National Institutes of Health
Office of Research Facilities
Operations & Maintenance Presentation to National Academies of Science, Engineering and Medicine Ad Hoc Committee

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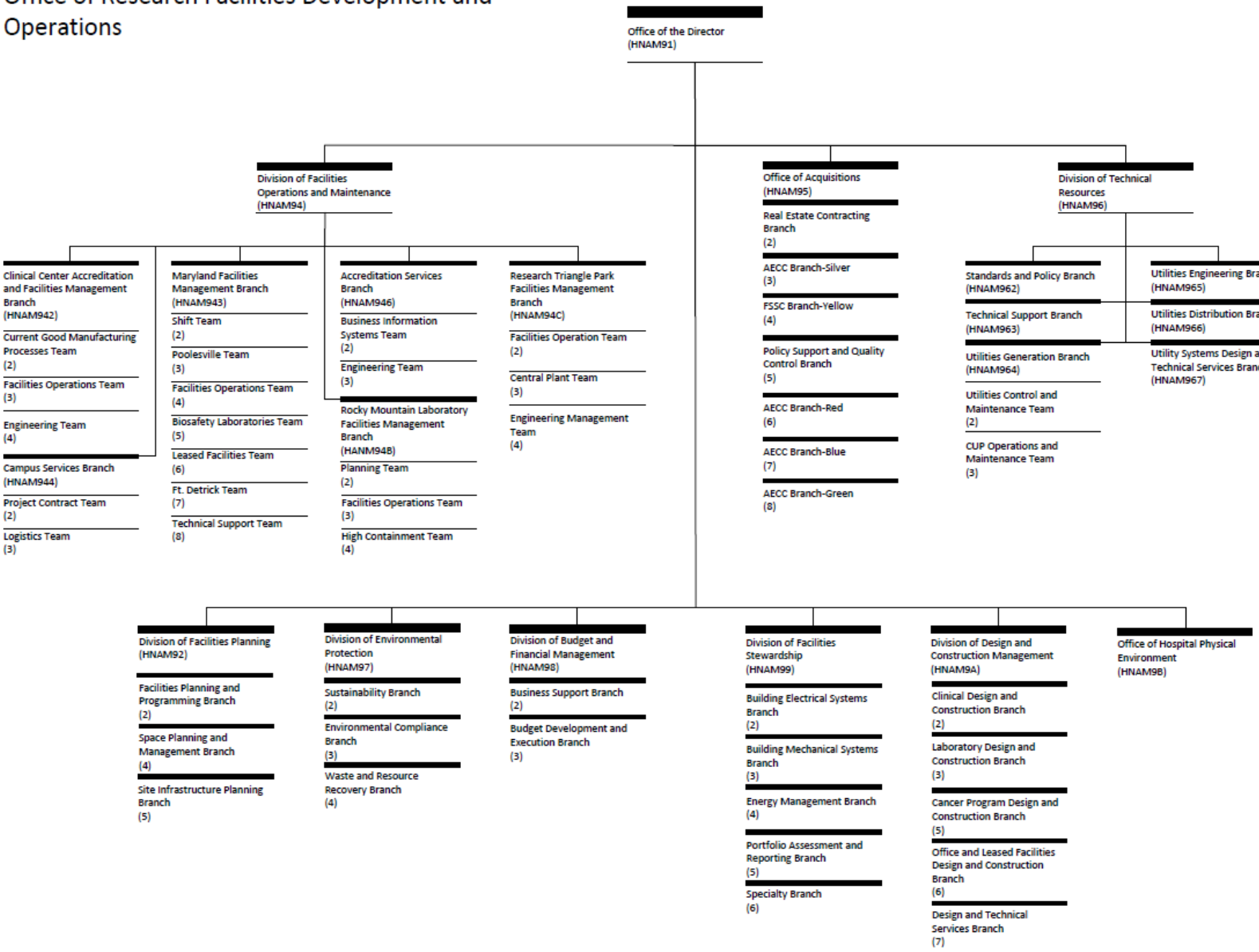
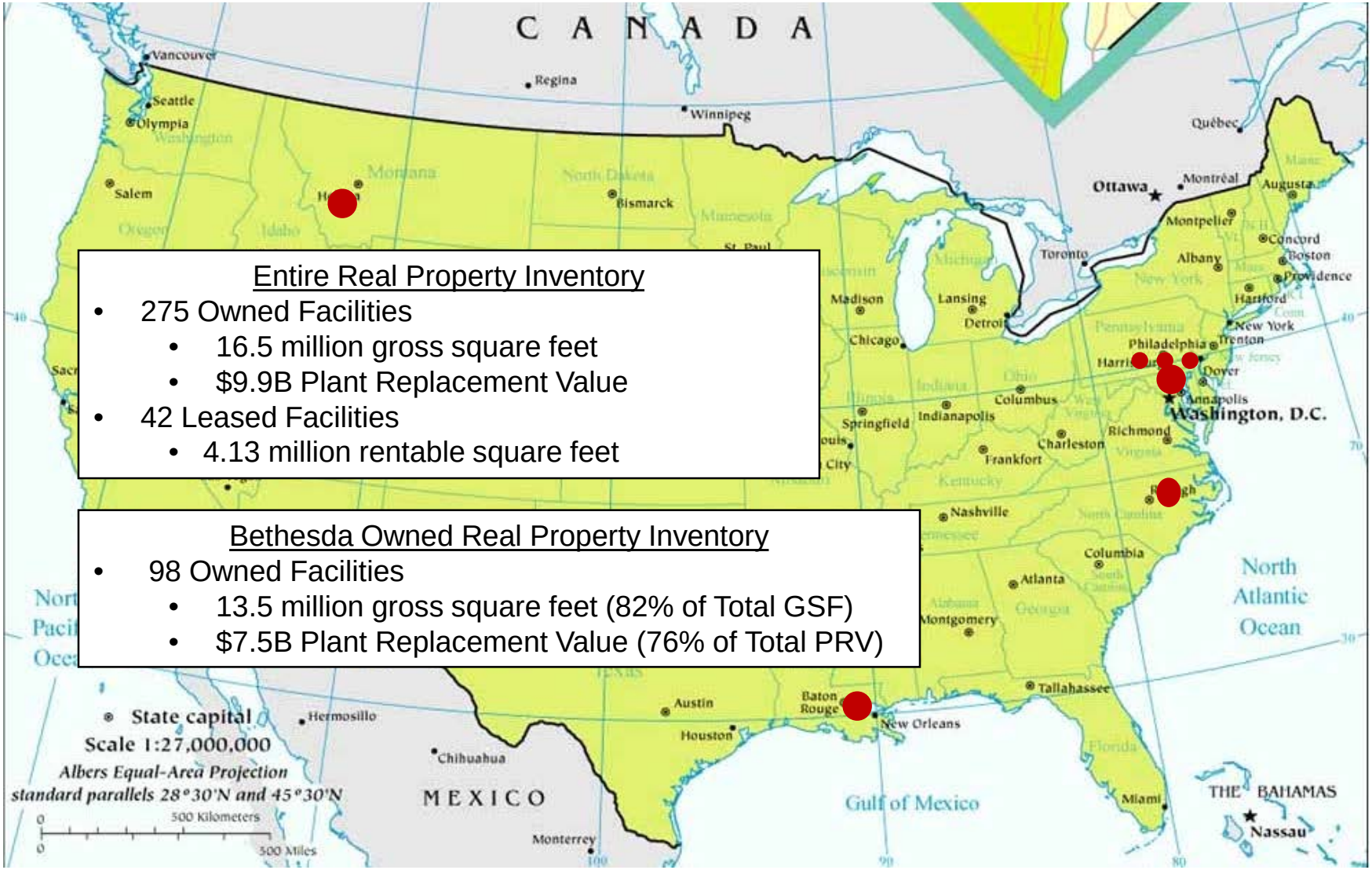
Office of Research Facilities Development and Operations



