



May 2018

DEFENSE INFRASTRUCTURE

DOD Needs to Improve the Accuracy of Its Excess Capacity Estimates

GAO Highlights

Highlights of [GAO-18-230](#), a report to congressional committees

Why GAO Did This Study

DOD has used the Base Realignment and Closure (BRAC) process primarily to reduce excess infrastructure capacity, transform the force, and produce cost savings. DOD completed hundreds of base closures and realignments in previous BRAC rounds and intends to work with Congress to address remaining excess capacity. The NDAA for Fiscal Year 2016 required DOD to submit, among other things, a force structure plan and a categorical infrastructure inventory of worldwide military installations. In response, DOD submitted its infrastructure capacity report to Congress in October 2017.

The NDAA included a provision for GAO to evaluate DOD's report for accuracy and analytical sufficiency. In this report, GAO evaluates the extent to which (1) DOD's report included the required elements, and (2) DOD's methodology and analysis result in accurate and analytically sufficient information on excess capacity. To conduct this work, GAO reviewed DOD's 2017 report and compared it with the statutory requirements and generally accepted research standards. GAO also interviewed DOD and military service officials.

What GAO Recommends

GAO is making three recommendations to DOD to update the baseline; use reasonable assumptions; and develop guidance to improve its methods for estimating excess capacity. In comments on a draft of this report, DOD concurred with one recommendation, partially concurred with two recommendations, and plans to incorporate them in any future capacity analysis.

View [GAO-18-230](#). For more information, contact Brian Lepore at (202) 512-4523 or leporeb@gao.gov.

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What GAO Found

The Department of Defense's (DOD) 2017 infrastructure capacity report addressed four of five required elements from section 2815 of the National Defense Authorization Act (NDAA) for Fiscal Year 2016. Specifically, DOD's report addressed the elements requiring it to submit

- a force-structure plan,
- a categorical inventory of worldwide military installations,
- a discussion of categories of excess infrastructure, and
- an assessment of the value of retaining certain excess infrastructure.

DOD's report partially addressed the element to include a description of the infrastructure capacity required to support the force structure. Specifically, DOD's report did not provide a complete picture of the infrastructure needed. For example, infrastructure at Air Force large aircraft installations was described by square yards of apron space, but did not include other infrastructure needs such as aircraft hangars and maintenance facilities.

DOD's excess capacity methodology and analysis has three key limitations that affect the accuracy and analytical sufficiency of the estimate. Specifically:

- DOD used a 1989 baseline for excess capacity that may lead to inaccurate results. This 1989 baseline does not reflect updates in DOD facility standards and requirements or requirements associated with new weapon systems.
- DOD's excess capacity methodology includes assumptions, such as not accounting for potential shortfalls—not having enough infrastructure to support the mission—that may not be reasonable. Specifically, when DOD's calculation identifies shortfall in capacity, DOD concludes that no excess capacity exists. As a result, DOD's analysis identifies no excess capacity in nearly half (14 of 32) mission categories. However, most installations support more than one mission and have more infrastructure present than the installation category metric measures. Thus, including potential capacity shortfalls could provide DOD and Congress with a more accurate estimate of excess capacity upon which to base decisions concerning the management of base infrastructure and excess capacity.
- DOD's method for estimating excess capacity is not always sufficient because the installation selection process does not result in a generalizable sample. Furthermore, DOD's method is not always implemented effectively because the military departments did not follow a consistent approach.

According to DOD officials, specific department-wide guidance concerning DOD's methods for selecting installations in its analysis does not exist. Moreover, without developing guidance, the estimate of excess capacity may not be based on consistent methods across the department, resulting in inaccurate estimates. Furthermore, neither DOD nor Congress will have the necessary information to make decisions concerning the management of excess infrastructure capacity across the department.

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Abbreviations

BRAC	Base Realignment and Closure
DOD	Department of Defense
EEA	Essential Elements of Analysis
MOE	Measures of Effectiveness
NDAAs	National Defense Authorization Act

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May 24, 2018

Congressional Committees

The Department of Defense (DOD) has used the Base Realignment and Closure (BRAC) process primarily to reduce excess infrastructure, readjust bases to accommodate changes in the size and structure of DOD's forces, and produce cost savings. Congress authorized five BRAC rounds in 1988, 1991, 1993, 1995, and 2005, and DOD completed hundreds of base closures and realignments as a result. To address remaining excess capacity, between 2013 and 2017 DOD requested additional BRAC rounds and, in February 2018, stated that it would work with Congress to find common areas where reforms and changes could be made. Congress has not authorized additional BRAC rounds to date.¹

Section 2815 of the National Defense Authorization Act (NDAA) for Fiscal Year 2016 required the Secretary of Defense to submit:

- a force-structure plan for each military service—the Army, Navy, Air Force, and Marine Corps;
- a categorical infrastructure inventory of worldwide military installations for each military department;
- a description of the infrastructure necessary to support the force structure;
- a discussion of categories of excess infrastructure and infrastructure capacity; and
- an assessment of the value of retaining certain excess infrastructure to accommodate contingency, mobilization, or surge requirements.²

¹The federal government has experienced long-standing problems in addressing its excess infrastructure. As a result, we have included Managing Federal Real Property across the federal government and specifically DOD's Support Infrastructure Management on our High-Risk List, which highlights program areas that are vulnerable to fraud, waste, abuse, and mismanagement, or are most in need of transformation. See also GAO, *High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, [GAO-17-317](#) (Washington, D.C.: Feb. 15, 2017).

²National Defense Authorization Act for Fiscal Year 2016, Pub. L. No. 114-92 § 2815 (2015).

DOD provided its final report—*Department of Defense Infrastructure Capacity*—to Congress on October 6, 2017.³

The act also included a provision for us to evaluate the force-structure plan and categorical infrastructure inventory for accuracy and analytical sufficiency. In this report, we evaluate the extent to which (1) DOD’s 2017 infrastructure capacity report included the required elements and (2) DOD’s methodology and analysis in its report results in accurate and analytically sufficient information on excess capacity.

