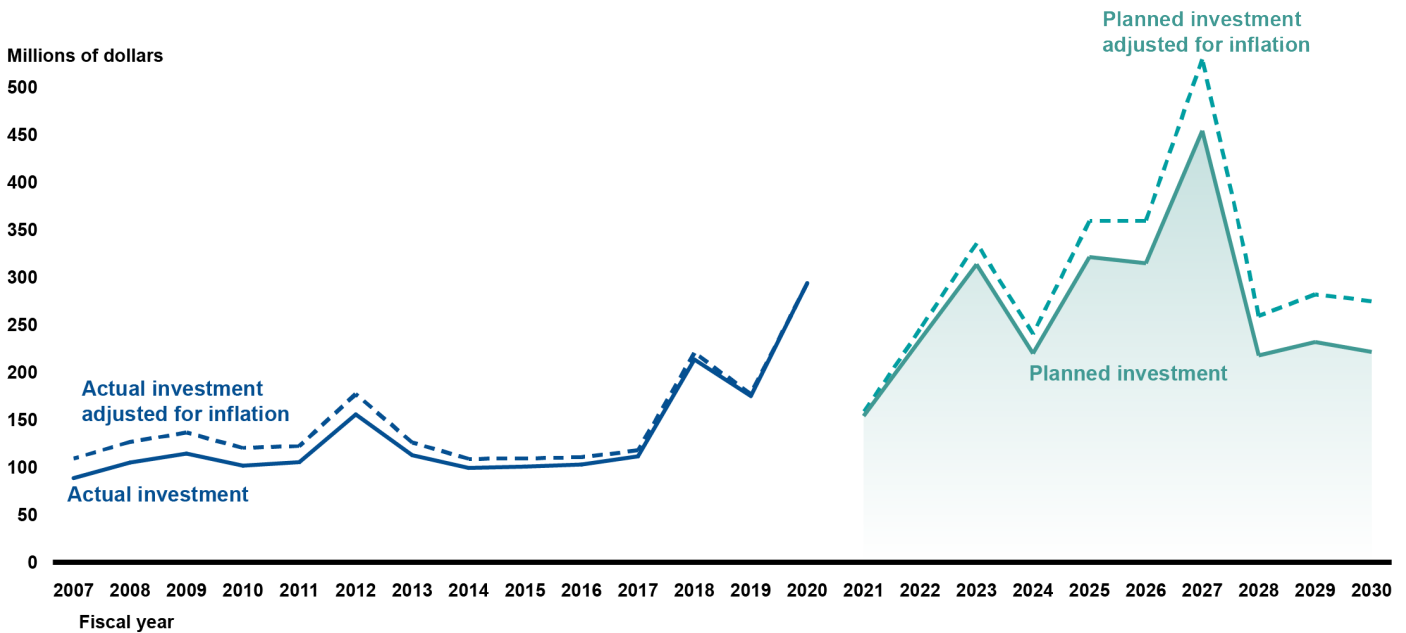
Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: Proposed shipyard investments from fiscal year 2021–2030 are based on the Shipyard Infrastructure Optimization Program’s \$21 billion cost estimate over 20 years. Proposed investment amounts are adjusted for inflation and expressed in 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis.

The Navy has increased the investment levels for its aviation depots since fiscal year 2018, and has reached the level of funding it plans to invest to begin implementing its depot improvement plan. However, the next 5 years will likely be more challenging as the improvement plan calls for an average investment level that is more than 25 percent higher than the previous 5-year average (see fig. 14).⁴⁴

⁴⁴Calculation is based on the 5-year inflation-adjusted investment average for fiscal years 2016 through 2020 compared against the 5-year inflation-adjusted average planned investment for fiscal years 2021 through 2025.

Figure 14: Navy Aviation Actual and Planned Investment in Depot Infrastructure Improvements



Source: GAO analysis of Department of Defense data. | GAO-22-105009

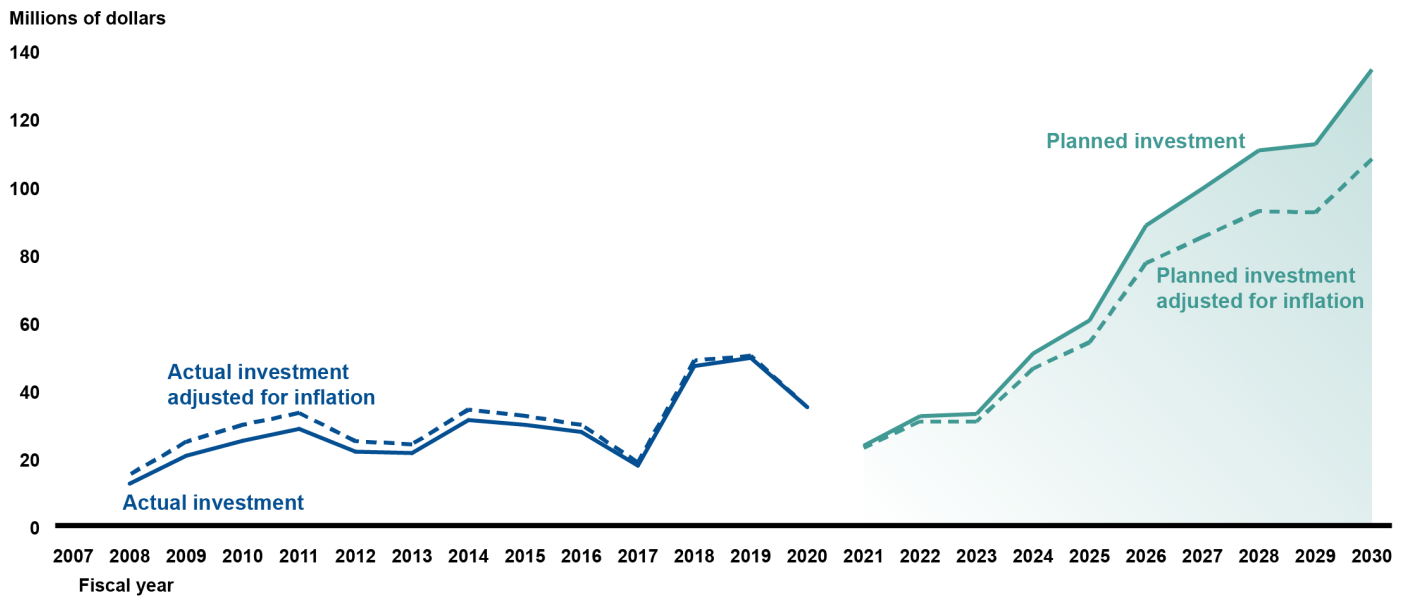
Note: Navy aviation’s proposed investments are those identified in the Fleet Readiness Centers Infrastructure Optimization Plan. The plan does not specify beginning in fiscal year 2020; instead it is written from a nominal “Year 1” perspective. For the purposes of this comparison, we are placing “Year 1” at fiscal year 2020. Proposed investment amounts are adjusted for inflation and expressed in 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis.

Marine Corps

The Marine Corps has proposed steadily increasing its planned depot facility investments (see fig. 15). The planned investment for the first 5 years of its plan compares favorably with its depot investment over the previous 5 years.⁴⁵

⁴⁵Calculation is based on the 5-year inflation-adjusted investment average for fiscal years 2016 through 2020 compared against the 5-year inflation-adjusted average planned investment for fiscal years 2021 through 2025.

