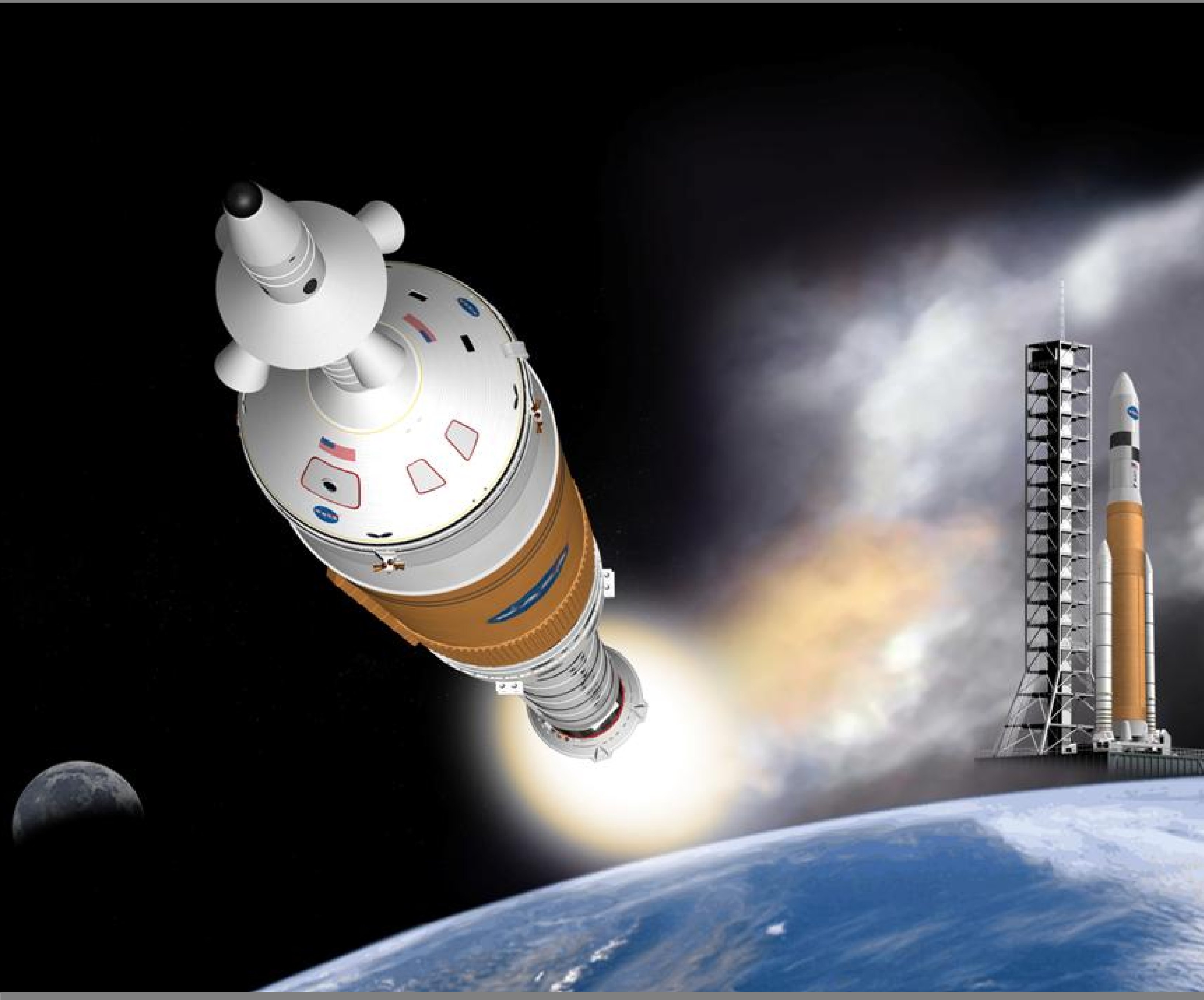
National Aeronautics and Space Administration

NASA REAL PROPERTY FACILITY CAPITAL PLAN



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EXECUTIVE SUMMARY

NASA Real Property Facility Capital Plan

The NASA Strategic Plan establishes the overall strategy for reaching the goals to pioneer the future in space exploration, scientific discovery, and aeronautics research. Mission success will depend not only on Agency program success, but also on building and maintaining a strong internal institution and infrastructure: "Ten Healthy Centers."