For objective one, we reviewed DOD’s 2017 infrastructure capacity report and compared it with the required elements contained in section 2815 of the NDAA for Fiscal Year 2016. Specifically, two analysts independently reviewed DOD’s infrastructure capacity report using a scorecard to determine whether the report included information that met the required reporting elements. We considered an element to be “addressed” if DOD’s 2017 infrastructure capacity report provided any evidence to support all aspects of the requirement. We considered an element to be “partially addressed” if the report provided evidence concerning some aspects of the requirement and “not addressed” if the report did not provide any evidence concerning any aspect of the requirement. We then reconciled the individual reviews, and reached a consensus on our assessment.

For objective two, we assessed the contents of DOD’s 2017 infrastructure capacity report against a relevant subset of the generally accepted research standards that we have described in a previous report.⁴ Specifically, we focused on whether assumptions were reasonable and, where appropriate, consistent; methods were sufficient and successfully executed; and the baseline and other data used to support the analyses were determined to be reliable and valid. All of the applied standards were considered to have equal importance regarding the accuracy and analytical sufficiency of the report. Some modification of the wording of

³Department of Defense, *Department of Defense Infrastructure Capacity*, (October 2017). Hereafter referred to in this report as DOD’s 2017 infrastructure capacity report.

⁴GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, [GAO-06-938](#) (Washington, D.C.: Sept. 20, 2006). To identify these standards, we had reviewed research literature and DOD guidance and identified frequently occurring, generally accepted research standards that are relevant for defense studies such as the Mobility Capabilities Study that define a high-quality or sound and complete study.

some of the standards was needed for the standard to be relevant and appropriate in the context of DOD's 2017 infrastructure capacity report. In such instances, we kept the meaning of the standard, but modified the language to align with the objectives and scope of DOD's tasks. Appendix I describes all the research standards, identifies the standards we chose to use in evaluating the quality of the research results conveyed in DOD's report, and provides the rationale for the inclusion and exclusion of each specific standard.

To conduct our analysis of DOD's 2017 infrastructure capacity report against the selected research standards, two analysts independently reviewed the contents of the report for information indicating the extent to which the presented analyses, results, and conclusions met these standards. We considered the report to have "met" a research standard when its contents explicitly addressed all aspects of the standard with sufficient specificity and detail. We considered the report to have "partially met" a standard when its contents addressed one or more attributes of the standard, but not all of the standard's attributes, or without sufficient specificity and detail. We considered the report to have "not met" a standard when its contents did not explicitly address any of the attributes of the standard and any implicit references to the standard's attributes were too vague or general to be useful. We then reconciled the individual assessments, and reached a consensus on the overall assessment. To further corroborate our scorecard assessment, we had a second pair of technical experts independently assess the validity and reliability of the methodology used to generate the report's results.

We conducted this performance audit from April 2016 to May 2018 in accordance with generally accepted government auditing standards.⁵ 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.

⁵We began this engagement in April 2016 after the President's Budget for Fiscal Year 2017 was submitted to Congress. DOD provided Congress with an interim report in April 2016. However, DOD did not submit its final report to Congress until October 2017.

Background

The Defense Base Closure and Realignment Act of 1990, as amended, has governed the BRAC process since 1990. The law established the procedures for making recommendations for base closures and realignments and originally required DOD to submit a 6-year force-structure plan and base its closure and realignment decisions on that plan.⁶ For the 1991, 1993, and 1995 BRAC rounds, DOD performed a detailed capacity analysis based on extensive data-collection efforts to identify specific bases capable of accommodating additional forces to develop its proposed list of closures and realignments. In 1997, after DOD requested another BRAC round, Congress required DOD to submit a report on, among other things, the need for any additional BRAC rounds and an estimate of the amount of DOD's excess capacity at the time.⁷ In 2001, when Congress authorized a BRAC round to begin in 2005, it required DOD to submit a force-structure plan to cover a 20-year period and an infrastructure inventory with its budget-justification documents for fiscal year 2005 before proceeding with the extensive data gathering efforts and analysis associated with the BRAC process.⁸ The submission was also to discuss categories of excess infrastructure and infrastructure capacity.⁹

Prior statutes included provisions for us to review DOD's 1998 and 2004 excess capacity reports, which used a method to estimate excess capacity that was very similar to the method used in its 2017 report. Our 1998 and 2004 reports reviewed DOD's 1998 and 2004 excess capacity

⁶Pub. L. No. 101-510, Title XXIX (1990) (10 U.S.C. § 2687 note). In addition to the force-structure plan, DOD was to consider other selection criteria proposed and established for the round by DOD.

⁷National Defense Authorization Act for Fiscal Year 1998, Pub. L. No. 105-85, § 2824 (1997). DOD submitted the required report in 1998 and reported that the department had 23 percent excess capacity. The act also required DOD to report on costs and savings from the prior BRAC rounds. Congress chose not to authorize a BRAC round at that time.

⁸Congress authorized BRAC 2005 with the passage of the National Defense Authorization Act for Fiscal Year 2002, Pub. L. No. 107-107, Title XXX (2001). The law reauthorized the BRAC process by amending the 1990 BRAC statute. Among other things, the law added several new sections to the 1990 BRAC statute, including sections 2912 through 2914, which established or revised various requirements for DOD to address in order for the 2005 round to continue.

⁹DOD submitted the required report in 2004 and reported that the department had 24 percent excess capacity.

reports, respectively.¹⁰ Our 2013 report assessed the estimating methods used in both the 1998 and 2004 excess capacity reports.¹¹ In these three previous reports, we concluded that DOD's methodology to estimate excess capacity had a number of limitations, and thus gave a rough indication that excess capacity existed.¹² Specifically, we identified the following four limitations with the method used in DOD's 1998 and 2004 reports:

- Installations were assigned to a single-mission category, yet most installations perform more than one mission.¹³
- Military services used different metrics to evaluate installations in similar mission categories.
- DOD used a 1989 baseline that did not take into account any excess capacity or capacity shortfall that may have existed at the time.
- DOD's analysis did not consider the possibility that a mission category might have a capacity shortage; mission categories were determined to have either an excess or no excess capacity.