Figure 15: Marine Corps Actual and Planned Investment in Depot Infrastructure Improvements



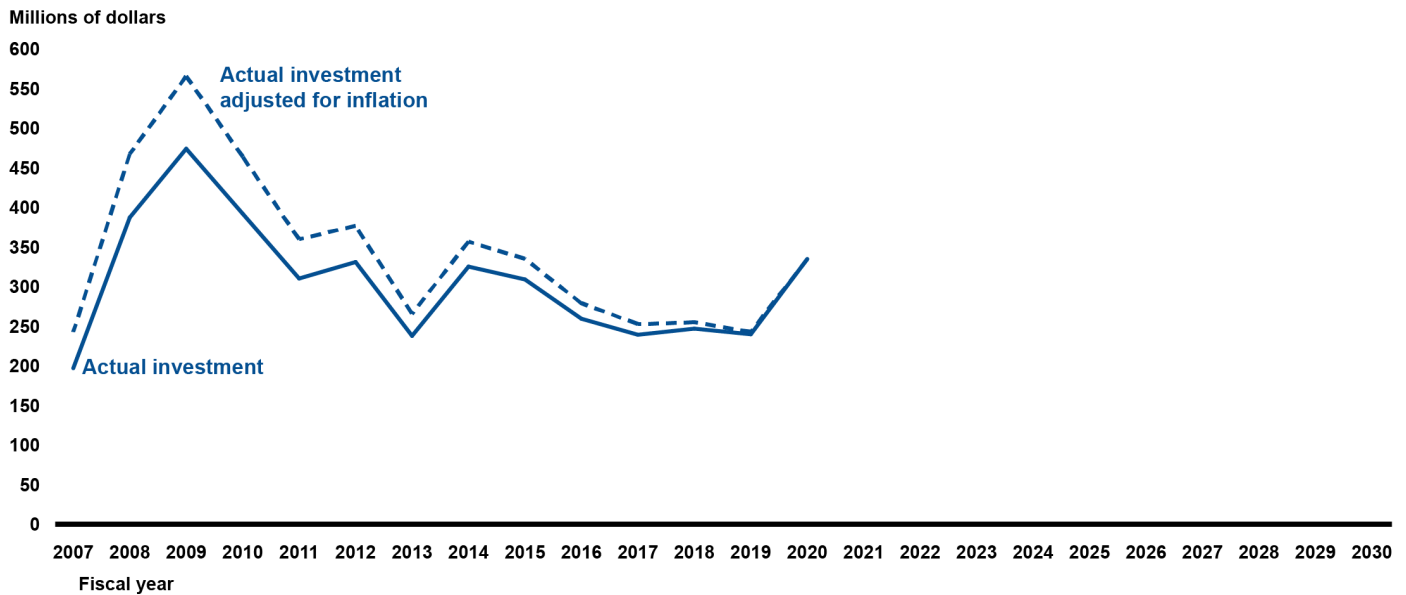
Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: Proposed investment amounts come from the July 2019 Marine Corps Organic Industrial Base Facilities Investment Strategy. Figures are adjusted for inflation and expressed in 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis.

Army

According to Army officials, the Army’s preliminary depot infrastructure modernization plan calls for \$16 billion in investment at all 23 Army depots and arsenals—including the Army’s nine covered depots—between fiscal year 2024 through fiscal year 2038. As of January 2022, the Army had not determined the planned investment specifically for covered depots, though Army officials stated that they intended to allocate available funding to projects across the enterprise that deliver readiness, build surge capacity, and modernize the future force. According to Army officials, the plan calls for an average investment of about \$1 billion per year from fiscal year 2024 through fiscal year 2028 and \$11 billion invested from fiscal year 2029 through fiscal year 2038. The Army’s average depot investment from fiscal years 2016 to 2020 was about \$264 million, but this amount includes only the nine covered depots, and is therefore not directly comparable (see fig. 16).

Figure 16: Army Actual Investment in Depot Infrastructure Improvements



Source: GAO analysis of Department of Defense data. | GAO-22-105009

Note: The Army’s proposed investment is not included on this graphic because they have not yet released the details of their 15-year, \$16-billion depot-improvement plan. Specifically, we do not know how much of that plan is intended for the Army’s depots and how much is intended for contractor-owned and operated depots.

DOD’s Depot Improvement Strategy Does Not Include Most Required Elements

In 2019, section 359 of the National Defense Authorization Act for Fiscal Year 2020 directed DOD to develop a comprehensive depot infrastructure improvement strategy with three elements: (1) a comprehensive review of depot conditions and performance; (2) an analysis of business cases for different investment alternative; and (3) a plan to improve depot conditions and performance.⁴⁶ DOD submitted its strategy to Congress in October 2021. In the statute, 21 subelements were outlined under the three main elements that DOD was required to include in its strategy.

DOD’s strategy did not fully address two of these three required elements. Of the 21 subelements, DOD’s strategy included six, partially included four, and did not include 11. Officials from the Office of the Deputy Assistant Secretary of Defense for Materiel Readiness (DASD/MR), which wrote the strategy, stated that it was missing those

⁴⁶Pub. L. No. 116-92.

elements, and stated that they plan to include required elements during future annual updates. They described the strategy as a living document, and they planned to issue an update in March 2022, with annual updates to follow.

Comprehensive review of depot conditions and performance. DOD’s strategy generally addressed the requirement to include a comprehensive review of depot conditions and performance. Specifically, DOD’s strategy fully included information to address five of the required subelements, and partially included information to address the remaining three subelements (see table 4). DASD/MR officials described the data in the strategy as a snapshot in time. For example, the officials noted that equipment age is an imperfect measurement of equipment condition, but described internal challenges in identifying a better way to evaluate equipment condition.

Table 4: GAO Assessment of DOD’s Depot Infrastructure Improvement Strategy for Inclusion of Subelements of a Comprehensive Review as Required in Section 359

Required subelement	Description	GAO assessment
(b)(1)(A)(i)	Cost and schedule performance of the depots	Included
(b)(1)(A)(ii)	Material availability of weapon systems supported at the depots and the effect of the performance of the depots on that availability	Partial
(b)(1)(A)(iii)	Work in progress and non-operational items awaiting depot maintenance	Included
(b)(1)(A)(iv)	The condition of the depots	Included
(b)(1)(A)(v)	The backlog of restoration and modernization projects at the depots	Partial
(b)(1)(A)(vi)	The condition of equipment at the depots	Included
(b)(1)(A)(vii)	The vulnerability of the depots to adverse environmental conditions and, if necessary, the investment required to withstand those conditions	Partial
(b)(1)(B)	An identification of analytically based goals relating to the [previous] elements	Included

Source: GAO analysis of Department of Defense (DOD) Depot Infrastructure Improvement Strategy. | GAO-22-105009

Note: These elements and subelements were outlined in section 359 of the National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019).

We assessed the following subelements of the comprehensive review as partially included:

- Materiel availability (subelement (b)(1)(A)(ii)—DOD personnel said subsequent editions of the strategy will include this metric.

- Backlog of restoration and modernization projects (subelement (b)(1)(A)(v))—The strategy provides an overall dollar amount of backlogged projects, but it does not identify specific projects that have been delayed.
- Vulnerability to adverse environmental conditions (subelement (b)(1)(A)(vii))—The strategy includes a description of adverse environmental conditions that could potentially affect its depots, but it does not describe the investments required to address those vulnerabilities.

Business case analysis for depot investment. DOD’s strategy generally did not address the requirement to include a business case analysis. Specifically, DOD’s strategy did not include information to address the four subelements (see table 5). OSD officials stated that they did not yet have enough information to complete this element, and that they needed complete service plans before they could begin this analysis. The strategy included a date—the fourth quarter of fiscal year 2024—that it planned to complete these subelements.

Table 5: GAO Assessment of DOD’s Depot Infrastructure Improvement Strategy for Inclusion of Subelements of a Business Case Analysis as Required in Section 359

Mandate subelement	Description	GAO assessment
(b)(2)	Cost, performance, risk, readiness outcomes, and an optimal investment approach	Not Included
(b)(2)(A)	The minimum investment necessary to meet investment requirements under section 2476 of title 10, United States Code	Not Included
(b)(2)(B)	The investment necessary to ensure the current inventory of facilities at covered depots can meet the mission-capable, readiness, and contingency goals of the Secretary of Defense	Not Included
(b)(2)(C)	The investment necessary to execute the depot infrastructure optimization plans of each military department	Not Included

Source: GAO analysis of Department of Defense (DOD) Depot Infrastructure Improvement Strategy. | GAO-22-105009

Note: These elements and subelements were outlined in Section 359 of the National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019).

A plan to improve depot condition and performance. We found that DOD’s strategy did not fully address the requirement to include a plan to improve depot condition and performance. Specifically, DOD’s strategy fully included information to address one of the required subelements, partially included information to address another subelement, and did not include information to address the remaining seven subelements (see table 6). DASD/MR officials stated that the subelements were not

included at that time, but said they will include them in future iterations of the strategy.