The NIH Real Property Portfolio



Entire Real Property Inventory

- 275 Owned Facilities
  - 16.5 million gross square feet
  - $9.9B Plant Replacement Value
- 42 Leased Facilities
  - 4.13 million rentable square feet

Bethesda Owned Real Property Inventory

- 98 Owned Facilities
  - 13.5 million gross square feet (82% of Total GSF)
  - $7.5B Plant Replacement Value (76% of Total PRV)

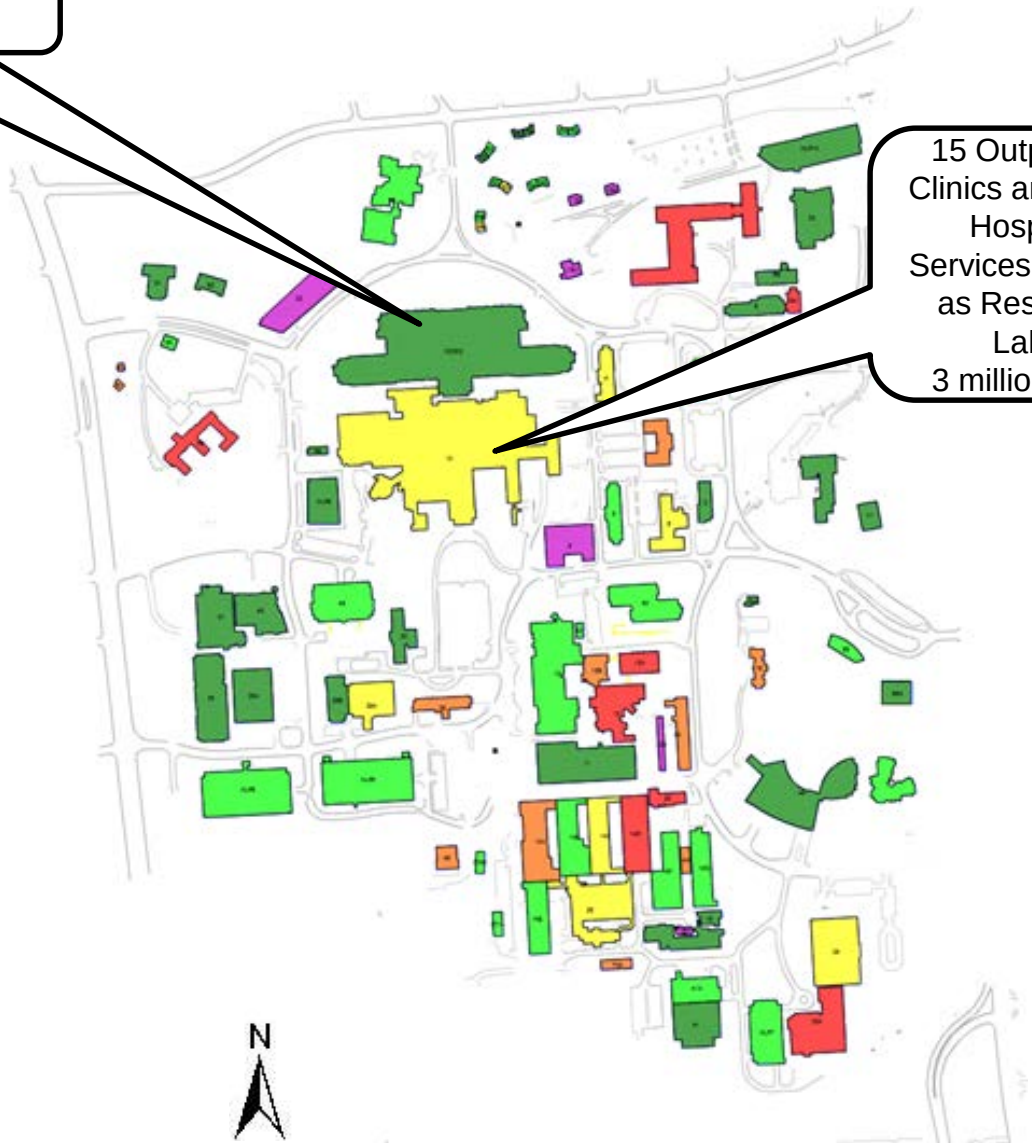
Condition Index (CI) for Bethesda Campus

200 Bed Inpatient Hospital and Research Labs
1.8 million GSF

15 Outpatient Clinics and other Hospital Services, as well as Research Labs
3 million GSF

NIHBC Condition Index

0 - 60	1,092,822 GSF
61 - 70	357,900 GSF
71 - 80	3,394,584 GSF
81 - 90	1,962,399 GSF
91 - 100	6,721,346 GSF



CI: An industry standard parametric tool used to compare relative building conditions
CI = [1 - total cost of needed repairs/replacement value] X 100

Office of Research Facilities

Hierarchy of 14 Service Groups (SGs) and 121 Discrete Services

Program Management	Planning	Development	Installation Operations	Stewardship
SG-1 Lead ORF	**SG-6** Master Planning	**SG-8** Design & Construction	**SG-12** Operations & Maintenance	**SG-17** Long Term Stewardship
SG-2 Measure Performance	**SG-7** Inventory & Space Assignments	**SG-10** Acquire Real Estate	**SG-13** Business Support	**SG-18** Manage Standards & Policies
			SG-15 Waste Management	**SG-19** Environmental Quality

Part I

Funding Source

- SSF Census
- SSF Fee For Service
- SSF Assessment (Rent)
- SSF Assessment

Part II — **SG-14** Utilities (For NIH Owned Facilities)