DOD agreed that our 2013 report properly highlighted the limitations in DOD's methodology for estimating excess capacity.¹⁴ At that time, DOD reiterated that the purpose of its methodology is to provide an indication of whether sufficient excess exists to justify authorization of another BRAC round. DOD concluded that only through the BRAC process is it

¹⁰GAO, *Military Bases: Review of DOD's 1998 Report on Base Realignment and Closure*, [GAO/NSIAD-99-17](#) (Washington, D.C.: Nov. 13, 1998) and *Military Base Closures: Assessment of DOD's 2004 Report on the Need for a Base Realignment and Closure Round*, [GAO-04-760](#) (Washington, D.C.: May 17, 2004). These reports did not contain recommendations to address the limitations identified because DOD reported that its analysis was designed to provide a broad assessment of whether another round of BRAC was needed. Only through the BRAC process is DOD able to determine excess capacity by installation and by mission or function in a process that is thorough and fair, according to DOD.

¹¹GAO, *Defense Infrastructure: DOD's Excess Capacity Estimating Methods Have Limitations*, [GAO-13-535](#) (Washington, D.C.: June 20, 2013). This report did not contain recommendations to address the limitations identified because DOD reported that its analysis was designed to provide a broad assessment of whether another round of BRAC was needed.

¹²[GAO/NSIAD-99-17](#); [GAO-04-760](#); and [GAO-13-535](#).

¹³Mission category refers to the primary mission that an installation performs as determined by the military services.

¹⁴[GAO-13-535](#).

able to determine excess capacity by installation and mission or function in a fair and thorough way. A list of related GAO products is included at the end of this report.

DOD’s 2017 Infrastructure Capacity Report Addressed or Partially Addressed the Required Elements

DOD’s 2017 infrastructure capacity report addressed or partially addressed the five required elements from section 2815 of the NDAA for Fiscal Year 2016. As shown in table 1, DOD addressed four of the required elements and partially addressed one element.

Table 1: GAO’s Assessment of the Extent the Department of Defense’s (DOD) Infrastructure Capacity Report Addressed Required Elements

Reporting element	What the report does and does not include	GAO’s Assessment
A force-structure plan for each of the Army, Navy, Air Force, and Marine Corps	<ul style="list-style-type: none"> DOD’s report discussed force structure that includes “Major Military Force Units” and the “End Strength” by military service. DOD’s report also discussed the probable threats to the United States’ national security. 	●
A categorical inventory of world-wide military installations for each military department	<ul style="list-style-type: none"> DOD’s report included a world-wide, categorical inventory of infrastructure that identifies the number of assets for both active and reserve forces for each of the military services. 	●
A description of the infrastructure necessary to support the force structure described in each force-structure plan.	<ul style="list-style-type: none"> DOD’s report included only a partial description of the infrastructure necessary to support the force-structure plan because the report describes infrastructure based on a single metric, which does not address needs in all infrastructure categories. 	◐
A discussion of categories of excess infrastructure and infrastructure capacity.	<ul style="list-style-type: none"> DOD’s report identified the categories of infrastructure where excess is likely for each of the military departments and the Defense Logistics Agency. 	●
An assessment of the value of retaining certain excess infrastructure to accommodate contingency, mobilization, or surge requirements.	<ul style="list-style-type: none"> DOD stated that it is more cost effective to rebuild a capability than it is to continually maintain excess assets. DOD retained excess capacity when the capability is “difficult to reconstitute.” 	●

Legend: ● Addressed ◐ Partially addressed ○ Not addressed

Source: GAO analysis of legislation and DOD Information | GAO-18-230

Note: GAO analyzed section 2815 of the National Defense Authorization Act for Fiscal Year 2016 and DOD, Department of Defense Infrastructure Capacity (October 2017).

DOD's report partially addressed the requirement to include a description of the infrastructure capacity required to support the force structure because the report describes only a small portion of the capacity needed. For example, in the case of Air Force large aircraft installations, the needed infrastructure was described in terms of the square yards of apron space needed to support the assigned aircraft, but did not describe other infrastructure needs such as aircraft hangars, maintenance facilities, and administrative space used by squadrons assigned to the installation. Similarly, in the case of Army maneuver installations, the needed infrastructure was described in terms of maneuver acres needed, but did not describe other infrastructure necessary to support assigned units. Consequently, the description of infrastructure needed does not provide DOD and Congress with a complete picture of the infrastructure needed to support the force structure at these major installations. However, as DOD points out in its report to Congress, the analysis performed does not provide the detail necessary to identify specific infrastructure for elimination; instead it provides an indicator of the categories of excess. DOD also stated that this level of detail is only provided through the formal BRAC process. Consequently, without a formal BRAC round, DOD does not have the details necessary to identify the total infrastructure necessary to support its current force structure. Therefore, we are not making any recommendations concerning this reporting requirement.

DOD's Excess Capacity Methodology and Analysis Has Limitations That Affect the Accuracy and Analytical Sufficiency of the Estimate

DOD's excess capacity methodology and analysis has limitations that affect the accuracy and analytical sufficiency of the estimate. Specifically, DOD's use of a 1989 baseline for excess capacity results in inaccurate estimates of excess capacity; DOD's methodology included assumptions that were not always reasonable; and DOD's approach to estimating excess capacity is not always sufficient or implemented consistently across the military departments. DOD noted some of these same limitations in its 2017 infrastructure capacity report.

DOD's Use of 1989 Data as the Baseline for Its Excess Capacity Analysis Results in Inaccurate Estimates of Excess Capacity

DOD's use of 1989 data as the baseline for its excess capacity analysis resulted in inaccurate estimates of excess capacity. According to generally accepted research standards, listed in appendix I, the baseline and other data used to support the analysis should be determined to be reliable and valid. Specifically, the baseline should be fully and completely identified and used consistently, where appropriate. In addition, the data limitations should be identified and the effect of these limitations should be fully explained. DOD has also recognized that using 1989 as a baseline did not account for excess capacity that existed in 1989. However, DOD only partially explained the effect of this limitation on its estimate of excess capacity.

First, using 1989 as the baseline assumes that the bases and facilities as they existed in 1989 were appropriately sized to support their missions. However, DOD's 2017 infrastructure capacity report did not provide a rationale for either why 1989 was an appropriate baseline or why the bases and facilities were assumed to be appropriately sized at that time. In fact, as discussed below, DOD has stated that excess capacity existed in 1989, but does not attempt to quantify the amount. Further, in at least one mission category, Marine Corps Bases, DOD acknowledges that it overstated excess capacity because the baseline ratio was based on infrastructure numbers that were not adjusted to recognize the documented shortfalls that existed in 1989.