Table 6: GAO Assessment of DOD’s Depot Infrastructure Improvement Strategy for Inclusion of Subelements of a Plan to Improve Depots as Required in Section 359

Mandate subelement	Description	GAO assessment
(b)(3)(A)	The approach of the Secretary of Defense for achieving the identification of analytically based goals of assessing condition and performance status of the covered depots	Included
(b)(3)(B)	The resources and investments required to implement the plan	Not Included
(b)(3)(C)	The activities and milestones required to implement the plan	Partial
(b)(3)(D)	A results-oriented approach to assess	
(b)(3)(D)(i)	The progress of each military department in achieving such goals	Not Included
(b)(3)(D)(ii)	The progress of the department in implementing the plan	Not Included
(b)(3)(E)	Organizational roles and responsibilities for implementing the plan	Not Included
(b)(3)(F)	A process for conducting regular management review and coordination of the progress of each military department in implementing the plan and achieving such goals	Not Included
(b)(3)(G)	The extent to which the Secretary has addressed recommendations made by the Comptroller General of the United States relating to depot operations during the 5-year period preceding the date of submittal of the strategy under this section	Not Included
(b)(3)(H)	Risks to implementing the plan and mitigation strategies to address those risks	Not Included

Source: GAO analysis of Department of Defense (DOD) Depot Infrastructure Improvement Strategy. | GAO-22-105009

Note: These elements and subelements were outlined in Section 359 of the National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019).

We assessed the “activities and milestones” subelement (b)(3)(C) of the improvement plan as partially included. The strategy includes four strategic goals—each of which includes objectives, lines of effort, and supporting actions and metrics against which the goals will be measured. However, none of the goals identifies parties within DOD or the services responsible for undertaking the actions and assessing their progress, or timelines for achieving the goals—key guidance that would assist the services as they develop their improvement plans.

For example, the objective for one strategic goal is to ensure human capital plans that assess and improve the effectiveness of the organic industrial base’s hiring and training. Also, the goal is to assess whether

retention programs are in place within the military services. The plan identifies the metric to assess this goal as the “individual military service-approved human capital plans.” However, no deadline was given for developing or implementing the human capital plans, and officials with DASD/MR told us that the services are responsible for drafting and implementing their own plans, with little involvement from DOD. They added that the services are also largely responsible for addressing the goals, including tracking, monitoring, and assessing their progress. The DASD/MR said they deferred much of the plan’s execution to the services because the services have responsibility for managing depots.

In the department’s report, OSD wrote that service plans were still incomplete, which would preclude OSD from completing key enterprise-level infrastructure-related analyses, planning, and policy development until fiscal year 2024. For example, OSD officials stated that they expect the DOD strategy’s goals to change as the services continue to update their infrastructure improvement plans through fiscal year 2024. OSD officials also told us that managing the depots was a service responsibility and that they did not want to interfere with service decisions.

While we recognize that the services are developing their congressionally directed plans, our prior work has highlighted some of the benefits of DOD developing results-oriented approaches to complex problems. OSD could enhance the oversight of and accountability over depot investments through a comprehensive oversight effort that includes using a consistent results-oriented approach. As noted in our prior work, plans for depot investment and improvement have experienced delays and schedule slippages.⁴⁷ Further, some departments have not produced required improvement plans by the congressionally requested dates. Moreover, DOD delivered its plan more than a year late and, as discussed above, it lacked many of the mandated elements.

OSD’s involvement at an early stage could help avoid similar delays. For example, OSD could task specific service organizations to develop the business case analyses, develop and standardize metrics to measure progress, set expectations for what the service plans should include, and create milestones for when the service plans should be complete. Service officials have stated that knowing DOD’s strategy could help them to develop plans that will meet the department’s needs. In addition, the

⁴⁷See, for example, [GAO-17-548](#). In that report we discussed several Navy infrastructure improvement efforts that experienced repeated schedule slippages.

services have already begun requesting resources to fund their plans, 2 years before DOD plans to complete key aspects of its statutorily required strategy. This creates a risk that service-level plans and related investments may not align with departmental goals.

If DOD completed all required elements of the strategy, it could enhance service efforts to identify appropriate analytically based goals aligned with the Secretary of Defense's readiness objectives, enhance optimization across the DOD enterprise, and ensure sustained senior leadership attention to achieving optimal depot efficiency and effectiveness. Without a timely depot strategy including all elements, DOD cannot ensure that service-level plans align with departmental goals or adequately track, monitor, or assess the strategy's effectiveness. Continuing to update and monitor the strategy through the changes to service plans will be essential to ensuring that DOD makes progress in addressing its depot challenges.

Conclusions

The service depots are critical to the military's ability to repair weapon systems. However, many facility projects remain backlogged, and most equipment remains well past its expected service life. These factors have contributed to continued challenges in depot performance and have not improved overall in the last few years. The departments have regularly met their statutory investment minimums; however, a number of individual depots have not consistently received investment at the 6-percent level. Our previous work has noted that addressing the poor conditions at DOD's depots will cost billions, require sustained management attention, and need implementation of a results-oriented approach over many years. Identifying a sufficient minimum investment that will enable the services to prevent further deterioration of infrastructure conditions would better position the services to assess the implications of potential resource trade-offs when developing annual budget requests.

The services developed long-term depot infrastructure improvement plans in 2018 and 2019. However, the services were in the process of updating their plans, and it was too early to determine how effective they might be. Furthermore, the amount the services plan to invest to implement their plans is higher than the services have invested over previous years. Ensuring this increased level of investment over a period of years will likely require service- and department- level leadership and support.

DOD has developed a broad strategy to help guide depot improvements. However, DOD's strategy did not include all of the elements required by statute. The strategy also relies on the service plans for many of its

details, meaning that it will remain incomplete until those plans are finished. We are encouraged that DOD has committed to including the missing elements as it provides annual updates of this plan. However, the services were already requesting investment funds for their plans in the absence of guidance from OSD. Completing its strategy in a timely manner will ensure that DOD helps the services follow through on their planned investments, enhance their ability to target department priorities to achieve the intended results, and help OSD avoid some of the challenges experienced by earlier improvement efforts.

Recommendations for Executive Action

We recommend that the Secretary of Defense ensure that the military services identify in annual budget submissions the minimum level of annual investment needed to prevent further infrastructure deterioration. The minimum investment level should reflect a percentage of the 3-year rolling average of maintenance, repair, and overhaul workload funded at all of the covered depots of the respective military service. (Recommendation 1)

We recommend that the Secretary of Defense ensure that the department completes the depot infrastructure strategy in a timely manner to fully address all required elements. (Recommendation 2)

Agency Comments

We provided a draft of our report to DOD for comment. DOD's written comments are reprinted in appendix III of this report. DOD concurred with our recommendation that the department fully address all required elements in its depot infrastructure strategy.

DOD partially concurred with our recommendation that the military services identify in annual budget submissions the minimum level of annual investment needed to prevent further infrastructure deterioration at the covered depots. The department stated that while DOD concurs with the intent of GAO's recommendation, providing this information in budget submissions would duplicate other reports the department prepares. DOD stated that it is meeting the intent of our recommendation through the business case analysis it is developing in response to section 359 of the fiscal year 2020 National Defense Authorization Act and through its compliance with the minimum investment requirements of section 2476 of title 10, United States Code.⁴⁸

⁴⁸Pub. L. No. 116-92 (2019).

We agree that the business case analysis DOD is preparing in response to section 359 could provide Congress information within the intent of our recommendation. However, the department has not yet completed its analysis. Section 359 also requires DOD to identify the investment necessary to execute the military departments' depot infrastructure improvement plans. This may differ from the amount needed to prevent further deterioration. In addition, section 359 requires a single business case analysis, not a regularly updated and reported analysis.

Further, the investment amount produced by the departments' compliance with section 2476 of title 10, United States Code, also differs from the amount needed to prevent further deterioration. As discussed in this report, the current minimum depot investment requirement produces an amount based on previous years' depot workload and is not based on depot-specific needs. As we have shown, the depots have continued to deteriorate and the backlog of restoration and modernization projects has continued to grow while the departments have complied with this requirement.