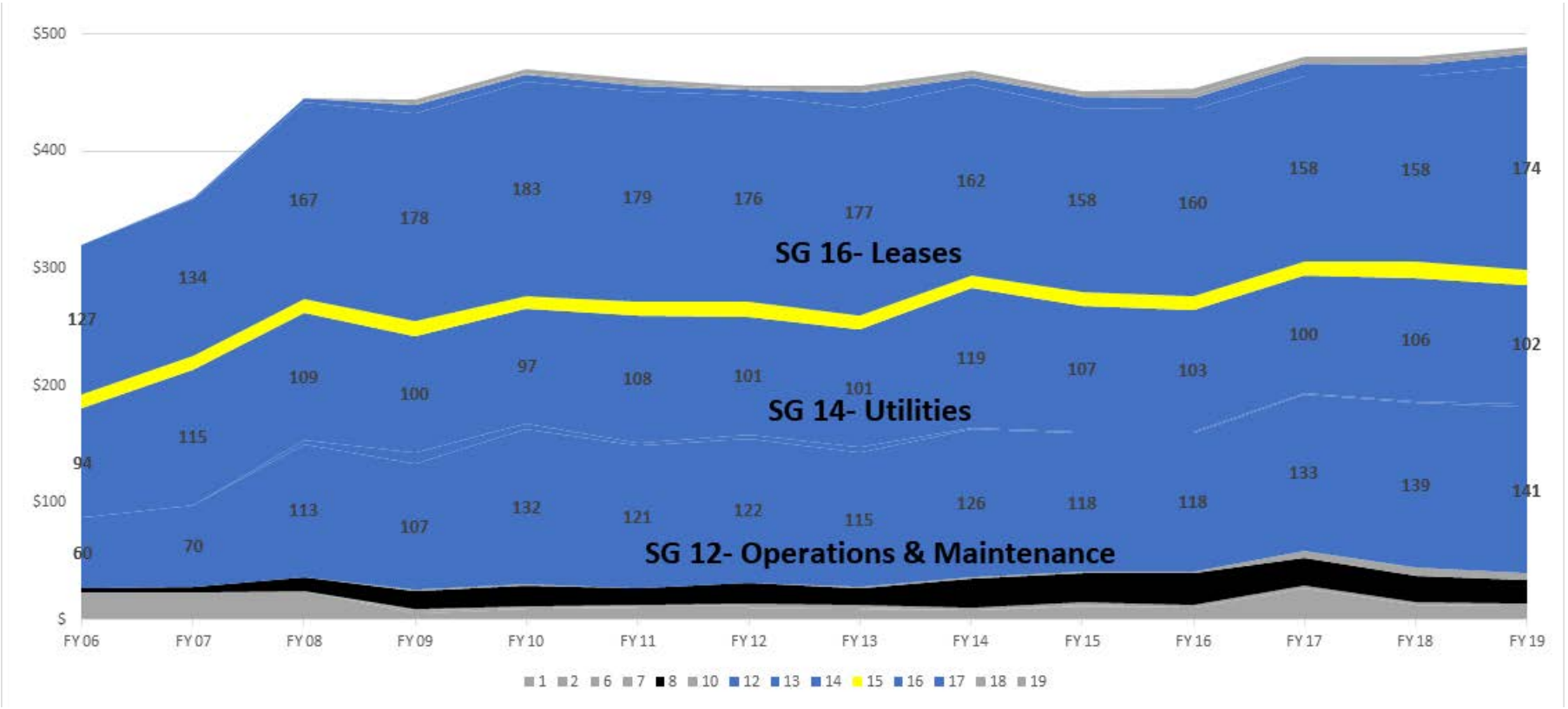
Part III — **SG-16** Lease Payments (incl. Utilities for Leases)

Part IV B&F

Service Group Costs Color-Code by Fund ($M)

National Institutes of Health
Office of Management

(FY19 Amounts Reflect Recommended Budget)



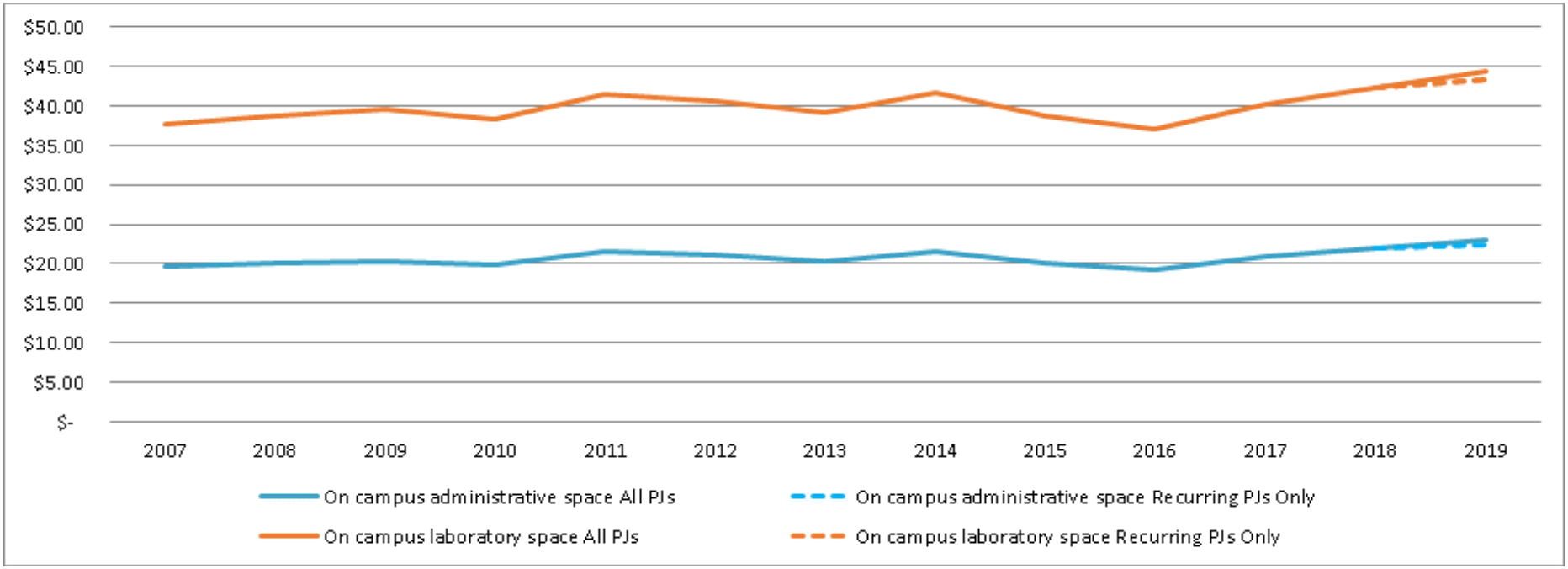
Management Fund | SSF Fee for Service | SSF Rent | SSF Assessment

Note: These costs include all sites shown on Slide 3

SG-12 Bethesda Campus Only

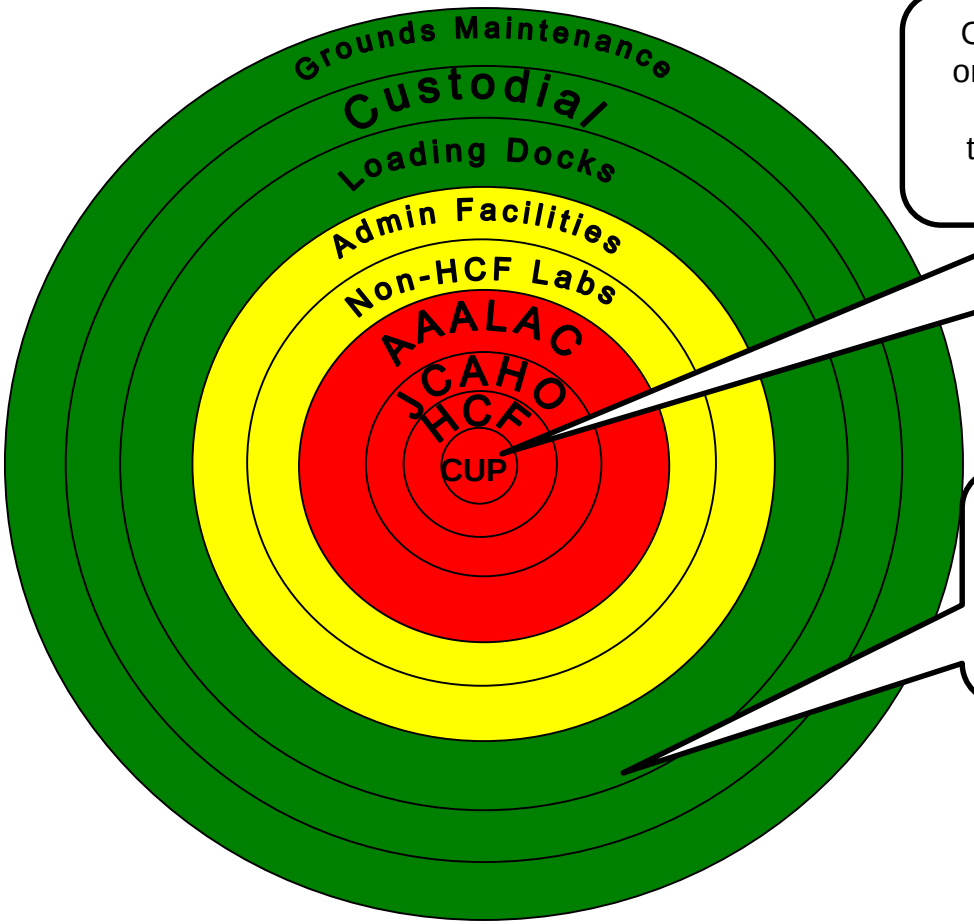
Fiscal Year	FY15	FY16	FY17	FY18
Bethesda O&M Costs ($M)	$ 98.00	$ 101.00	$ 113.00	$ 114.00
Bethesda GSF (M)	12.04	12.04	12.04	11.99
Bethesda $/GSF	$ 8.14	$ 8.39	$ 9.39	$ 9.51