Second, the effects of DOD's assumptions about the 1989 baseline have not been consistently reported by DOD. DOD has used the same baseline in its three analyses conducted over the past 20 years, yet DOD draws different conclusions concerning how the baseline affects its estimates of excess capacity.¹⁵ For example, DOD concluded

- in 1998 that excess capacity existed in the 1989 baseline because the majority of realignment and closures took place after 1989;
- in 2004 that very significant excess capacity existed in the 1989 baseline; and
- in 2017, in DOD's infrastructure capacity report, that the 1989 baseline was both properly sized to support assigned missions and forces and included significant excess capacity.

¹⁵Although 1989 is used as the baseline, DOD's first excess capacity analysis was performed in 1998.

Nevertheless, DOD has consistently stated that its estimate of excess capacity is likely conservative because significant excess existed in 1989. DOD also stated that its analysis provides an indicator of the categories where excess might exist and that only through a BRAC round can the department undertake the detailed analysis necessary to make closure and realignment recommendations. Since 1988, DOD has completed five BRAC rounds that have closed a significant number of DOD facilities. In addition, as discussed below, DOD facility standards and requirements have been updated and new weapon systems have been introduced, which can affect the amount and type of infrastructure needed. Consequently, without a definitive measure of the excess that existed in 1989, as well as adjustments in the method to account for the effect of updated facility standards and requirements, and new weapons systems, there is no clear rationale for using 1989 as a baseline year in the estimate of excess capacity provided by DOD's analysis.

Third, during the last 29 years DOD facility standards and requirements have been updated and new weapon systems with greater ranges and capabilities have been developed that have changed the amount and type of infrastructure needed to support DOD's forces. For example, we recently reported that only 11 of the Navy's 18 drydocks are configured to perform maintenance on the newer ship and submarine classes like the *Ford*-class aircraft carrier and *Virginia*-class submarine.¹⁶ Using such an old baseline, without making adjustments in the method to account for these changes, leads us to conclude that DOD's results are likely inaccurate.

Because DOD continues to use its outdated 1989 baseline we found that DOD's 2017 excess capacity analysis results in estimates that are likely inaccurate. Without updating the baseline that is used in the methodology to calculate excess capacity across DOD, DOD will not have accurate information for making critical decisions related to investments in infrastructure. Furthermore, Congress will not have accurate information to make fully informed decisions concerning whether and to what extent another BRAC round is needed.

¹⁶GAO, *Naval Shipyards: Actions Needed to Improve Poor Conditions that Affect Operations*, [GAO-17-548](#) (Washington, D.C.: Sept. 12, 2017).

DOD's Methodology for Estimating Excess Capacity Includes Assumptions That Are Not Always Reasonable

DOD's excess capacity methodology includes assumptions that are not always reasonable, such as assigning installations to only one mission category.¹⁷ According to generally accepted research standards, reasonable assumptions are characterized by being realistic, credible, and accompanied by a statement of their rationale. In addition, these standards also state that assumptions should support a sound analysis (e.g., the assumptions should not skew the results of the analysis or reduce the range of possible outcomes).

We previously reported limitations related to DOD's assumptions when we examined DOD's excess capacity analyses in 1998, 2004, and 2013.¹⁸ DOD continues to use the same methodology in 2017 that it has previously used to estimate excess capacity; thus, these limitations continue to exist in its methodology in its 2017 report. First, DOD's approach of assigning an installation to only one mission category treats an installation as if it has only one mission, yet most installations support more than one mission. As a result, only a small portion of an installation's infrastructure may be considered by DOD's analysis. For example, in the case of Fort Bragg, North Carolina, which is included in the maneuver base category by the Army, base acres are included in the analysis, but more than 43.8 million square feet of infrastructure is not considered. Similarly, in the case of Naval Base Kitsap, Washington, which is included in the Naval Station category by the Navy, the pier space is considered in the analysis, but the more than 7.5 million square feet of facilities is not considered. In addition, as discussed later in this report, there were instances where the military departments included installations in more than one mission category. Finally, there are several categories that measure capacity in terms of direct labor hours or work-years, but the analysis does not include the actual infrastructure, such as buildings, structures, and linear structures. Consequently, the assumption that each installation is included in one mission category may not be reasonable because only a portion of the infrastructure at the installations is being considered when identifying potential excess capacity.

¹⁷Installation category is defined differently by each military department and the Defense Logistics Agency. Hereafter, we refer to installation category as mission category.

¹⁸[GAO/NSIAD-99-17](#), [GAO-04-760](#), and [GAO-13-535](#). These reports did not contain recommendations to address the limitations identified.

Second, as implemented, DOD's estimate of excess capacity may be overstated because its methodology did not account for any potential shortfalls in capacity—not having enough infrastructure to support the mission—and did not provide a rationale for this approach in its calculations. As illustrated in table 2, when DOD's calculation identifies that the proportional capacity is less than the infrastructure capacity for the year being analyzed (i.e., DOD needs less infrastructure than it has), DOD concludes that excess capacity exists and provides a percentage amount of excess capacity.¹⁹ However, when the proportional capacity exceeds the infrastructure capacity for the year being analyzed (i.e., DOD may need more infrastructure), DOD concludes that no excess capacity exists. Moreover, DOD's calculation provides a zero percentage for excess capacity, rather than a negative percentage that would account for a potential capacity shortfall in its analysis. DOD's 2017 infrastructure capacity analysis identifies zero percent excess capacity in nearly half (14 of 32) of the installation categories that needed more capacity—included in the analysis, including 8 or 12 Navy installation categories.

¹⁹ Proportional capacity is the number derived when DOD's 1989 baseline ratio is multiplied by the 2012 force structure.

Table 2: Examples of Excess Capacity and of Potential Shortfalls at Military Installations Not Accounted for in the Excess Capacity Analysis^a

Category type	Fiscal year 1989 (ratio)	Fiscal year 2012 Capacity	Fiscal year 2012 force structure	Proportional Capacity	Delta from fiscal year 2012 Capacity ^b	Excess fiscal year 2012 Capacity (percent) ^b
Mission Category Shows Excess Capacity						
Major Training Reserve (Army) ^c	0.8101	333,724	205,000	166,065	167,659	50%
Naval Bases ^d	1.0670	431	289	308	123	28%
Large Aircraft (Air Force) ^e	14,623.58	14,920,059	717	10,485,109	4,434,950	30%
Mission Category Shows “No Increase” in Excess Capacity, Yet Potential Shortfall Is Reflected						
Major Training Active (Army) ^f	7,820	945,900	140	1,094,854	-148,954	-16%
Air Stations (Navy) ^g	1.1748	310	329	386	-76	-25%
Air National Guard (Air Force) ^h	17,206.75	769,995	50	860,337	-90,342	-12%

Source: GAO analysis of Department of Defense (DOD) data | GAO-18-230.