On December 13, 2005, NASA's Strategic Management Council proposed a set of attributes that will define strong, healthy Centers—Centers strategically positioned, configured, and operated to support NASA's Mission. These attributes represent performance expectations for NASA Centers to guide them toward successful management of the Agency's people, physical assets, and finances.

Attributes of strong, healthy Centers will include:

- Clear, stable, and enduring roles and responsibilities;
- Clear program/project management leadership roles;
- Major in-house, durable spaceflight responsibility;
- A skilled and flexible blended workforce with sufficient depth and breadth to meet the Agency's challenges;
- Technically competent and value-centered leadership;
- Capable and effectively utilized infrastructure; and,
- Strong stakeholder support.

This *NASA Real Property Facility Capital Plan* presents a summary of the overarching planning documents that guide and form the articulated framework for the Agency's real property management decision-making. The plan strives to demonstrate the integrated processes that are in place to inform, direct, and support the implementation of NASA's real property management goals.

The focus of the Plan is "Capable and Effectively Utilized Infrastructure" and the integral importance of facilities in meeting the NASA mission. Starting with the Agency strategic viewpoint, Section I, Agency Strategic Plan, Mission, Goals, and Objectives, presents strategic goals and outlines steps that demonstrate the responsible stewardship of NASA regarding management of its assets for its Mission: "To pioneer the future in space exploration, scientific discovery and aeronautics research." Additionally, an overview is provided of mission support by NASA Centers to embrace the strategic goals for Space Exploration.

In fulfillment of these goals, NASA has begun a transition from current operations of flying the Space Shuttle and assembling the International Space Station (ISS) to sustaining the ISS and developing and flying the Constellation Program's series of vehicles for exploring the Moon, Mars, and beyond. Hence, the NASA Transition is a continuum of careful planning; optimized utilization; and responsive disposition of resources, real and personal property, personnel, and processes focused on leveraging existing Space Shuttle and ISS assets for the Exploration Program's safety and mission success. NASA Transition is both an integrated strategic effort as well as a tactical, execution-oriented systems approach. As such, it is a key driver for NASA Facilities planning and utilization decisions. As the Constellation Program planning and development matures, the infrastructure requirements to support this effort will also evolve and enable the Agency to enunciate more finely detailed facilities support of the mission goals.

In Section II, NASA Real Property Management Plan (RPMP), the NASA strategic goals are translated into real property management tactical goals in order to sustain and optimize support of NASA's missions and the capabilities required for today and tomorrow. NASA's primary real property management goal is to align its facilities with NASA's mission while applying fiduciary accountability. Next, implementation of the NASA real property management goals is addressed in Section III, NASA Real Property Asset Management Plan (RPAMP). NASA's facilities engineering and real property management strategy and requirements tools are discussed. A graphical depiction that supports the rationale for NASA's facilities strategy and requirements tools is provided in the "Facility Life Cycle Performance Curve."

In Section IV, NASA "Portfolio" for Capital Improvement, NASA's strategic goals are further defined to update, formalize, and unify all Center master plans. The Center master plans will propose a 20-year view for making strategic decisions about facilities and equipment that will ensure the creation of efficient, sustainable, and affordable facilities that are capable of being responsive to and supportive of the Agency's mission in the long term. This effort also will enable NASA to consolidate and integrate the capital improvement proposed by the Centers for use in Agency-level planning via a consolidated, Web-based portfolio.

In Section V, The Construction of Facilities (CoF) Program Process, NASA strategy is translated into program-level processes. The manner in which the CoF Program is developed is addressed with specific focus on NASA's internal processes with Headquarters Mission Directorates, Mission Support Offices, and the Centers. However, processes external to the Agency in program formulation are included in the project process cycle and flow charts.

Project-level detail evolved from the program processes, FY 2008 NASA Facilities Projects, is provided in Appendix D. This appendix, together with the information presented in Appendixes E, and F, provides the currently available detailed data in response to the sub elements of paragraph (2) of the legislative direction contained in Section 101(e) of the *NASA Authorization Act of 2005*. This data is consistent with the information contained in NASA's FY 2008 President's Budget Request. NASA's FY 2008 Institutional, Program Direct, and Demolition Only Projects are presented. Status of known facility closures, other transactions, and cost savings are discussed. The appendixes provide lists of both Institutional and Program Direct CoF Projects, and Demolition Only Projects. Projects presented in these appendixes are either continuing or will be initiated in FY 2008.