Rent Chargeback Mechanism Rates for Office and Lab Space (These rates include utilities)



The 27 NIH Institutes and Centers are assessed rent based upon the quantity and type of square footage that they consume. Strength: creates incentives to properly utilize space. Challenge: creates pressures to contain costs, which can reduce the amount of investment in maintenance.

Risk-Based Approach to Owned Facilities



Our Hospital, Labs and Research Animal facilities use one-pass air, which means that our Central Utility Plant (CUP) is extremely critical in order to maintain temperature, humidity and differential pressures. The Bethesda CUP is one of the largest in the world.

Cost containment strategies have been focused over the past decade on low and medium risk services

HCF = High Containment Facilities

CUP = Central Utility Plant & Distribution

SG-12, AKA O&M: What's Included

- Utilities staff associated with utilities generation and distribution (but excluded the cost of the raw utilities such as electrical, natural gas, and water)
- 24x7x365 maintenance desk, with shift personnel
- Maintenance engineering
- Procurement staff
- Grounds maintenance
- Snow removal
- Elevator maintenance
- Emergency Generator maintenance
- Fire Alarm Detection, Suppression, Fire Pumps
- Joint Commission oversight and documentation
- Aseptic Manufacturing oversight (Pharmacy Intravenous Admixture Unit, Cell Therapy, etc.)

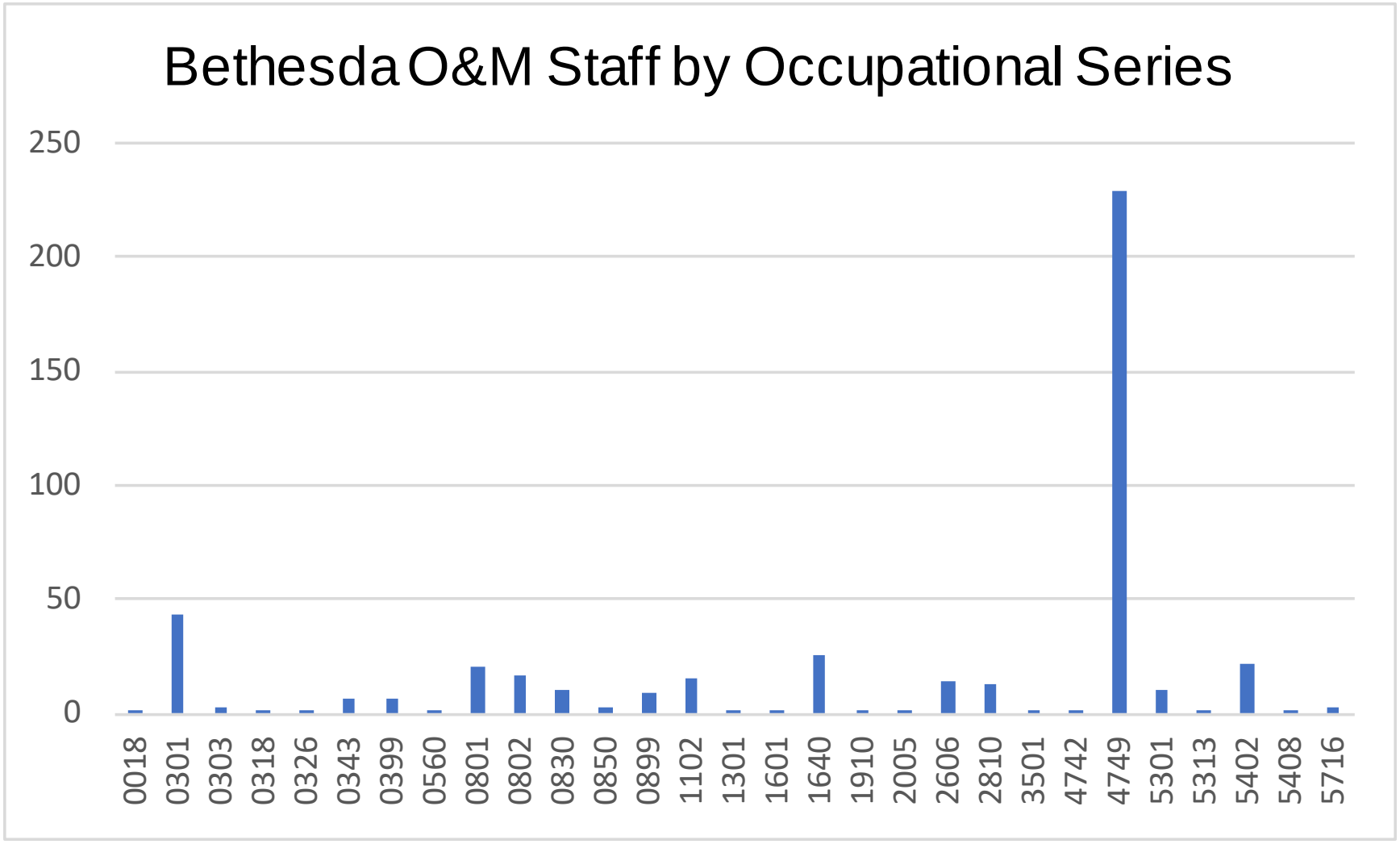
SG-12, AKA O&M: What's Excluded

- Office of Research Facilities Office of the Director
- Division of Fire Marshal (Authority Having Jurisdiction)
- Division of Occupational Health and Safety
- Division of Budget and Financial Management
- Division of Environmental Protection
- So if the VA considers these to be O&M costs, these would need to added to those provided earlier in this presentation
- O&M of Nurse Call System

Qualitative Cost Drivers That Could Affect the Costs/GSF in a Medical Facility

- Age of facility
- Condition of facility
- Size of facility; economies of scale
- Area cost factors for labor and material
- Ratio of inpatient and outpatient functions
- Amount of snowfall, assuming snowfall is considered O&M
- Amount of aseptic manufacturing in areas such as:
  - Intravenous Admixture Unit
  - Cell Therapy
  - Development of Investigational Drugs
- Presence of cyclotron; compliance with NRC
- Presence of biomedical research functions; example: NIH has a Special Clinical Studies Unit capable of treating patients exposed to Ebola
- Size of Behavioral programs that might affect suicide prevention expenses, ligature risk, jumping hazards
- Extent of use of Building Automation Systems and other types of Information Technology
- Presence of pneumatic tubes and/or Mosler automatic track system
- Desire to achieve and maintain Joint Commission accreditation