Note: GAO analyzed data from DOD, Department of Defense Infrastructure Capacity (October 2017).

^aFourteen of the 32 mission categories included in the analysis showed “no increase” in excess capacity, yet a potential shortfall may exist as reflected in this table.

^bNumbers in italics are GAO computations.

^cThe Major Training Reserve ratio compares base acres to end strength. Capacity is measured in base acres.

^dThe Naval Bases ratio compares cruiser equivalent available to cruiser equivalent assigned. Capacity is measured in cruiser equivalent available.

^eThe Large Aircraft ratio compares parking apron space (square yards) to number of large aircraft. Capacity is measured in parking apron space (square yards).

^fThe Major Training Active ratio compares base acres to maneuver battalion equivalents. Capacity is measured in base acres.

^gThe Air Stations ratio compares hangar modules available to hangar modules required. Capacity is measured in hangar modules available.

^hThe Air National Guard ratio compares parking apron space (square yards) to National Guard aircraft. Capacity is measured in parking apron space (square yards)

Because DOD’s methodology uses the excess capacity percentages from the 32 installation categories to compute a weighted average for excess capacity across the department, treating a negative percentage from a mission category as 0.0 percent would increase DOD’s overall excess capacity percentage. DOD officials believe that treating these 14 installation categories as if they have 0.0 percent excess capacity is appropriate because the purpose of the analysis is to identify the categories where excess capacity may exist. In addition, they asserted

that treating these categories as if they had a shortfall would assume that infrastructure from 1 of the 18 other installation categories identified as having excess capacity could be used to offset the shortfall when the categories are likely to have different metrics. DOD officials also told us that, from their perspective, no increase does not mean that there is large deficit of infrastructure within a mission category; it just means that the infrastructure to force-structure ratio indicates that the particular category does not have excess. We found, however, 6 installation categories where the force-structure measure exceeds the capacity measure, which indicates that a shortfall exists. In addition, because most installations support more than one mission and have more infrastructure present than the mission category metric measures, including potential capacity shortfall in its analysis could provide DOD and Congress with a more accurate estimate of excess capacity.

DOD's methodology to estimate excess capacity includes assumptions that are not reasonable. Without using assumptions to estimate excess capacity that are considered reasonable (i.e., realistic, credible, and accompanied by a statement of their rationale), DOD's methodology may overstate its estimate of excess capacity.

DOD's Method for Estimating Excess Capacity Is Not Always Sufficient or Implemented Consistently

DOD's method for estimating excess capacity across the department is not sufficient because it is based on a nongeneralizable sample and therefore its reported estimates cannot be generalized to describe excess capacity across the department.²⁰ Furthermore, DOD's sampling method is not always implemented effectively because some of the military departments adjusted the sampling approach. According to generally accepted research standards, the methods used and the analysis should be sufficient for accomplishing the objectives of the study. In addition, the analysis should be executed consistently with the study plan or the described methodology. We found that the calculations performed by DOD in the analysis were generally accurate.

First, DOD and the military departments used a nongeneralizable sample of different types of installations to develop an excess capacity estimate. However, a nongeneralizable sample cannot be used to develop a

²⁰ A nongeneralizable (or nonstatistical) sample is defined as a sample from a population that is not a statistical probability sample—for example, this type of sample includes judgmental, purposive and quota samples. The results from nongeneralizable samples are not considered representative, or generalized, to an entire population.

department-wide estimate of excess capacity because this technique is not designed to yield a sound probable statistical estimate. Specifically, when the analysis was first done in 1998, the military departments sorted installations into categories and only included installations that were considered by the departments to be “major installations.” The departments were to assign each “major installation” to only one mission category. The departments were to then calculate the estimated capacity by mission category for both the baseline year, 1989, and the projected force-structure year, 2003. The same approach was used for the 2017 analysis; however, neither the 1998 nor the 2017 analysis provided guidance to the military department concerning what constitutes a “major installation.” This approach for selecting and sorting samples of installations relies on the judgment of each of the military departments, yielding a nongeneralizable sample of installations that vary across the military departments. Consequently, the results from the analysis cannot be used to make inferences about the amount of excess capacity across DOD.

Second, the military departments did not follow a consistent approach when calculating excess capacity. Specifically, the DOD method bases its excess capacity estimate on the number of installations in each mission category. However, we found that, in the 2017 analysis, the military departments did not consistently follow the practice of including installations in only one category across the services when the analysis was performed in 2017. For example, we found several installations that were included in more than one category by some of the military departments:

- In the 2017 analysis, the Air Force included two subcategories under the heading of “Education and Training”: “Flight Training” and “Classroom.” The flight training subcategory included 13 installations and the classroom subcategory included 14 installations. We found that all 13 of the flight training installations were also included as classroom installations. Yet, when the analysis was performed in both 1998 and 2004, the same 14 installations were used, but 8 of the installations were then categorized as being flight training installations and the other 6 installations were categorized as classroom installations. If this previous categorization approach was used in the 2017 analysis, the Air Force estimate of excess capacity would have been about 2 percent lower.
- In two instances, the Navy included the same installations in both the “Naval Station” and “Air Station” categories and, in one instance, the Navy included a joint base in both the “Naval Station” and “Shipyards”

categories. According to a Navy official, these installations were included in both categories because a major mission would have been omitted from the analysis if the bases were included in only one category. This treatment, however, is not consistent with DOD's methodology.

Including the same installation in multiple installation categories may have resulted in double counting of capacity, and thereby affected the resulting estimate of excess capacity for multiple installation categories.