Given the state of the depots and the department's multiyear efforts to enhance depot infrastructure, we continue to believe that DOD should identify in annual budget submissions the minimum level of annual investment needed to prevent further depot infrastructure deterioration. Providing this information would help Congress determine whether the services are prioritizing depot improvements at a level commensurate with their impact on readiness, and inform Congressional funding decisions for the depots.

The Secretary of the Navy also provided technical comments that we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Secretary of the Navy, Secretary of the Army, Secretary of the Air Force, Commandant of the Marine Corps, and other interested parties. 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) 512-9627 or maurerd@gao.gov. GAO staff who made key contributions to this report are listed in appendix IV.

A handwritten signature in black ink that reads "Diana Maurer". The signature is written in a cursive, flowing style.

Diana Maurer
Director, Defense Capabilities and Management

List of Committees

The Honorable Jack Reed
Chairman
The Honorable James M. Inhofe
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Jon Tester
Chairman
The Honorable Richard Shelby
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

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

The Honorable Betty McCollum
Chair
The Honorable Ken Calvert
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Scope and Methodology

To address our first objective, we analyzed performance metrics for the 21 covered depots from fiscal year 2016 through fiscal year 2020. These metrics included facility condition ratings, facility restoration and modernization backlogs, investment levels, and equipment age. We also reviewed Department of Defense (DOD) and service guidance and interviewed service depot, sustainment, and budget officials to obtain an understanding of how they manage depot investment. For each service we interviewed headquarters-level officials charged with managing depot strategy. We also interviewed depot maintenance officials from all 21 covered depots to discuss their service's depot infrastructure improvement plan, depot conditions, and depot performance.

To assess the reliability of the data used in this report, we reviewed systems documentation and interviewed officials to understand system operating procedures, organizational roles and responsibilities, and error checking mechanisms. We also conducted our own error checks to look for inaccurate or questionable data and discussed with officials any data irregularities we found. We reviewed data from fiscal years 2015–2020. We conducted these assessments on six data systems, specifically:

- The Installation Status Report system for data on Army facility condition and replacement cost;
- Sustainment Management System BUILDER on Army, Air Force, and Department of Navy facility condition data;
- The Defense Industrial Financial Management System for data on Air Force age of equipment;
- The Defense Property Accountability System for data on Army age of equipment;
- The Facilities and Equipment Maintenance system for data on Navy shipyard equipment condition; and
- The internet Navy Facility Asset Data Score for data on Navy and Marine Corps facility condition and replacement cost.

We analyzed facility condition ratings by weighting the ratings by the plant replacement value (i.e., the cost to replace the facility). We did this to ensure that more expensive facilities—such as production facilities—would be weighted higher than less expensive facilities—such as storage units or guard shacks. We found the data that we used from these systems to be sufficiently reliable for the purposes of summarizing trends in the selected facility, equipment, and performance metrics reported.

To address our second objective, we reviewed depot investment plans from fiscal year 2007 to fiscal year 2020 to assess the extent to which services and components met minimum required investment levels outlined in title 10 United States Code, section 2476. We reviewed investment data from publicly available budget documentation and compared minimum required investment amounts against actual investments. We adjusted these numbers for inflation using 2020 dollars using the U.S. Gross Domestic Product Price Index from the U.S. Department of Commerce, Bureau of Economic Analysis. We reviewed the data at the service level and also, where available, at the depot level. We compiled a list of depots that reached the required threshold. Where possible, we conducted the same analysis at the depot level. The U.S. Marine Corps was unable to provide depot-level investment numbers because they collected the data aggregated. We also reviewed the services' long-term investment plans.

To address our third objective, we identified the required elements of section 359 of the Fiscal Year 2020 National Defense Authorization Act and evaluated the extent DOD included them in its strategy.¹ We conducted an independent two-party review of the strategy. First, an analyst recorded an assessment of whether the elements from section 359 were included in the DOD strategy. A second analyst independently reviewed the same information and recorded an assessment. The two analysts created a final assessment that reconciled the two independent assessments and reflects their consensus.

We spoke with representatives from the following offices and depots:

Department of Defense

- Office of the Deputy Assistant Secretary of Defense for Materiel Readiness

Department of the Army

- Army Audit Agency
- Army Materiel Command
- Tank-Automotive and Armaments Command
- Army Joint Munitions Command

¹Pub. L. No. 116-92 (2019)

- Army Depots and Arsenals
 - Anniston Army Depot
 - Corpus Christi Army Depot
 - Letterkenny Army Depot
 - Red River Army Depot
 - Tobyhanna Army Depot
 - Tooele Army Depot
 - Pine Bluff Arsenal
 - Rock Island Arsenal
 - Watervliet Arsenal

Department of the Navy

- Naval Air Systems Command
- Naval Facilities Engineering Systems Command
- Naval Sea Systems Command
- Commander, Fleet Readiness Centers
- U.S. Marine Corps Logistics Command
- Navy Shipyards
 - Norfolk Naval Shipyard
 - Pearl Harbor Naval Shipyard
 - Portsmouth Naval Shipyard
 - Puget Sound Naval Shipyard
- Navy Fleet Readiness Centers
 - Fleet Readiness Center East
 - Fleet Readiness Center Southeast
 - Fleet Readiness Center Southwest
- U.S. Marine Corps (USMC) Production Plants
 - Production Plant Barstow
 - Production Plant Albany

Department of the Air Force

- Headquarters Air Force, Office of the Deputy Assistant Secretary of the Air Force for Logistics and Product Support
- Air Force Materiel Command
- Air Force Sustainment Command
- Air Force Air Logistics Complexes
 - Ogden Air Logistics Complex
 - Oklahoma City Air Logistics Complex
 - Warner Robins Air Logistics Complex

We conducted this performance audit from February 2021 to May 2022 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 audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Implementation Status of Prior GAO Recommendations Related to Depot Infrastructure Improvements

In recent years, we have issued a number of reports related to the condition of depot infrastructure. Table 7 summarizes the recommendations in these reports.¹ The Department of Defense (DOD) concurred with 26 of these recommendations and has implemented six recommendations. Tables 8 through 14 below summarize the specific recommendations from each report, along with any progress made in implementing them

Table 7: Status of Selected Recommendations That GAO Has Made Since 2016 on Depot Infrastructure

Product date	Product title and number	Number of recommendations	
		Open	Implemented
Recommendations to the Department of Defense			
January 31, 2022	<i>Defense Infrastructure: DOD Should Better Manage Risks Posed by Deferred Facility Maintenance.</i> (GAO-22-104481)	4	
January 30, 2020	<i>Military Depots: DOD Can Benefit from Further Sharing of Best Practices and Lessons Learned</i> (GAO-20-116)		1
April 29, 2019	<i>Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency.</i> (GAO-19-242)	1	
June 23, 2016	<i>Defense Facility Condition: Revised Guidance Needed to Improve Oversight of Assessments and Ratings.</i> (GAO-16-662)		1
Subtotal		5	2
Recommendations to the Army			
July 16, 2020	<i>Military Depots: Army and Marine Corps Need to Improve Efforts to Address Challenges in Measuring Performance and Planning Maintenance Work.</i> (GAO-20-401)	4	
January 30, 2020	<i>Military Depots: DOD Can Benefit from Further Sharing of Best Practices and Lessons Learned</i> (GAO-20-116)	1	
April 29, 2019	<i>Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency.</i> (GAO-19-242)	3	
Subtotal		8	0
Recommendations to the Air Force			
April 29, 2019	<i>Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency.</i> (GAO-19-242)	2	1
Subtotal		2	1

¹This summary does not include classified recommendations made in classified reports and reports without recommendations.

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

Product date	Product title and number	Number of recommendations	
		Open	Implemented
Recommendations to the Navy			
July 16, 2020	<i>Military Depots: Army and Marine Corps Need to Improve Efforts to Address Challenges in Measuring Performance and Planning Maintenance Work. (GAO-20-401)</i>	1	
November 25, 2019	<i>Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations. (GAO-20-64)</i>	3	1
April 29, 2019	<i>Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency. (GAO-19-242)</i>	4	2
September 12, 2017	<i>Naval Shipyards: Actions Needed to Improve Poor Conditions That Affect Operations. (GAO-17-548)</i>	3	
Subtotal		11	3
Total		26	6

Source: GAO analysis of recommendations. | GAO-22-105009

Note: This table does not include classified recommendations made in classified reports and reports without recommendations.