Bethesda SG-12 (O&M) Employee Staffing



Occupational Series and Names

Occupational Series	Occupational Name
0018	Safety and Occupational Health Specialist
0301	Miscellaneous Administration and Program
0303	Miscellaneous Clerk and Assistant
0318	Secretary
0326	Office Automation Technician
0343	Management & Program Analyst
0399	Administration and Office Support Student Trainee
0560	Budget Analyst
0801	General Engineer
0802	Engineering Technician
0830	Mechanical Engineer
0850	Electrical Engineer
0899	Engineering and Architecture Student Trainee
1102	Contract Specialist
1301	General Physical Science
1601	Equipment, Facilities, and Services
1640	Facility Operations Services
1910	Quality Assurance
2005	Supply Clerical and Technician
2606	Electronic Industrial Controls Mechanic
2810	High Voltage Electrician
3501	Miscellaneous General Services and Support Work
4742	Utility Systems Repairing-Operating
4749	Maintenance Mechanic
5301	Miscellaneous Industrial Equipment Maintenance
5313	Elevator Mechanic
5402	Boiler Plant Operator
5408	Wastewater Disposal Plant Operator
5716	Engineering Equipment Operator

How To Organize Maintenance Staff

- By Customer – align staff to customers, even if they have space in different portions of the building
- Geographically – align staff to buildings, wings, and/or floors
- By building system
- Hybrid (geographic and building system)
- NIH uses a hybrid system whereby the maintenance staff is predominantly organized geographically, but some staff are organized by specialty building systems (elevators, pneumatic tube, doors, fire protection)
- In addition, we have a campus-wide evening/weekend shift that covers all issues and can recall specialty staff when needed.
- We also have staff who do maintenance engineering to address chronic maintenance issues
- Lastly, we have Joint Commission and Aseptic Manufacturing oversight staff who specialize in compliance with patient safety

In-house versus Outsource Factors for Consideration

- Disruption
  - Federal service contracts are typically limited in duration to 5 or 8 years.
  - Risk of disruption can be mitigated by using FAR Clause 52.222-17 Nondisplacement of Qualified Workers. When a service contract succeeds a contract for performance of the same or similar services, as defined at 29 CFR 9.2, at the same location, the successor contractor and its subcontractors are required to offer those service employees that are employed under the predecessor contract, and whose employment will be terminated as a result of the award of the successor contract, a right of first refusal of employment under the contract in positions for which they are qualified. Executive Order 13495 generally prohibits employment openings under the successor contract until such right of first refusal has been provided, when consistent with applicable law.
  - Despite such provisions, sometimes the new contractor will offer predecessor contractor staff lower salaries, which could result in significant turnover.
- Agility
  - There are some tasks that would require significant time to define and procure, so we have found it prudent to have in-house forces to address those emergent requirements
- A-76
  - NIH underwent an A-76 study in the early 2000s
  - In-house forces won the competition, but the decision was protested twice
  - Lost many great employees in the process
  - Fortunately, A-76 doesn't seem like a major theme these days, but it is a risk

In-house versus Outsource

Function	In-House Cost %	Contract Cost %
Real Property Facility Management	100%	0%
Utilities Generation	82%	18%
Maintenance Engineering	67%	33%
24/7/365 Call Desk Reception, Monitoring and Emergency Response	64%	36%
Real Property Customer-Initiated Maintenance Requests	53%	47%
Real Property Preventive Maintenance	41%	59%
Custodial, Grounds Maintenance, Project Contracts and Material Management	30%	70%

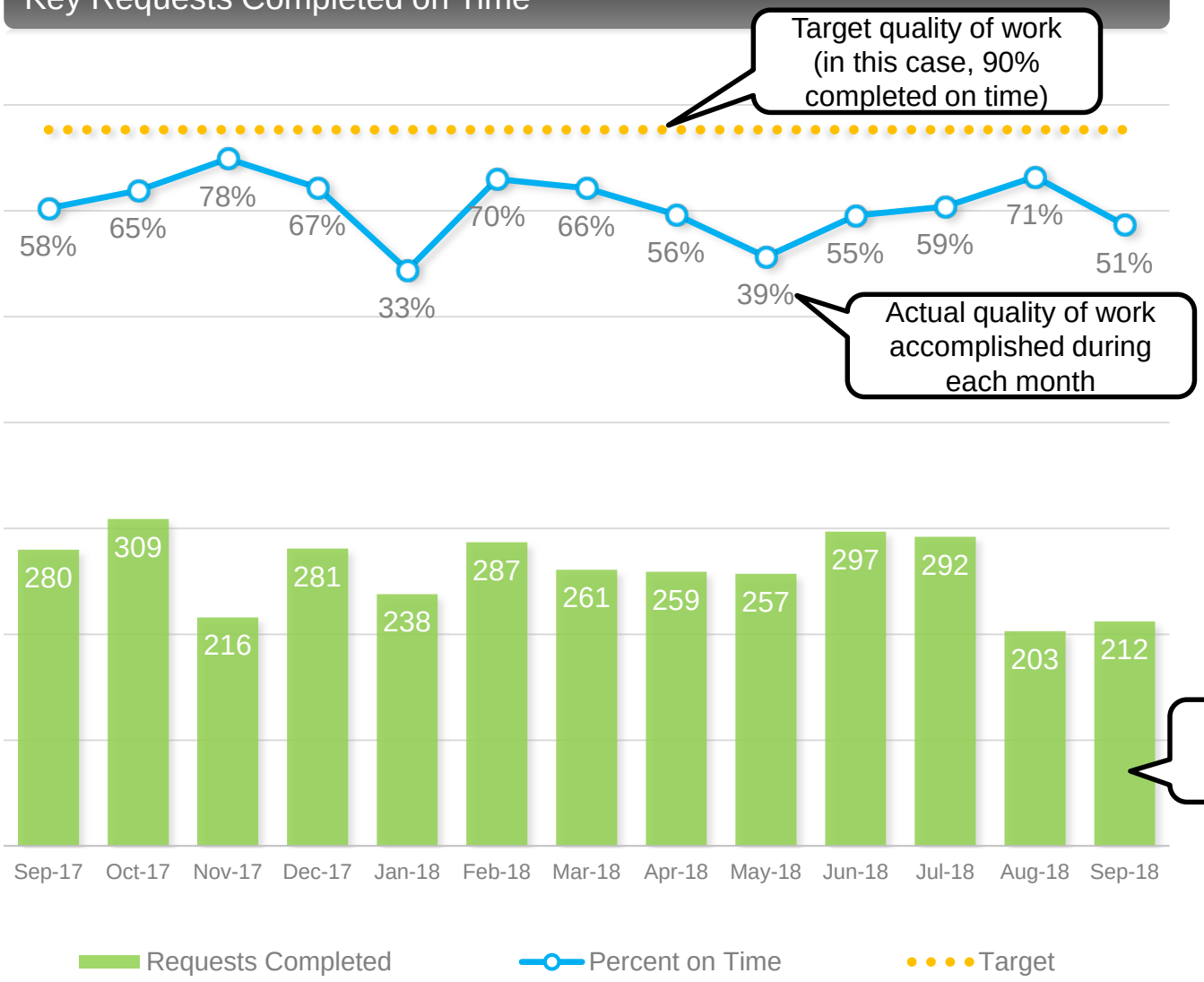
Recommendations for Aligning Budget and Performance