Third, the military departments did not consistently account for the joint bases in their excess capacity analysis.²¹ In some instances, we found that only the lead military department included the joint base in its analysis. For example, in the case of Joint Base Lewis-McChord, Washington—an Army-led joint base comprising Fort Lewis and McChord Air Force Base—the Army, consistent with its treatment of Fort Lewis in previous excess capacity analyses, included the joint base in its maneuver category. However, the Air Force did not include McChord Air Force Base in its analysis in 2017 although it had in previous years. In these instances where only the lead military department included the joint base in its analysis, the infrastructure associated with the tenant military department was usually left out of the analysis because the metric used by the leading department does not incorporate the same measures of infrastructure and force structure as the tenant department. In the Joint Base Lewis-McChord example, the Army included the base in the maneuver category, which is measured by the ratio of maneuver acres to maneuver battalion equivalents while the Air Force had previously used the ratio of parking apron space to number of aircraft to measure capacity at McChord Air Force Base. Consequently, DOD's analysis no longer takes into account the infrastructure that supports the flying mission at this joint base.

In other instances, we found that both the lead military department and the tenant military department included their portion of the infrastructure in their analyses. For example, for Joint Base Charleston, South Carolina—an Air Force-led joint base comprised of Charleston Air Force Base and Naval Support Activity Charleston—each of the military

²¹Based on a 2005 BRAC recommendation, DOD established 12 joint bases (5 joint bases in October 2009 and the remaining 7 in October 2010) by combining 26 installations in close proximity to each other that were originally operated by the Army, Navy, Air Force, or Marine Corps. Each joint base has a designated lead military service that provides installation support for base, including for tenant military services.

departments continued to include their portion of the infrastructure in their individual analyses. Consequently, DOD's analysis accounts for the infrastructure that supports both missions at the joint base.

DOD's method for estimating excess capacity is not always sufficient and is not implemented consistently across the military departments because DOD lacks specific department-wide guidance, according to DOD officials. Specifically, explicit guidance does not exist that clearly defines "major installations," identifies whether and when it is appropriate to include a facility in more than one category to take into account multiple missions at the facilities, or provides protocols for assessing excess capacity at joint bases. These topics were discussed in meetings with military department officials, but, according to DOD officials, no specific method was identified for department-wide use. Without developing guidance for the military departments, the estimate of excess capacity may not be based on consistent methods across the department, resulting in inaccurate estimates.

Conclusions

DOD's 2017 excess capacity analysis does not have the accuracy and analytical sufficiency to provide Congress with a reasonable estimate of the actual excess capacity within the department. DOD recognizes the limitations of its analysis, specifically noting that the resulting percentages of excess capacity are at best indicators to justify the more detailed analysis of excess capacity provided by a full BRAC analysis. Specifically, DOD used a baseline for the analysis that did not fully take into account changes in infrastructure needs since 1989, used assumptions in its analysis that are not reasonable, and used methods that were not sufficient or implemented consistently. These limitations resulted in excess capacity estimates that do not have the accuracy and analytical sufficiency to support decision making on future BRAC rounds. Without improvements to DOD's method of estimating excess capacity, DOD is not providing the information that Congress requires to make decisions concerning the management of excess infrastructure capacity within the department. Similarly, DOD does not have the information it needs to appropriately manage its infrastructure capacity and therefore cannot make informed decisions about what it needs to support its mission as land and infrastructure requirements of newer weapon systems are introduced. Moreover, the combined effect of neither DOD nor Congress having the information means that DOD will continue to experience challenges with funding related to its infrastructure and potential excess costs.

Recommendations for Executive Action

We are making the following three recommendations to DOD:

The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment reliably updates the baseline used for estimating excess infrastructure capacity. (Recommendation 1)

The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment uses assumptions in estimating excess capacity that are considered reasonable (i.e., realistic, credible, and accompanied by a statement of their rationale). (Recommendation 2)

The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment develops guidance to improve the methods used in the analysis and ensure consistent implementation of DOD's methodology to produce reliable estimates of excess capacity across the department. The guidance, at a minimum, should clearly define "major installations," identify whether and when it is appropriate to include a facility in more than one category to take into account multiple missions at the facilities, and provide protocols for assessing excess capacity at joint bases. (Recommendation 3)

Agency Comments and Our Evaluation

We provided a draft of this report to the Department of Defense (DOD) for comment. DOD provided written comments, which are reproduced in appendix II.

DOD concurred with one recommendation and partially concurred with the other two recommendations.

DOD stated that it concurred with our first recommendation, which called for it to reliably update the baseline used for estimate excess infrastructure capacity. Specifically, the department stated that it would review methods to update the baseline for future excess capacity analysis that is undertaken.

The department partially concurred with our second recommendation, which called for the department to use assumptions that were considered reasonable (i.e. realistic, credible, and accompanied by a statement of the rationale) in estimating excess capacity. Specifically, the department agreed that its capacity report should lay out any assumptions made and

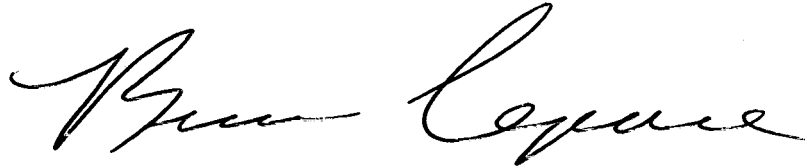
the rationale for each assumption and will ensure that any future capacity report includes that information. The department did not concur, however, that assumptions used in its 2017 infrastructure capacity report were other than reasonable, realistic, or credible. While we are encouraged that the department will lay out any assumptions and the rationale for each assumption in future capacity reports, not all assumptions used in the 2017 analysis were reasonable (i.e. realistic, credible, and accompanied by a statement of the rationale) as outlined in this report. For example, we found that assigning installations to only one mission category was not realistic because most installations support more than one mission.

The department partially concurred with our third recommendation that DOD develop guidance to improve the methods used in the analysis and ensure consistent implementation of DOD's methodology to produce reliable estimates of excess capacity across the department. This guidance, at a minimum, should clearly define "major installations," identify whether and when it is appropriate to include a facility in more than one category to take into account multiple missions at the facilities, and provide protocols for assessing excess capacity at joint bases. DOD concurred that guidance should precede any future infrastructure capacity review and that such guidance should include definitions and implementation instructions, but the three items identified would not necessarily be applicable for a future analysis. Provided that future DOD guidance addresses all appropriate characteristics for analysis, such guidance would meet the intent of our recommendation.

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

If you or your staff have any questions concerning this report, please contact me at (202) 512-4523 or leporeb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on

the last page of this report. Key contributors to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read "Brian Lepore". The signature is written in a cursive style with a large initial "B" and "L".