Section VI, CoF Agency-Wide Prioritization Process for Institutional Projects Risk Management Plan, provides information as to how institutional projects compete for resources in the CoF Agency-wide prioritization process in which risk to the Agency of not doing the project is evaluated.

Section VII, Staffing Requirements, identifies that NASA is extremely dependent upon its contract support staff in the facility management arena. NASA continues to benchmark and deploy best practices at its Centers, such as participating in the Engineering Construction Innovations Committee; incorporation of sustainable design elements, and project evaluation based on the Leadership in Energy and Environmental Design (LEED) system.

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I. Agency Strategic Plan, Mission, Goals, and Objectives

The fundamental goal of NASA's Strategic Plan is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this strategic goal, the United States will:

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond;
- Promote international commercial participation in exploration to further U.S. scientific, security, and economic interests;
- Develop the innovative technologies, knowledge, and infrastructures both to explore and to support the decisions about the destinations for human exploration; and,
- Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations.

NASA Mission and Strategic Goals is shown in Figure I-A.

NASA Mission and Strategic Goals (Figure I-A)

Achieving the goal for Space Exploration is a challenge requiring new and innovative roles, responsibilities, capabilities, and relationships throughout NASA. Mission success will depend not only on Agency program success, but also on building and maintaining a strong internal institution and infrastructure. In line with the strategic goals, NASA has begun a transition from current operations of flying the Space Shuttle and assembling the International Space Station (ISS) to sustaining the ISS, and developing and flying the Constellation Program's series of vehicles for exploring the Moon, Mars, and beyond. Hence, the NASA Transition is defined as the careful planning, optimized utilization, and responsive disposition of resources, real and personal property, personnel, and processes focused on leveraging existing Shuttle and ISS assets for the Exploration Program's safety and mission success. Likewise, it is a continuum of transition for program and exploration support that includes: Space Shuttle program Transition and Retirement (STaR), ISS Program impacts from STaR, Constellation Program transition from development to operations, as well as Commercial Orbital Transportation Services (COTS) transition and possible implementation. Further, NASA Transition is both an integrated strategic effort and a tactical, execution-oriented systems approach. As such, it is a key driver for NASA capital assets planning and utilization.

NASA's capital assets, including real property, land, buildings, facilities, roads, and utility systems, constitute a major capital investment and make this Agency the ninth largest Federal Government property holder. NASA has responsibility for more than 360,000 acres of real property (100,000 acres are fee owned) and over 5,000 buildings and other structures totaling more than 44 million square feet. The current replacement value (CRV) for NASA real property is more than $23 billion.

NASA will continue to purchase, construct, and operate only those assets required to conduct NASA programs, maintain the Agency's core capabilities, and meet national responsibilities, fully leveraging Agency retained assets to increase their functionality in support of mission success. As such, NASA's real and personal property needs, emphasizing facilities, will be evaluated based on fulfilling direct or anticipated program and mission requirements. Likewise, every attempt will be made to reduce life-cycle cost and risk while ensuring safety and mission success through effective facilities management, development, and operations.

First, NASA will identify, evaluate, and address real property and other assets and requirements as an integral part of Agency planning activities. Specifically related to NASA Transition, a Strategic Capabilities Assessment Database (SCADB) has been developed and maintained to identify the Agency-wide Shuttle last-need and Constellation first-need dates for all real and personal property assets, including facilities. Through this rollup database, strategic or tactical decision-making/execution data can be filtered and tracked. Further, NASA will include real property, logistics, and environmental requirements and associated life-cycle cost in program and project budgets by ensuring that facility program and project managers, logistics manager, and environmental specialists participate as members of mission and program planning teams. The Agency will ensure that Mission Directorates and program managers review real property, logistics, and environmental requirements throughout program life cycles and address changing requirements as they occur. The Agency also will identify capability shortages and determine how they can be addressed to ensure that Agency-validated future capabilities are maintained. And NASA will identify and eliminate redundant and excess real property capabilities and demolish or deconstruct unneeded facilities and equipment consistent with the requirements of the National Historic Preservation Act.