- Ideally, the cost accounting associated with discrete services can be aligned in a way that allows budget and performance to be correlated.
- NIH recently aligned its performance measures in a way that allows management to track the quantity and quality of the work, using authoritative systems
- Following slides illustrate some of the O&M discrete services

NIH National Institutes of Health
Office of Management

Locksmith Key Requests

Key Requests Completed on Time



Metrics

Results Driven | Buildings

Locksmith key requests completed before due date (cabinet keys not counted)

90% of requests completed before due date

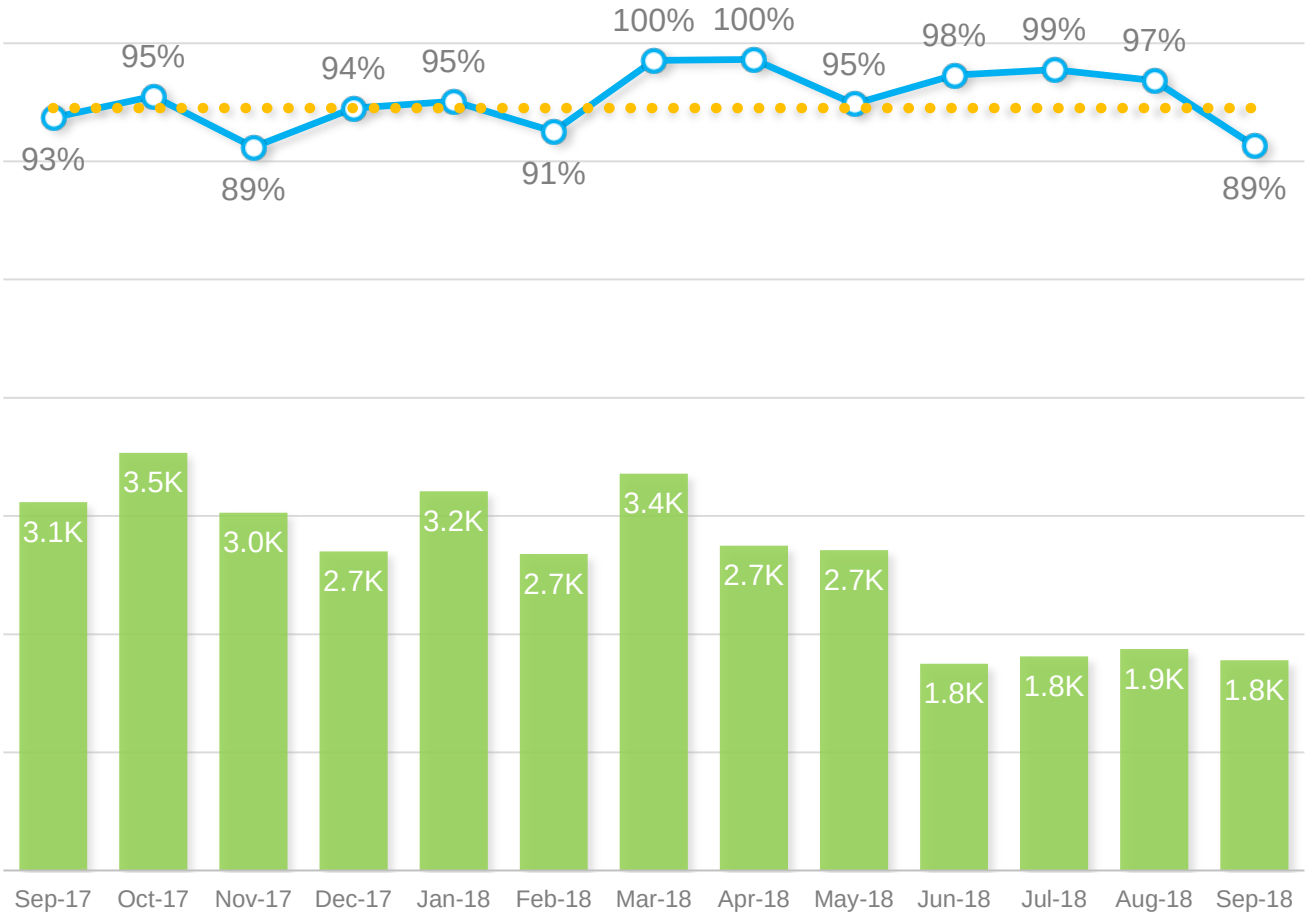
FIMS

Data Quality

Accuracy

Preventive Maintenance

Preventive Maintenance Actions Completed on Time



Metrics

Results Driven | Buildings

Preventive Maintenance actions completed on time

94% of actions completed on time

MS2000

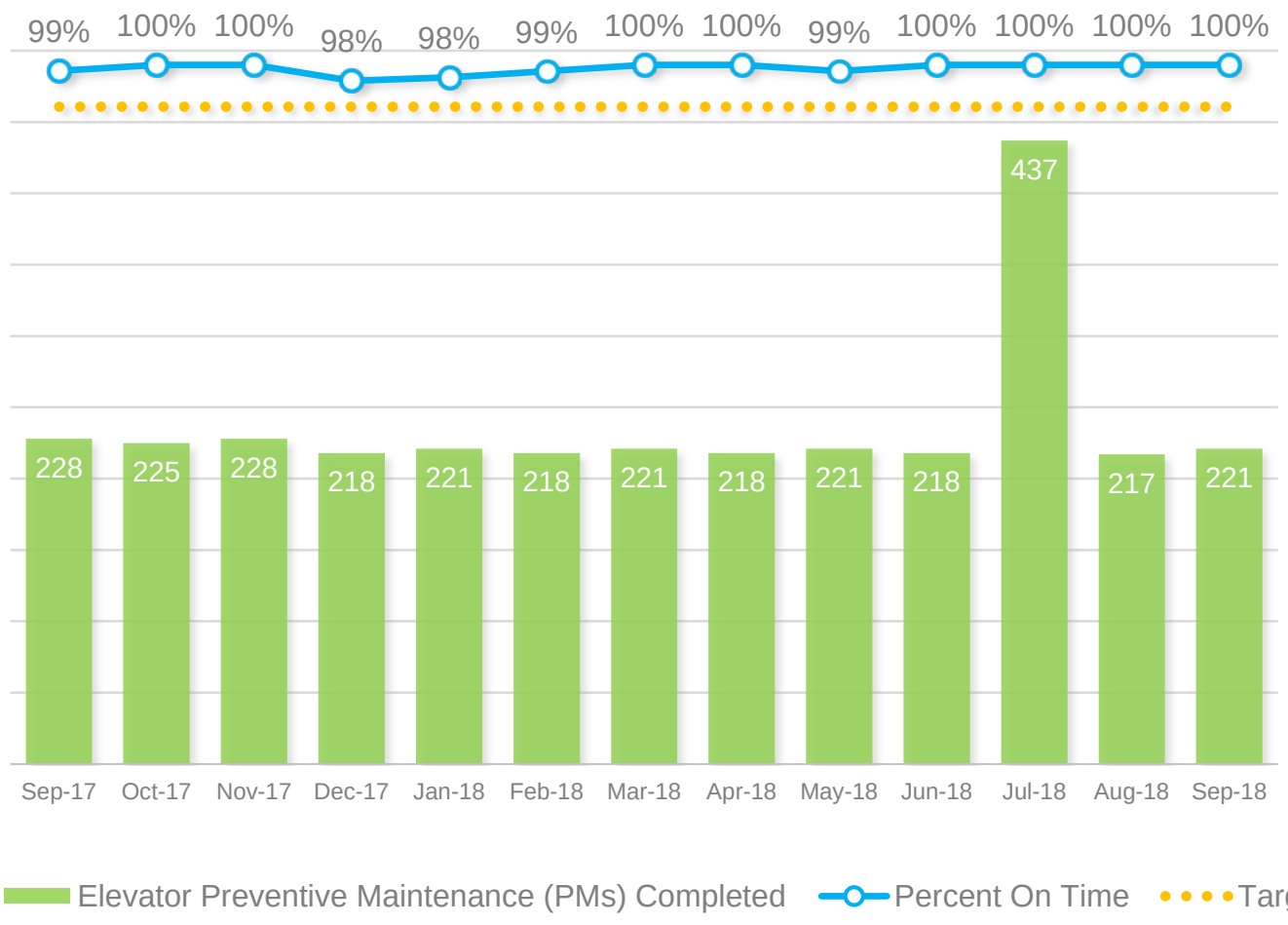
Data Quality

Accuracy

NIH National Institutes of Health
Office of Management

Elevator Preventive Maintenance

Elevator Monthly Preventive Maintenance (PMs) Accomplished On Time



Metrics

Results Driven | Buildings

Elevator PMs completed on time