Brian J. Lepore
Director
Defense Capabilities and Management

List of Committees

The Honorable John McCain
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Richard C. Shelby
Chairman
The Honorable Richard J. Durbin
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable John Boozman
Chairman
The Honorable Brian Schatz
Ranking Member
Subcommittee on Military Construction,
Veteran's Affairs, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Mac Thornberry
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Kay Granger
Chairwoman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable John Carter
Chairman
The Honorable Debbie Wasserman Schultz
Ranking Member
Subcommittee on Military Construction,
Veteran's Affairs, and Related Agencies
Committee on Appropriations
House of Representatives

Appendix I: Generally Accepted Research Standards Relevant to DOD's Infrastructure Capacity Report

Table 3 describes the generally accepted research standards, identifies the standards we used in evaluating the quality of the research results conveyed in DOD's 2017 infrastructure capacity report and provides the rationale for the inclusion and exclusion of each specific standard.¹

Table 3. Generally Accepted Research Standards Relevant to DOD's Infrastructure Capacity Report

Generally Accepted Research Standards	Standard used in GAO's review?	Rationale for inclusion in or exclusion from GAO's review
I Study plan, scope, and objectives follow existing guidance? [plan]	No	Team is not aware of any standard guidance for the development of this document
I.a Do the study scope and objectives fully address the mandated elements?	No	This standard is being evaluated under research question
I.a.1 Does the study plan address specified guidance?	No	Team is not aware of any standard guidance for the development of this document.
I.b Was the study plan followed?	No	Team is not aware of any study plan that guided the development of this report.
I.c Were deviations from the study plan explained and documented?	No	Team is not aware of any study plan that guided the development of this report.
I.d Was the study plan updated over the course of the study and the updates explicitly identified in the study and updated study plan?	No	Team is not aware of any study plan that guided the development of this report.
II Assumptions and limitations are reasonable and, where appropriate, consistent	Yes	
II.a Are assumptions and limitations explicitly identified?	Yes	Given the judgment required to execute the analyses the assumptions and constraints are key to team's determination of the accuracy and analytical sufficiency of the report.

¹ As described in GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, [GAO-06-938](#) (Washington, DC: Sep. 20, 2006). DOD, *Department of Defense Infrastructure Capacity* (October 2017).

Appendix I: Generally Accepted Research Standards Relevant to DOD's Infrastructure Capacity Report

Generally Accepted Research Standards		Standard used in GAO's review?	Rationale for inclusion in or exclusion from GAO's review
II.a.1	Are the assumptions reasonable in that they are realistic, credible, and accompanied by a statement of their rationale?	Yes	Given the judgment required to execute the analyses, the assumptions and constraints are key to the team's determination of the accuracy and analytical sufficiency of the report. Team felt that 'reasonable' was sufficient and 'necessary' was not readily apparent.
II.b	Do the assumptions support a sound analysis?	Yes	Given the judgment required to execute the analyses the assumptions and constraints are key to team's determination of the accuracy and analytical sufficiency of the report.
II.c	Are the assumptions used in analyses common throughout the study and models?	No	This standard is not needed to answer the objectives of our report. Other standards for study assumptions are more relevant and sufficient for our purposes.
II.d	Do the assumptions contribute to an objective and balanced research effort?	Yes	The information from this report can be used to inform decision making. The report should not be biased toward an outcome.
III	Scenarios and threats are reasonable	No	There were no scenarios or threat assessments that were part of the analyses
III.a.	Did they synthesize the supporting analyses such that it is traceable back to formal guidance?	No	Not applicable
III.b	Were the threat scenarios validated and Joint Staff approved and documented?	No	Not applicable
III.c	Do scenarios represent a reasonably complete range of conditions?	No	Not applicable
III.d	Were the threats varied to allow for the conduct of sensitivity analysis?	No	Not applicable
Execution: The study is well executed			
IV	Methods are sufficient and successfully executed	Yes	
IV.a	Were the study methods executed consistent with the study plan and schedule?	Yes	While no plan or schedule was provided, the report did include a description of how the model was to be implemented
IV.b	Were the methods and analyses sufficient for accomplishing the objectives presented in the study?	Yes	Given the judgment required to execute the analyses the methodology is key to determine if DOD accomplishes its objectives.

Appendix I: Generally Accepted Research Standards Relevant to DOD's Infrastructure Capacity Report

Generally Accepted Research Standards	Standard used in GAO's review?	Rationale for inclusion in or exclusion from GAO's review
IV.c Were the models used to support the analyses adequate for their intended purpose? //Were the calculations used to support the analyses accurate?	Yes	Important to ensure the model is designed well in addition to accurate arithmetic calculations. DOD conducted analyses and calculations in the report.
V Baseline and other data used to support the analyses were determined to be reliable and valid?	Yes	
V.a Is the baseline fully and completely identified and used consistently, where appropriate, throughout the various analyses?	Yes	DOD report includes the use of baseline data in the underlying analyses.
V.b Were data limitations identified and the impact of the limitations fully explained?	Yes	DOD report uses data obtained from DOD components.
V.c Were the data determined to be reliable and valid?	No	Incorporated with V.e below.
V.d Were the data reliability and validation process documented?	Yes	DOD report uses data obtained from DOD components.
V.e Were the appropriate data gathered to support the analyses?	Yes	OSD obtained data from other DOD components and used it to generate the report.
VI Analyses are reasonable	No	
VI.a Was a verification, validation, and accreditation report that addresses the models and data certification signed by the study director and included in the report?	No	In the context of our engagement, redundant with section II above.
VI.b Were analytic limitations identified and explained?	No	In the context of our engagement, redundant with section II above.
VI.c Has each analysis in the study been described?	No	In the context of our engagement, redundant with section II above.
VI.d Were the analyses clearly explained, documented?	No	In the context of our engagement, redundant with sections IV and V above.
VII Measures of effectiveness (MOEs) and essential elements of analysis (EEAs) are addressed	No	Not applicable
VII.a Do MOEs adhere to the guidance in the study terms of reference?	No	The mandate language does not require DOD to include measures of effectiveness in its report. Furthermore, DOD is not required to submit a strategic plan so Government Performance and Results Act requirements are not applicable.
VII.b Are the MOEs fully addressed in the study?	No	Same rationale cited above.
VII.c Are the EEAs addressed in the study?	No	Same rationale cited above.