Table 8: Status of Recommendations from Defense Infrastructure: DOD Should Better Manage Risks Posed by Deferred Facility Maintenance (GAO-22-104481)

Recommendation #1:	
The Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition & Sustainment, in coordination with the FSM Configuration/Support Panel, collects, assesses, and revises—as appropriate—the sustainment unit costs of facility analysis categories in which the average ages of the facilities exceed their expected lifespans.	Status: Open
	Concurrence: No
	Comments:
Recommendation #2:	
The Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition & Sustainment, in coordination with the DOD components, sets milestones and holds component leadership accountable for implementing SMS.	Status: Open
	Concurrence: Yes
	Comments
Recommendation #3:	
The Secretary of Defense should ensure that the heads of the DOD components, in coordination with the Under Secretary of Defense for Acquisition & Sustainment and the Under Secretary of Defense (Comptroller), develop funding plans to support continued implementation of SMS facility condition assessments.	Status: Open
	Concurrence: Yes
	Comments:
Recommendation #4:	
	Status: Open
	Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition & Sustainment, in coordination with the DOD components, conducts an assessment of the SMS implementing guidance to determine which elements of SMS should be applied consistently across the components, and uses the results of that assessment to update the guidance for SMS condition assessments to ensure that facility condition data are comparable across the department.

Comments:

Source: GAO analysis of recommendations made in GAO-22-104481. | GAO 22-105009

Table 9: Status of Recommendations from Military Depots: Army and Marine Corps Need to Improve Efforts to Address Challenges in Measuring Performance and Planning Maintenance Work (GAO-20-401)

Recommendation #1:

The Secretary of the Army should ensure that the Commander, Army Materiel Command, develops procedures to help ensure that it will incorporate depot stakeholder input into the new metrics framework for the Army's organic industrial base through iterative and ongoing processes.

Status: Open

Concurrence: Yes

Comments: The Army stated that Army Materiel Command (AMC) is committed to continuing its collaboration with the Life Cycle Management Commands (LCMCs), Depots, Arsenal, and Ammunition plants as it refines its performance metrics. Additionally, in its comments on our report, AMC stated it would conduct training at the LCMC and industrial base sites once the metrics framework is finalized. In March 2021, the Army stated that AMC has implemented 10 of the 65 Strategic, Operational, and Tactical level measures and metrics that it developed with stakeholder support. However the Army has yet to identify any specific procedural changes that have been made to ensure that the stakeholders' input has been considered in this metrics development effort. The Army stated that it expects to complete this metrics framework initiative later this fiscal year. The recommendation remains open in March 2022, pending receipt of an Army action plan. We will continue to monitor its progress.

Recommendation #2:

Status: Open

Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Commandant of the Marine Corps should ensure that the Marine Corps Logistics Command establishes a complete baseline schedule, which includes all planned depot maintenance work for the fiscal year, against which to measure performance.

Comments: the Marine Corps reported in March 2021 that it had added \$19.5 million in depot-level repairables to its baseline master schedule for fiscal year 2020, which represented 75 percent of the Marine Corps depot-level-repairable work that year. Further, the Marine Corps stated that it added \$14.3 million in depot-level-repairable workload to its baseline master schedule for fiscal year 2021, or 67 percent of the repairable work performed through the first half of the year. The Marine Corps added that it will continue to refine its process to capture as much depot-level-repairable workload as possible in the baseline Master Workload Schedule.

Additionally, in setting its baseline schedule for fiscal year 2022, the Marine Corps is taking steps to minimize production disruptions and potentially reduce carryover. Specifically, in what is intended to be an annual data call, the Marine Corps set a March 31, 2021, deadline for its other customers to provide key information about their requirements, so that the Marine Corps can account for these requirements earlier as it prepares its fiscal year 2022 baseline schedule. The intent of this data call is to confirm what could be nearly \$80 million in depot workload during fiscal year 2022. The Marine Corps will reach a formal agreement with its customers to “confirm” the workload, which will then be assigned Master Work Schedule Line Numbers and be added to the baseline Master Work Schedule. Further, the Marine Corps is requiring funding from its other customers by second quarter of the year of execution so that it can maintain its production schedule, with any funding received afterwards being treated as unplanned workload and rescheduled accordingly. We are very encouraged by the Marine Corps actions to date, and will continue to monitor progress as it takes these steps during the rest of calendar year 2021 and the first part of 2022. The recommendation remains open in March 2022, pending receipt of a Marine Corps action plan.

Recommendation #3:

Status: Open

Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of the Army should ensure that the Commander, Army Materiel Command, develops guidance that synchronizes the Army's timelines for required inputs from Army depot maintenance customers who use funds from the Procurement; Research, Development, Test, and Evaluation; and Operations and Maintenance budgets with the depots' timelines for development of their finalized budget estimate submissions to AMC.

Comments: The Army stated that Army Materiel Command is establishing an "Improved Organic Industrial Base (OIB) Workloading Review Process" to synchronizes plans with all Lifecycle Management Commands, OIB installations, OIB customers (including Inter-service and other government/non-government agencies), and supply chain partners (including DLA). In March 2021, the Army identified two steps that it has taken in response to our recommendation, resulting in a more thorough approach to depot workload planning.

First, the Commanding General, AMC, held a detailed review to plan for fiscal 2022 workload in October 2020, and plans to hold another review in June 2021 (the Army also stated that the AMC commander first initiated these reviews in April and June 2020, attributing this action to our on-going work). The Army stated that these reviews were designed to identify gaps and look for opportunities to improve workload planning data and the overall execution of customer workload. The Army stated that these reviews helped to synchronize workload planning with the process for developing the depots' budget estimates. Second, an Army G-4 official told us that the Army made additional changes to the workload planning process for procurement-funded work in preparing the Program Objective Memorandums for fiscal years 2022-26 and 2023-27. DOD considers this recommendation to be closed and implemented based on these actions. However, we will continue to monitor progress, in particular to determine whether these process changes have resulted in any cost savings or other efficiencies. The recommendation remains open in March 2022, pending receipt of an Army action plan.

Recommendation #4:

The Secretary of the Army should ensure that the Commander, Army Materiel Command, provides its non-Army customers with guidance that will help ensure that the depots have all updated maintenance needs in sufficient detail from non-Army customers prior to the depots' finalized budget estimate submissions to AMC.

Status: Open

Concurrence: Yes

Comments: Army officials stated in March 2021 that AMC is developing a proposal to move the current Depot Maintenance Inter-Service Agreement (DMISA) and other planning efforts from the 4th quarter to the 2nd quarter. Further, the Army stated that AMC and the other services are in discussions to review and update policies concerning depot workload requirements planning for non-Army customers. If implemented, these steps would provide an additional four-to-six months of workload planning time for all stakeholders, and improve the accuracy and synchronization of DMISA and other workload requirements planning with activities leading up to the depot's budget estimate submissions. We will continue to monitor the Army's progress to implement this recommendation. The recommendation remains open in March 2022, pending receipt of an Army action plan. We will continue to monitor the Army's progress.

Recommendation #5:

Status: Open

Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of the Army should ensure that the Army Organic Industrial Base Corporate Board oversees a study that includes a recurring, comprehensive, and systematic analysis of Army depot data to identify trends and causes behind changes in depot maintenance schedules; and that it uses this analysis to recommend actions to reduce unplanned maintenance work, as appropriate and necessary.

Comments: The Army stated that the Organic Industrial Base Corporate Board (OIBCB) has initiated a comprehensive and systematic assessment to identify the appropriate operational and strategic metrics and governance actions necessary to support OIB readiness. The assessment will complement ongoing efforts at AMC to analyze the trends and causes of depot maintenance schedule changes. This OIBCB assessment is to be completed by December 2022. The recommendation remains open in March 2022, pending receipt of an Army action plan. We will continue to monitor the Army's efforts to implement this recommendation.