Second, NASA will seek alternatives to ownership of real property where feasible and economically viable, and alternative uses for underutilized real property, including leasing and consolidation of functions. NASA will make full use of its authorities under the National Aeronautics and Space Act of 1958, as amended (Space Act), to enter into public/private agreements that provide for cost sharing to sustain real property management capacity. This includes the Agency's authority to enter into enhanced-use leases under the demonstration authority contained in Section 315 of the Space Act, 42 U.S.C 2459j. Based on the success of NASA's Enhanced Use Leasing (EUL) demonstration at the Kennedy Space Center in Florida and the Ames Research Center in California, NASA submitted to Congress on March 28, 2007, a proposed amendment to the Space Act to modify and expand NASA's existing statutory EUL authority to all NASA Centers. This proposed amendment will facilitate the ability of NASA to realign real property assets with NASA missions, which will result in improved performance by positioning the Agency to recover asset values, improve facility conditions, and achieve improved mission effectiveness. Under these same authorities, NASA also will seek third-party financing and servicing opportunities. In addition, the Agency will market temporarily available capacities to non-NASA customers, divest real property when appropriate, and seek adaptive re-use of historical facilities where possible.

Third, NASA will sustain and revitalize its real property assets and purchase, construct, or operate new real property only when existing capabilities (including those owned by NASA and other external entities) cannot be used or modified cost-effectively. When construction is needed, NASA will use advanced technologies for master planning, design, construction, and facility operations to ensure that NASA facilities are built for sustainability, safety, security, and environmental soundness.

Finally, through the Agency's corporately managed Shared Capability Asset Program (SCAP), NASA will ensure that the Agency's unique, high-value research, test, and evaluation capabilities remain available to support missions that require them. NASA will identify and prioritize these critical assets and their associated human capital investments and make strategic investment decisions to replace, modify, or disposition them based on NASA and other national needs. The implementation of SCAP is particularly important to the NASA Transition effort, as it helps ensure that cross-cutting assets, many largely funded by Shuttle in the past, remain viable and are treated appropriately in the forward planning process.

NASA will coordinate shared capabilities and assets and investments with overall real property management planning and execution initiatives to ensure that the needs of the special classes of assets currently identified (e.g., wind tunnels, thermal vacuum test capability) are considered in long-term planning. NASA will continue to assess requirements for and performance of the asset classes and, over time, assets or asset classes may be added to or withdrawn from the SCAP account based on Agency priorities and balance among the assets being considered.

II. NASA Real Property Management Plan

The NASA Real Property Management Plan (RPMP) sets Agency goals and improvement initiatives to support the NASA Strategic Plan implementation strategy to “achieve management and institutional excellence comparable to NASA’s technical excellence.” Specifically, the RPMP supports the Strategic Plan objective that “NASA will improve the institutional management of capital assets to ensure that NASA’s real property, personal property, processes, and systems are sustained and optimized to support NASA’s missions and the capabilities required for today and tomorrow.”

The RPMP directly responds to the addition of real property to the President’s Management Agenda (PMA) directed by the February 4, 2004, Executive Order 13327, Federal Real Property Asset Management. The purpose of this Executive Order is to improve overall management of Federal real property assets on a Government-wide level. The expected results of this new focus include expanded asset portfolio tracking and analysis capabilities, comprehensive asset management strategies, increased sales of underperforming assets, and reduced maintenance and operating costs. Under the PMA Scorecard evaluation, NASA was one of three Federal Agencies to “Get to Green” on both Status and Progress effective June 2006. Currently, NASA is “Green” on Status, and “Yellow” on Progress.

The Agency’s strategic planning process incorporates facility planning as an integral component. The goals and objectives of the Agency Strategic Plan, Mission Directorate Strategies, and Center Implementation Plans cannot be met without considering the real property element.