Appendix I: Generally Accepted Research Standards Relevant to DOD's Infrastructure Capacity Report

Generally Accepted Research Standards	Standard used in GAO's review?	Rationale for inclusion in or exclusion from GAO's review
Presentation of results: Timely, complete, accurate, concise, and relevant to the client and stakeholders		
VIII	Presentation of results support findings	No
VIII.a	Does the report address the objectives?	No Redundant with IV.b above
VIII.b	Does the report present an assessment that is well documented and conclusions that are supported by the analyses?	No Redundant with V.d above. Also, we will address conclusionary language in the context of the data used to support it above
VIII.c	Are conclusions sound and complete?	No We will address conclusionary language in the context of the data used to support it above.
VIII.d	Are recommendations supported by analyses?	No The mandate language does not require DOD to include recommendations and DOD did not include recommendations.
VIII.e	Is a realistic range of options provided?	No Not applicable. DOD's report does not include range of options for force-structure plans and categorical infrastructure inventory.
VIII.f	Are the study results presented in the report in a clear manner?	No Not relevant to accuracy or analytical sufficiency
VIII.g	Are study participants/stakeholders (i.e., services and Combatant Commands) informed of the study results and recommendations?	No Not relevant to accuracy or analytical sufficiency

Source: GAO analysis of generally accepted research standards. | GAO-18-230.

Appendix II: Comments from the Department of Defense



ENERGY,
INSTALLATIONS,
AND ENVIRONMENT

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

MAY 02 2018

Mr. Brian Lepore
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

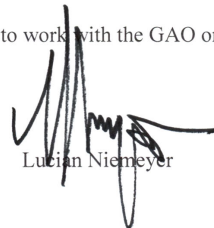
Dear Mr. Lepore:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-18-230, "DEFENSE INFRASTRUCTURE: DOD Needs to Improve the Accuracy of Its Excess Capacity Estimates," dated March 28, 2018 (GAO Code 100508). Detailed comments on the report recommendations are enclosed.

The Department has stated in response to previous GAO reviews, and again in our own capacity report, that we agree the methodology has limitations. Those limitations, however, are a necessary element of a pre-Base Realignment and Closure (BRAC) analysis that is parametric in nature so as to avoid identifying specific installations as being at risk for closure. Such identification would negatively affect local communities and potentially prejudice a detailed BRAC analysis.

That said, the Department generally concurs with the sentiment of the GAO recommendations - that processes can always be improved - if not the specifics of each recommendation. The Department looks forward to working with Congress to provide credible estimates of categories of excess capacity to support any future request for BRAC authorization, without causing unnecessary angst in and economic harm to local communities or prejudicing a detailed BRAC analysis.

We look forward to continuing to work with the GAO on these important issues.



Lucian Niemeyer

Enclosure:
As stated

GAO DRAFT REPORT DATED MARCH 28, 2018
GAO-18-230 (GAO CODE 100508)

“DEFENSE INFRASTRUCTURE: DOD Needs to Improve the Accuracy of Its Excess
Capacity Estimates”

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS

RECOMMENDATION 1: The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment reliably updates the baseline used for estimating excess infrastructure capacity.

DoD RESPONSE: Concur. The Department agrees that the baseline should be updated for any future capacity analysis and will review methods to do so.

RECOMMENDATION 2: The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment uses assumptions in estimating excess capacity that are considered reasonable (i.e. realistic, credible, and accompanied by a statement of their rationale).

DoD RESPONSE: Partially Concur. The Department agrees that its capacity report should clearly lay out any assumptions made and the rationale for each assumption and will ensure that any future capacity report includes that information. The Department does not concur, however, that the assumptions used in its 2017 Capacity Report were other than reasonable, realistic, or credible.

RECOMMENDATION 3: The Secretary of Defense should ensure that the Assistant Secretary of Defense for Energy, Installations, and Environment develops guidance to improve the methods used in the analysis and ensure consistent implementation of DOD’s methodology to produce reliable estimates of excess capacity across the department. The guidance, at a minimum, should clearly define “major installations”, identify if and when it is appropriate to include a facility in more than one category to take into account multiple missions at the facilities, and provide protocols for assessing excess capacity at joint bases.

DoD RESPONSE: Partially Concur. The Department concurs that guidance should precede any future infrastructure capacity review and that such guidance should include definitions and implementation instructions. While the Department agrees that the three items identified as the minimum factors for future guidance currently appear reasonable, we do not necessarily agree that these same items would be applicable for a future analysis. For any future analysis the Department will develop appropriate guidance, definitions, and implementing instructions that balance the need for consistently applied methodology with necessary flexibility allowing Services to account for unique operational requirements and priorities.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Brian J. Lepore, (202) 512-4523 or leporeb@gao.gov

Staff Acknowledgments

In addition to the contact named above, Gina Hoffman (Assistant Director), Tracy Barnes, Ronald Bergman, Patricia Donahue, Kerstin Hudon, Terrance Lam, Amie Lesser, Carol Petersen, Clarice Nassif Ransom, Matt Spiers, Tristan To, and John Wren made key contributions to this report.

Related GAO Products

High-Risk Series: Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others. [GAO-17-317](#). Washington, D.C.: February 15, 2017.

Military Base Realignment and Closures: DOD Has Improved Environmental Cleanup Reporting but Should Obtain and Share More Information. [GAO-17-151](#). Washington, D.C.: January 19, 2017.

Defense Infrastructure: DOD Efforts to Prevent and Mitigate Encroachment at Its Installations. [GAO-17-86](#). Washington, D.C.: November 14, 2016.

Defense Facility Condition: Revised Guidance Needed to Improve Oversight of Assessments and Ratings. [GAO-16-662](#). Washington, D.C.: June 23, 2016.

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Underutilized Facilities: DOD and GSA Information Sharing May Enhance Opportunities to Use Space at Military Installations. [GAO-15-346](#). Washington, D.C.: June 18, 2015.

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Federal Real Property: Strategic Focus Needed to Help Manage Vast and Diverse Warehouse Portfolio. [GAO-15-41](#). Washington, D.C.: November 12, 2014.

DOD Joint Bases: Implementation Challenges Demonstrate Need to Reevaluate the Program. [GAO-14-577](#). Washington, D.C.: September 19, 2014.

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