Source: GAO analysis of recommendations made in [GAO-20-401](#). | GAO-22-105009

Table 10: Status of Recommendations from Military Depots: DOD Can Benefit from Further Sharing of Best Practices and Lessons Learned ([GAO-20-116](#))

Recommendation #1:

The Under Secretary of Defense for Acquisition and Sustainment should ensure that the Deputy Assistant Secretary of Defense for Materiel Readiness create, share, and maintain a comprehensive and up-to-date list of all DOD sharing venues (i.e., working groups), including points of contact related to depot maintenance.

Status: Implemented

Concurrence: Yes

Comments: In response to our report, the Deputy Assistant Secretary of Defense for Materiel Readiness took action by creating a comprehensive and up-to-date list of all DOD sharing venues (i.e., working groups, communities of practice), including points of contact, related to depot maintenance. The list includes nearly four dozen depot maintenance communities of practice and was created in collaboration with members of the Maintenance Executive Steering Committee and military service maintenance representatives. The Office of the Deputy Assistant Secretary of Defense for Materiel Readiness has shared the list with the depot maintenance community via a Materiel Readiness share drive and plans to share the list annually at the DOD Maintenance Symposium. Finally, the Office of the Deputy Assistant Secretary of Defense for Materiel Readiness will maintain the list through leveraging the DOD Maintenance Symposium as a venue to take annual action to update the list as well as whenever a stakeholder provides new or revised information on DOD sharing venues.

Recommendation #2:

The Secretary of the Army should ensure that Army Materiel Command reestablish and maintain organizations dedicated to sharing materiel best practices and lessons learned, as required by Army regulations.

Status: Open

Concurrence: Yes

Comments: In response to our report, the Army stated it is working to update policies to accurately reflect current activities for capturing, preserving, and distributing lessons learned and best practices throughout the organic industrial base. The estimated completion date is no later than December 2022. When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.

Source: GAO analysis of recommendations made in [GAO-20-116](#). | GAO-22-105009

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

Table 11: Status of Recommendations from Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations (GAO-20-64)

Recommendation #1:	
The Secretary of the Navy should ensure that the shipyard optimization program office (PMS 555) include all costs—such as costs for program office activities, utilities, roads, environmental remediation, historical preservation, and alternative workspace—when developing its second, more detailed, cost estimate.	Status: Open Concurrence: Yes Comments: Navy officials stated that they plan to implement this recommendation when the program office secures its second internal cost estimate, around fiscal year 2025.
Recommendation #2:	
The Secretary of the Navy should ensure that the shipyard optimization program office (PMS 555) use cost estimating best practices—as outlined in the GAO Cost Estimating and Assessment Guide—in developing its second cost estimate, including a program baseline, work breakdown structure, a description of the methodology and key assumptions, inflation, fully addressing risk and uncertainty, and a sensitivity analysis.	Status: Open Concurrence: Yes Comments: Navy officials stated that they plan to implement this recommendation when the program office secures its second internal cost estimate, around FY25.
Recommendation #3:	
The Secretary of the Navy should ensure that the shipyard optimization program office (PMS 555) obtain an independent cost estimate of the Naval Shipyards program prior to the start of its project prioritization effort.	Status: Open Concurrence: Yes Comments: Navy officials stated that they plan to implement this recommendation when the program office secures its second internal cost estimate, around FY25.
Recommendation #4:	
The Secretary of the Navy should ensure that the shipyard optimization program office (PMS 555), in coordination with relevant stakeholders, establish clear roles and responsibilities for the shipyards involved in the Shipyard Infrastructure Optimization Plan.	Status: Implemented Concurrence: Yes Comments: Naval Sea Systems Command issued guidance in November 2019 that outlined the staffing, roles, responsibilities, and business rules for the Shipyard Infrastructure Optimization Program (SIOP), PMS 555at the four public Naval shipyards. This action met the intent of this recommendation.

Source: GAO analysis of recommendations made in [GAO-20-64](#). | GAO-22-105009

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

Table 12: Status of Recommendations from Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency (GAO-19-242)

Recommendation #1:	
The Secretary of the Army should ensure that Army Materiel Command establishes measures for its depots to track facility or equipment conditions that lead to maintenance delays.	Status: Open
	Concurrence: Yes
	Comments: Army officials stated that, as of March 2022, they plan to develop a new metric - Work Center Downtime. This metric will measure and record unplanned equipment downtime as an indicator of impact to production. The Army plans to implement this metric by the end of fiscal year (FY) 2023. For facilities, the Army is transitioning to a new data system - BUILDER - which is intended to provide better insight into facility condition. However, it is not clear to what extent the Army intends to track situations where facility problems lead to maintenance delays.
Recommendation #2:	
The Secretary of the Army should ensure that Army Materiel Command implements tracking of the measures for identifying when facility or equipment conditions lead to maintenance delays at each Army depot.	Status: Open
	Concurrence: Yes
	Comments: The Army reported that, as of March 2022, it intends to begin tracking equipment problems that lead to maintenance delays by the end of fiscal year 2023. The Army reported that it would complete transitioning to a new facility data system in July 2022. However, we assessed that it is not clear if the Army will be tracking delays caused by facility problems.
Recommendation #3:	
The Secretary of the Navy should ensure that Naval Sea Systems Command and the Commander, Fleet Readiness Centers establish measures for their depots to track facility or equipment conditions that lead to maintenance delays.	Status: Implemented
	Concurrence: Yes
	Comments: The Navy reported in July 2019 that it changed its delay code for maintenance delays. Prior to that, the Navy had a single delay code for all facility, equipment, and tooling-caused delays. After July 2019, the Navy created three separate codes - one each for facility, equipment, and tooling-caused maintenance delays, which it could then use to better analyze the effects of these on maintenance throughput. This change allows the Navy to track the causes of maintenance delays and meets the intent of this recommendation.
Recommendation #4:	
The Secretary of the Navy should ensure that Naval Sea Systems Command and the Commander, Fleet Readiness Centers implement tracking of the measures for identifying when facility or equipment conditions lead to maintenance delays at each Navy depot.	Status: Implemented
	Concurrence: Yes
	Comments: According to Navy officials, they began generating reports using the new facility, equipment, and tooling delays codes in August 2019. Examples of these reports were provided to us. They then used these reports to analyze the most common causes of delays and adjusted equipment maintenance and investment plans, as appropriate. These actions met the intent of this recommendation.
Recommendation #5:	
	Status: Implemented
	Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of the Air Force should ensure that Air Force Materiel Command establishes measures for its depots to track facility or equipment conditions that lead to maintenance delays.

Comments: According to Air Force officials, the Facility Status Tracker was designed & built to track infrastructure/equipment insufficiencies leading to disruptions. The tool is designed to capture disruptions to industrial plant equipment and facility capabilities as well as assign an estimated dollar value to each disruption. The tracker has been delayed over the last year due to research of optional programs and ensuring the security of the data. The far term goal is to house the tracker within the IBM MAXIMO program. In March 2021, the Tracker was launched utilizing an interim data collection tool until the MAXIMO pilot is tested/developed. This tool met the intent of this recommendation.

Recommendation #6:

The Secretary of the Air Force should ensure that Air Force Materiel Command implements tracking of the measures for identifying when facility or equipment conditions lead to maintenance delays at each Air Force depot.

Status: Open

Concurrence: Yes

Comments: According to Air Force officials, they are developing a new data system to track infrastructure/equipment insufficiencies leading to disruptions. Air Force anticipated, as of January 2022, that this would be completed by June 2022, after which we will assess the extent to which this tracker is used.

Recommendation #7:

The Commandant of the Marine Corps should ensure that Marine Corps Logistics Command establishes measures for its depots to track facility or equipment conditions that lead to maintenance delays.

Status: Open

Concurrence: Yes

Comments: As of March 2022, the Marine Corps was still working on this recommendation. According to officials, the Marine Corps had taken measures to implement an oversight function within Marine Corps Logistics Command to monitor depot operations, minimize disruption to include those caused by facilities and equipment and facilitate coordinated actions necessary to mitigate maintenance disruptions and problems. However, we assessed that it was not clear the extent to which this addressed our specific recommendation to develop a measure to track when facility or equipment conditions leads to maintenance delays.