Once program/project requirements are defined, facilities requirements are addressed to ascertain whether existing infrastructure is adequate, needs renovation, or new facilities must be constructed. In order to assess the most beneficial solution for the Government, a Business Case Analysis that includes full life-cycle cost (including operations, sustainment, and disposal), benefit estimates, alternatives and sensitivity analyses, and risk assessments is required by *NPR 7120.5, NASA Program and Project Management Processes and Requirements*. *(*Note: Applicable extract provided as Appendix C*.)*

NASA will manage its real property in the most effective manner, including the use of its authorities under the Space Act to enter into real estate agreements such as third-party financing and expanded EUL. In the Consolidated Appropriations Act of 2003 (P.L. 108-7), NASA was provided authority to implement EUL as a pilot program at two NASA Centers (Section 315 of the Space Act, 42 U.S.C. 2459j). The Agency chose to use this authority at KSC in Florida and ARC in California. Based on the success of NASA’s EUL demonstration these two Centers, on March 28, 2007, NASA submitted to the Congress a proposed amendment to the Space Act to modify and expand NASA’s existing statutory authority to all NASA Centers. This proposed amendment will facilitate the ability of NASA to realign real property assets with NASA missions, which will result in improved performance by positioning the Agency to recover asset values, improve facility conditions, and achieve improved mission effectiveness.

Additionally, aging institutional facilities and utility distribution systems must be sustained or revitalized to support current and future facility requirements. A balanced funding approach is essential for continuing to operate facilities safely and efficiently, and to support the Agency’s mission.

NASA’s Real Property Management Goals are listed in Figure II-A.

Agency Real Property Management Goals

1	**NASA will identify and address real property requirements as an integral part of Agency, Mission Directorate, program, and project planning.**
2	**NASA will construct and operate new real property to meet mission requirements only when existing capabilities cannot be effectively used or modified.**
3	**NASA will continually evaluate its real property assets to ensure alignment with the NASA Mission.**
4	**NASA will leverage its real property to its maximum potential.**
5	**NASA will sustain, revitalize, and modernize its real property required by the NASA Mission.**

NASA Real Property Management Goals (Figure II-A)

III. NASA Real Property Asset Management Plan

The *NASA Real Property Asset Management Plan* (RPAMP) is the companion document to the *NASA Real Property Management Plan* (RPMP). While the RPMP addresses what the Agency is doing, the RPAMP addresses how it is being done, containing detailed action plans for the goals and improvement initiatives identified.

Facilities requirements tools are utilized to identify and objectively evaluate the facilities inventory. A wide range of enabling and analysis tools ensure that NASA seeks alternatives to new construction where feasible. When new construction is needed, these tools enable planning, design, and construction that ensures that new facilities are of the right size and type; are safe, secure, and environmentally sound; operate efficiently; and provide sustainable quality workplaces.

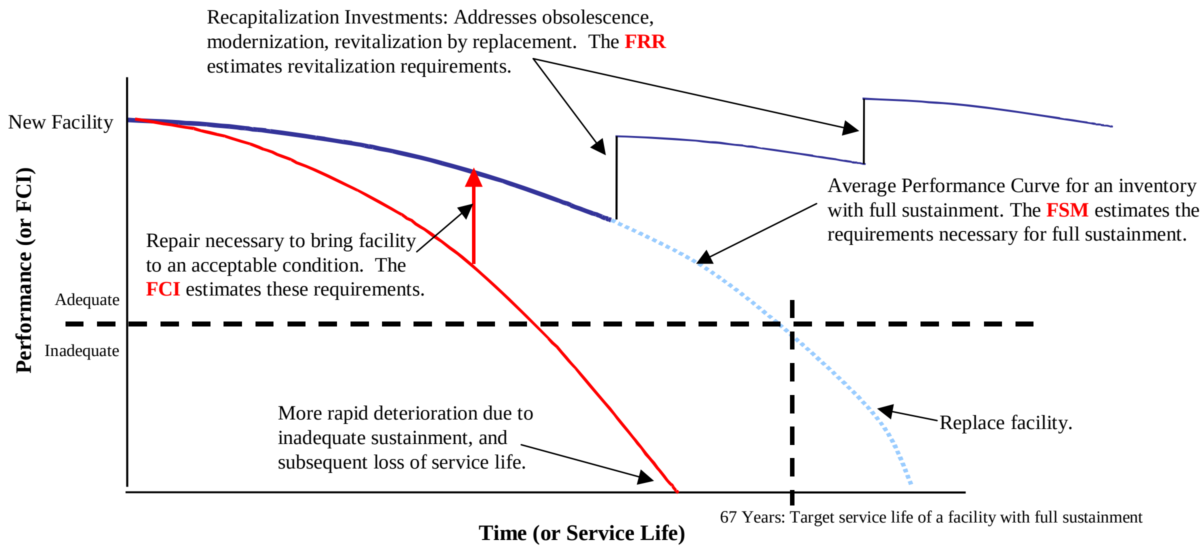
NASA's facilities strategy is to invest in facility maintenance, repair, replacement, and demolition/disposal to ensure that its infrastructure will fully enable current and future missions. A Center's basic utility distribution and infrastructure systems must, with certainty, be capable of supporting these critical facilities. Thus, NASA invests in sustainable operations, design, and construction. Additionally, in FY 2004, NASA instituted a Demolition Only Fund for 2004 through 2007; in FY 2006, this fund was expanded to include FY 2008. The purpose of the Demolition Only Program is to fund the demolition of unused and obsolete facilities that are not required for the current strategic objectives. The removal of these structures eliminates potential safety and environmental liabilities, as well as public eyesores. Also, operations and maintenance funding allocated for these structures can be directed to higher priorities.