94% of actions completed on time

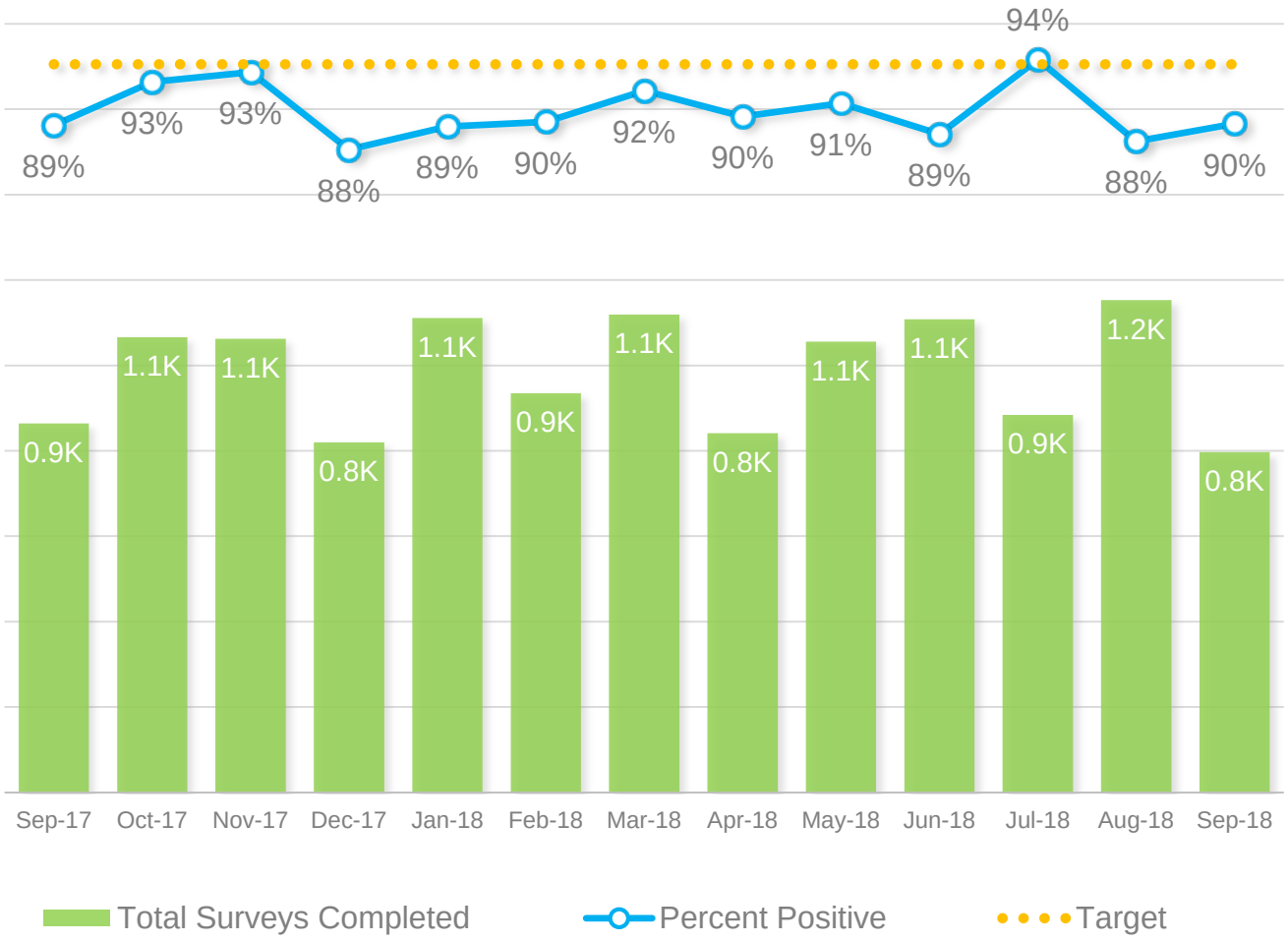
MS2000

Data Quality

Accuracy

Maintenance Request: Customer Survey Satisfaction Rate

Customer Survey Satisfaction



Metrics

Results Driven | Services

Customer survey satisfaction for trouble calls

94% of survey responses positive

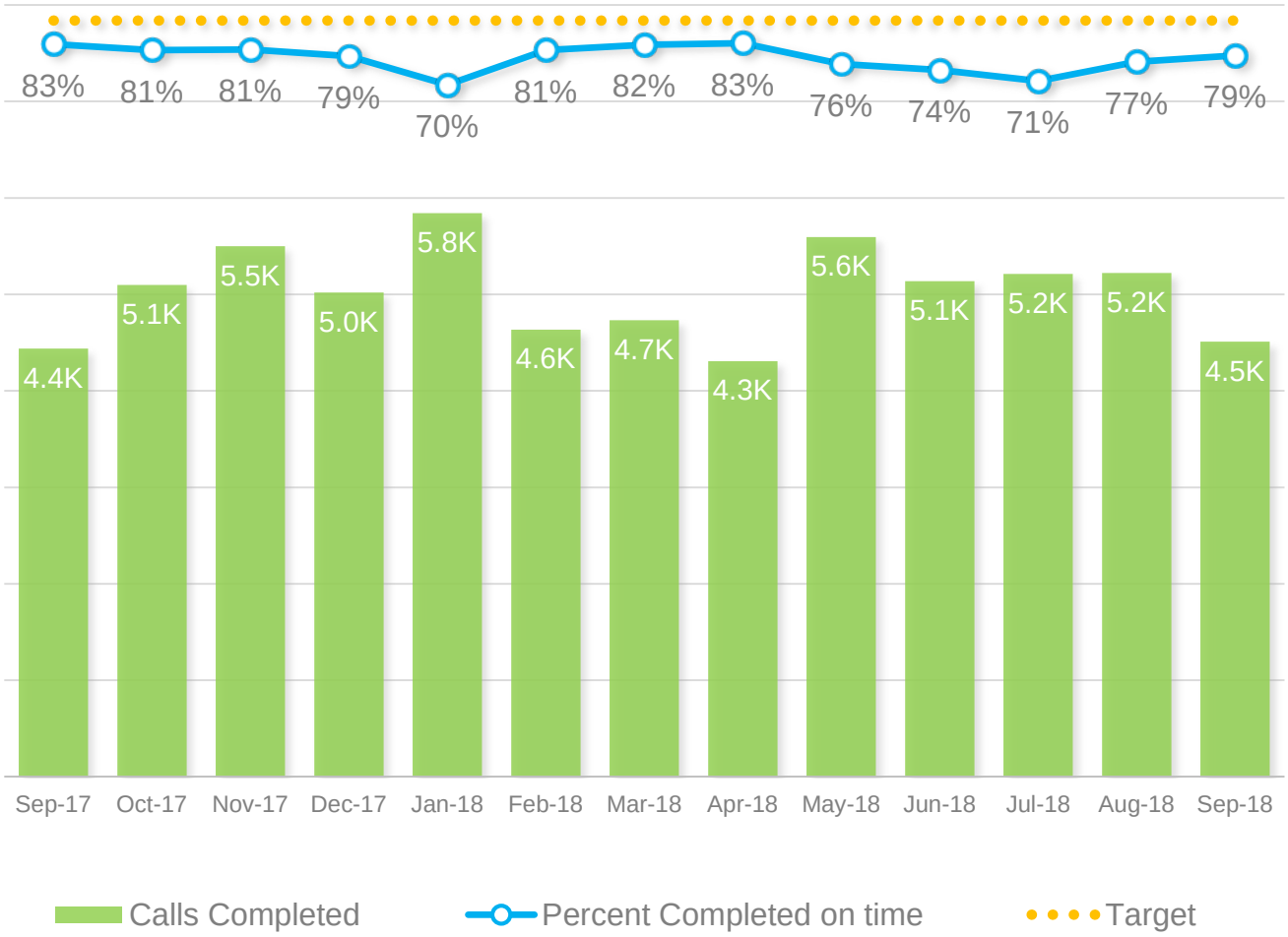
MS2000

Data Quality

Accuracy

Maintenance Request Completion Rate

Trouble Calls Completed on Time



Metrics

Results Driven | Services

Trouble calls completed on time

90% of calls completed on time

MS2000

Data Quality

Accuracy

NIH National Institutes of Health
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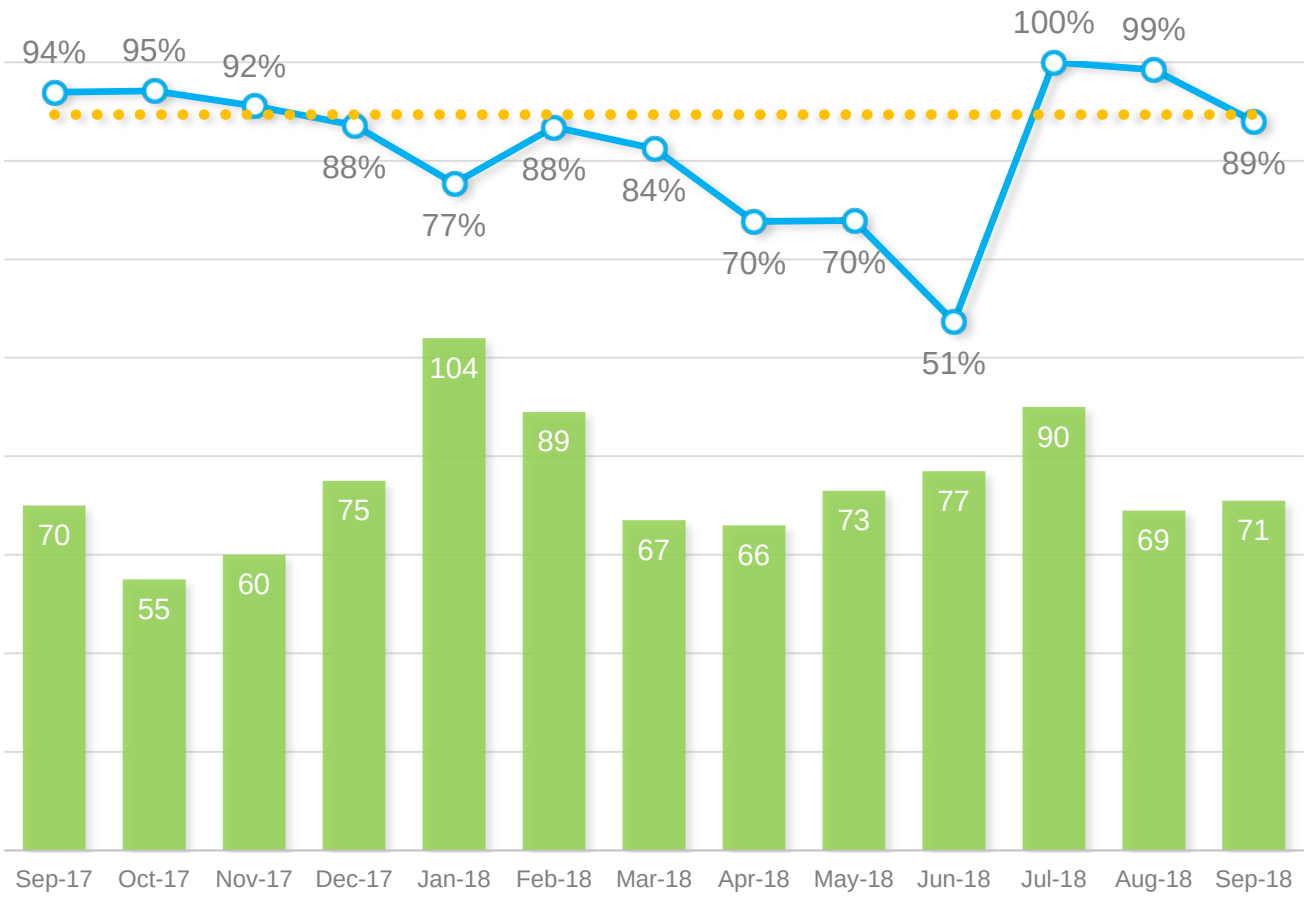
Elevator Trouble Calls

Elevator Trouble Calls Completed on Time



Elevator Trouble Calls Completed — Percent Completed on time — Target

Metrics

Results Driven | Services

Elevator Trouble calls completed on time

90% of calls completed on time

MS2000

Data Quality

Accuracy

Summary

- While NIH may have much in common with the VA in terms of health care services, cost accounting might differ, thus making an apple-to-apple comparison difficult
- Alignment of program risks (such as patient safety, Joint Commission accreditation, and operational availability) with budget, cost accounting, and performance measurement can enable management to identify opportunities to optimize the use of its resources and find out where misalignments can be addressed.
- Competition in Contracting Act (CICA) effectively prohibits standardization of building components across a Federal Agency, which results in a potpourri of systems, components and parts inventory, which often means that buildings even with nearly identical functions can have radically different mechanical, electrical, plumbing, and fire protection systems – so that the safety, reliability, and life cycle maintenance is dependent upon staff who, through experience, understand the nuances and idiosyncrasies of the systems.
- Recommend exercising caution when outsourcing functions to ensure proper acquisition support (Contracting Officers and Contracting Officer Representatives) is properly funded – and that building-specific knowledge is sustained.
- When leveraging technology, such as Building Automation Systems, recommend ensuring that proper life cycle funding is included to provide for IT security, upgrades, licenses and other costs.