Recommendation #8:

The Commandant of the Marine Corps should ensure that Marine Corps Logistics Command implements tracking of the measures for identifying when facility or equipment conditions lead to maintenance delays at each Marine Corp depot.

Status: Open

Concurrence: Yes

Comments: As of March 2022, the Marine Corps was still working on this recommendation. According to officials, Marine Corps Logistics Command was conducting a proof of concept/analyses in collaboration with Marine Corps Installations Command to test a networked industrial environment for a Condition-Based Maintenance model. However, it was not clear the extent to which this action would address our specific recommendation to track when facility or equipment conditions lead to maintenance delays. Officials told us the Marine Corps has reason codes that can help identify when a facility problem is causing maintenance delays. However, we could not determine whether the Marine Corps was developing a similar reason code for equipment-related delays.

Recommendation #9:

Status: Open

Concurrence: Yes

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of the Army should ensure that Army Materiel Command incorporates in its depot optimization plan, key results-oriented elements including analytically-based goals, results-oriented metrics, identification of required resources, risks, and stakeholders, and regular reporting to decision makers on progress.

Comments: The Army issued its “Master Plan for the Army’s Organic Industrial Base Infrastructure” in July 2019. However, the Army issued a new Modernization Strategy shortly thereafter, which meant that the master plan was not aligned with the Army’s future force structure. The Army was working on a revision to the Infrastructure Plan as of February 2022 that incorporates the Army’s modernization strategy and the depots’ needs into an overall Army Depot Modernization Strategy. Army officials have told us that this plan will likely not be complete until spring 2022. When this strategy is complete, we will review it to assess the extent to which it includes the results-oriented elements we recommended.

Recommendation #10:

The Secretary of the Navy should ensure that Commander, Fleet Readiness Centers incorporates in its depot optimization plan, key results-oriented elements including analytically-based goals, results-oriented metrics, identification of required resources, risks, and stakeholders, and regular reporting to decision makers on progress.

Status: Open

Concurrence: Yes

Comments: The Commander, Fleet Readiness Centers issued an “Infrastructure Optimization Plan Assessment for Depot-Level FRCs” in Jan. 2018 and also provided an update to the Office of the Secretary of Defense (OSD) in 2020. We are assessing this plan as part of an ongoing engagement, and will update this recommendation as more information becomes available.

Recommendation #11:

The Secretary of the Air Force should ensure that Air Force Materiel Command incorporates in its depot optimization plan, key results-oriented elements including analytically-based goals, results-oriented metrics, identification of required resources, risks, and stakeholders, and regular reporting to decision makers on progress.

Status: Open

Concurrence: Yes

Comments: The Air Force released its “Master Plan for Organic Industrial Base Infrastructure” in February 2019. It then provided an update - named “2.0” to OSD in response to Congressional interest in 2020. The Air Force is – as of January 2022 – working on a third version of this plan - “3.0” - which officials say will be released sometime in spring 2022. We are currently reviewing the extent to which this plan includes the results-oriented elements highlighted in the recommendation, and will update as more information becomes available.

Recommendation #12:

The Commandant of the Marine Corps should ensure that Marine Corps Logistics Command incorporates in its depot optimization plan, key results-oriented elements including analytically-based goals, results-oriented metrics, identification of required resources, risks, and stakeholders, and regular reporting to decision makers on progress.

Status: Open

Concurrence: Yes

Comments: DOD concurred with this recommendation. The Marine Corps released a report on its Industrial Base in July 2019 and as of May 2021, the Marine Corps has implemented a Depot of the 21st Century initiative in order to establish the framework for modernization that will support the Marine Corps’ future force. We will assess whether the plan meets the intent of this recommendation through an ongoing engagement.

Recommendation #13:

Status: Open

Concurrence: No

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of Defense should ensure that the Assistant Secretary of Defense for Sustainment develops an approach for managing service depot investments that includes management monitoring and regular reporting to decision makers and Congress on progress.

Comments: DOD stated it could not develop such an approach until the services finalized and resourced depot optimization plans. DOD stated it would continue to monitor capital investments at service depots through the budget process. We continue to believe that the Assistant Secretary of Defense (ASD) for Sustainment should develop an approach for managing service depot investments that includes management monitoring and regular reporting to decision makers and Congress on progress. First, our recommendation is focused on the ASD for Sustainment developing an approach for overseeing the services' overall depot investments, not just those contained in their optimization plans. Second, the ASD for Sustainment's early involvement in the services' development and resourcing of depot optimization plans could enhance service efforts to identify appropriate analytically-based goals aligned with the Secretary of Defense's readiness objectives, enhance optimization across the DOD enterprise, and ensure sustained senior leadership attention to achieving optimal depot efficiency and effectiveness. Third, while monitoring investments at the service depots through the budget process is an important aspect of oversight, the ASD for Sustainment could enhance the oversight of and accountability over depot investments through a more comprehensive oversight approach. Finally, having regular reporting of progress will help ensure DOD leadership and the Congress have the information needed to help make critical funding and policy decisions. Section 359 of the National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92 (2019) mandated that DOD create a comprehensive strategy for improving depot infrastructure by October 2020. DOD issued this strategy in November 2021, but excluded discussion on managing service depot investments. According to OSD officials, annual updates to Congress will include information on service depot investments. To fully implement this recommendation, DOD needs to provide evidence of actions taken to manage service depot investments.

Source: GAO analysis of recommendations made in [GAO-19-242](#). | GAO-22-105009

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

Table 13: Status of Recommendations from Naval Shipyards: Actions Needed to Improve Poor Conditions That Affect Operations (GAO-17-548)

Recommendation #1:	
<p>The Secretary of the Navy should develop a comprehensive plan for shipyard capital investment that establishes (1) the desired goal for the shipyards' condition and capabilities; (2) an estimate of the full costs to implement the plan, addressing all relevant requirements, external risk factors, and associated planning costs; and (3) metrics for assessing progress toward meeting the goal that include measuring the effectiveness of capital investments.</p>	<p>Status: Open</p> <hr/> <p>Concurrence: Yes</p> <hr/> <p>Comments: The Navy concurred with this recommendation and said it would take steps to develop and implement a comprehensive plan. Naval Sea Systems Command (NAVSEA) produced a Shipyard Infrastructure Optimization Plan in February 2018 to guide the overhaul and improvement of the naval shipyards. This plan includes some of the recommended elements but not others. (1) The plan includes some goals for the desired shipyard condition and capabilities including to: recover almost 70 maintenance periods over the next 20 years, modernize capital equipment to industry standards, optimize facilities, and reduce travel time and movement for personnel and materiel during the maintenance process. Navy officials stated the program office is in the process of creating digital maps of the yards to use in modeling facility layouts to identify the optimal layout. The Navy states that the optimal layout will recover 328,000 man days per year, a 65 percent reduction of travel and movement. (2) The report includes a preliminary cost estimate, but work is underway to determine the full costs to address all relevant requirements, risk factors, and planning costs. The plan identifies risks that could increase costs, but does not identify solutions to address those risks. Program officials said they will develop plans to address the risks in subsequent phases of the planning effort. The risks Navy officials identified included historical preservation, environmental regulations, and the need for extra capacity. (3) As of February 2022, the plan did not include metrics for assessing progress toward meeting each of the goals. Navy officials have stated that they intend to develop metrics to meet this element during a second phase that will be complete in fiscal year 2024. To fully implement this recommendation, the Navy should complete its optimization plan, develop a reliable cost estimate addressing all relevant requirements, risks, and planning costs, and develop metrics to help it assess progress towards meeting its goal that include measuring the effectiveness of capital investments.</p>
Recommendation #2:	
	<p>Status: Implemented</p> <hr/> <p>Concurrence: Yes</p>

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

The Secretary of the Navy should conduct regular management reviews that include all relevant stakeholders to oversee implementation of the plan, review metrics, assess the progress made toward the goal, and make adjustments, as necessary, to ensure that the goal is attained.

Comments: The Navy concurred with this recommendation and said it would take steps to conduct regular management reviews. To address this recommendation, the Navy issued NAVSEA Notice 5450, Establishment of the Shipyard Infrastructure Optimization Program Management Office in June 2018. This notice established a new program management office responsible for planning, developing, scheduling, budgeting, and sustaining the Shipyard Infrastructure Optimization Plan. In addition, the Assistant Secretary of the Navy for Research, Development, and Acquisition, in September 2018, required this new program office to provide regular updates to an Executive Oversight Council.

According to Navy officials, the goal of that council is to have collective semi-annual meetings with all relevant stakeholders. The Navy held their first such meeting in October 2019, which included leadership from the Office of the Secretary of the Navy, Office of Naval Operations, Naval Sea Systems Command, Naval Facilities Command, and Navy Installations Command. In addition, in April 2020, the Vice Chief of Naval Operations issued a memo that required the Shipyard Infrastructure Optimization Plan to provide semiannual briefings on its progress to a Resources and Requirements Review Board, which would review the plan's requirements, resources, and execution.

Navy officials held the first of these board meetings in June 2020. Its second meeting was postponed by COVID-19, but eventually held in January 2021. By creating the program office and requiring regular briefings to the Executive Oversight Council and Resources and Requirements Review Board, the Navy has taken meaningful steps to implement a framework of regular management reviews for the plan. These actions met the intent of this recommendation.

Recommendation #3:

The Secretary of the Navy should provide regular reporting to key decision makers and Congress on the progress the shipyards are making to meet the goal of the comprehensive plan, along with any challenges that hinder that progress, such as cost. This may include reporting on progress to reduce their facilities restoration and modernization backlogs, improve the condition and configuration of the shipyards, and recapitalize capital equipment.

Status: Implemented

Concurrence: Yes

Comments: The Navy concurred with this recommendation and said it would take steps to provide regular reporting to key decision makers and Congress. DOD officials stated in October 2018 that the Shipyard Infrastructure Optimization Plan, along with the creation of the Readiness Reform Oversight Council, began to address this recommendation. The Navy provided additional reports to Congress in February and June of 2020, describing specific efforts, such as military construction and capital equipment that would be needed for the Shipyard Infrastructure Optimization Plan.

Finally, a mandate in the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283, § 346 (2021) required the Navy to submit biannual reports to Congress on the status of the Shipyard Infrastructure Optimization Plan through Fiscal Year 2025. The Navy provided an initial status update pursuant to this mandate in September 2020, with a second in September 2021. Given the statutory nature and 5-year timeframe of this mandate, we assessed that this met the intent of this recommendation.

Source: GAO analysis of recommendations made in [GAO-17-548](#). | GAO-22-105009

**Appendix II: Implementation Status of Prior
GAO Recommendations Related to Depot
Infrastructure Improvements**

Table 14: Status of Recommendations from Defense Facility Condition: Revised Guidance Needed to Improve Oversight of Assessments and Ratings (GAO-16-662)

Recommendation #1:	
<p>To improve the Office of the Secretary of Defense’s (OSD) oversight of the services’ progress in implementing the standardized process for assessing facility conditions and recording facility condition ratings based on that process, the Assistant Secretary of Defense for Energy, Installations, and Environment should revise its guidance to clarify how—either in DOD’s Real Property Assets Database or by some other mechanism—the services are to indicate when a facility condition rating recorded in DOD’s Real Property Assets Database is based on the standardized process.</p>	<p>Status: Implemented</p> <hr/> <p>Concurrence: Partial</p> <hr/> <p>Comments: DOD partially concurred with our recommendation, stating in its written comments that they conduct periodic implementation reviews to ensure that the services are making appropriate progress in implementing the 2013 policy memorandum, and that these reviews use data directly from the Sustainment Management System since that system reflects real-time data and is more reliable for program management oversight. DOD also stated that they do not use the Real Property Assets Database to manage or oversee the services’ progress in inspecting their facilities. In August 2018, an official in the Office of the Assistant Secretary of Defense for Sustainment stated that the office planned to begin requesting information from the military services on the status of completing facility condition assessments based on the standardized process.</p> <p>In September 2018, the services began reporting this information, which included the percentage of buildings in each service’s inventory that had been assessed using the standardized process, the planned date for completing assessments on the remaining buildings, and the number of buildings with a facility condition rating in the Real Property Assets Database that is either missing or entered as zero. Officials in the Office of the Assistant Secretary of Defense for Sustainment told us that they intend to request this information annually to monitor the services’ progress. As a result, DOD should have improved oversight of the services’ progress in using the standardized process for assessing and rating the condition of facilities.</p>

Source: GAO analysis of recommendations made in [GAO-16-662](#). | GAO-22-105009

Appendix III: Comments from the Department of Defense



SUSTAINMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

Ms. Diana Maurer
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Ms. Maurer:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-22-105009, 'MILITARY DEPOTS: DOD Strategy for Addressing Deteriorating Facilities and Equipment is Incomplete,' dated April 1, 2022 (GAO Code 105009). Enclosed is the Department's response to the recommendations in Draft Report GAO-22-1005009.

Sincerely,

RAMDASS.VICK¹ Digitally signed by
Y.SHASHINDER HINDERAJ.1019209780
AJ.1019209780 Date: 2022.04.21
09:58:43 -04'00'

Vic S. Ramdass, Ph.D
Deputy Assistant Secretary of Defense
(Materiel Readiness)

Enclosure:
As stated

**GAO DRAFT REPORT DATED APRIL 1, 2022
GAO-22-105009 (GAO CODE 105009)**

**“MILITARY DEPOTS: DOD STRATEGY FOR ADDRESSING DETERIORATING
FACILITIES AND EQUIPMENT IS INCOMPLETE”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION**

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the military services to identify in annual budget submissions the minimum level of annual investment needed to prevent further infrastructure deterioration as a percentage of the three-year rolling average of maintenance, repair, and overhaul workload funded at all the covered depots of that military service.

DoD RESPONSE: DoD partially concurs with this recommendation. DoD concurs with the intent of this recommendation, but believes that GAO’s suggested mechanism to accomplish this intent is duplicative.

First, as required by section 359 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020, the Secretary of Defense is required to perform a business case analysis (BCA) that assesses infrastructure investment alternatives comparing cost, performance, risk, and readiness outcomes and recommend an optimal investment approach across DoD to ensure covered depots effectively and efficiently meet required readiness goals of current and future weapon systems. This BCA, which is a required element of the depot infrastructure strategy (see Recommendation 2) is currently in progress, and will focus on assessing: (a) the minimum investment necessary to meet investment requirements under section 2476 of title 10, United States Code; (b) the investment necessary to ensure the current inventory of facilities at the covered depots can meet the Secretary of Defense’s mission capable, readiness, and contingency goals; (c) the investment necessary to execute each Military Department’s depot infrastructure optimization plans; and (d) any other strategies for investment in covered depots, as identified by the Secretary.

Second, pursuant to under section 2476 of title 10, United States Code, each Military Department is already required to annually invest an amount equivalent to six percent of the three-year average total combined maintenance, repair, and overhaul workloads funded at all of its depots in its covered depots’ capital budgets. These investments include funds spent to modernize or improve depot facilities, equipment, work environment, or processes, which includes investment needed to prevent infrastructure deterioration. The Department has been complying with this statutory requirement, and will continue to do so.

Thus, while the Department concurs with GAO’s recommendation that the Military Departments need to identify the minimum levels of annual investment in their covered depots necessary to prevent infrastructure deterioration, DoD is meeting this intent through: (a) the BCA that, when complete, will identify the minimum infrastructure investment levels at the covered depots; and

**Appendix III: Comments from the Department
of Defense**

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(b) its compliance with section 2476 of title 10, United States Code, which will ensure that the funding levels identified in the aforementioned BCA will be invested in the covered depots infrastructure. As a result, directing the Military Services to identify the minimum level of annual investment needed to prevent infrastructure deterioration in annual budget submissions is duplicative to the Department's current and in-progress actions to accomplish this recommendation's intent.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense ensure that the department completes the depot infrastructure strategy in a timely manner to fully address all required elements.

DoD RESPONSE: DoD concurs with this recommendation.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the contact named above, Suzanne Wren (Assistant Director), James Lackey (Analyst in Charge), Ava Bagley, Lyndsay Baker, Amy Bush, Chad Hinsch, Amie Lesser, Claire Liu, Felicia Lopez, Richard Powelson, and Elizabeth Wood made significant contributions to this report.

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