The facilities requirements tools are defined and illustrated in the Facility Life Cycle Performance Curve, Figure III-A. This diagram illustrates the typical life cycle of a facility and the means that might be employed to extend the life of the facility. On the Y-axis is the Performance or Facility Condition Index (FCI) of the building; on the X-axis is Time or the Service Life of the Facility. The first curve (red) represents a new facility that has not had the proper repairs and in which subsequent deterioration foreshortens the life of a facility. The second curve (blue) represents a facility that has had the proper repairs (vertical red arrow) to sustain the FCI of the facility to the target age of 67 years. The amount needed to sustain facilities for their useful life is called the Facility Sustainment Metric (FSM). The third and following partial curves (purple) represent recapitalization of investments in which modernizations or repair-by-replacement has occurred to extend the facility beyond the average target age. The Facilities Revitalization Rate (FRR) (black vertical bar) is the amount needed to revitalize facilities to this standard. This diagram portrays the reason that "the best defense is a good offense," that is, regularly scheduled sustainment is paramount. When proper sustainment does not occur, facilities costs are exacerbated exponentially.

In addition to FCI, FSM, and FRR, NASA tracks facilities utilization, operations and maintenance costs, and mission dependence of facilities in its Real Property Inventory Database.

Facility Requirements Tools

Facility Life Cycle Performance Curve



FSM: Facility Sustainment Model; FCI: Facility Condition Index;FRR: Facility Revitalization Rate

Also measure and use facility utilization, O&M costs, and mission dependency.

NASA Mission and Strategic Goals (Figure III-A)

IV. NASA "Portfolio" for Capital Improvement

NASA has recently embarked on a $6.3M strategic initiative to update, formalize, and unify all Center master plans under the oversight of the Facilities Engineering and Real Property (FERP) Division. The Center master plans will propose a 20-year view for making strategic decisions about facilities and equipment that will ensure the creation of efficient, sustainable, and affordable facilities that are capable of being responsive to and supportive of the Agency's mission in the long term.

Development of a Center master plan and the plan for its implementation is a multiyear, iterative process involving close consultation between Centers and Mission Directorates, a review process involving Center presentations to FERP and Mission Directorates, and finalization of the Center master plan and approval by FERP. Approval of a Center master plan represents approval of the overall concept and plan but does not represent assurance that any specific project will be funded. Following signature of the final master plan by a Center Director, it becomes the primary roadmap for ongoing Center development to support NASA's goals and mission.

At this time, four Centers have approved master plans. Four additional Center master plans were approved by NASA Headquarters in 2007. The remaining two Centers are expected to develop master plans for Headquarters review and approval within the next 2 years. Center master plans will be updated on a continual basis and reviewed no less than every 3 years to ensure they continue to support the Centers' concepts of development in support of the NASA mission.

The strategic initiative to update, formalize, and unify all Center master plans will enable NASA to consolidate and integrate the capital improvements proposed by the Centers for use in Agency-level planning via a consolidated, Web-based portfolio. This portfolio will serve as an information resource on NASA facility land use, constraints, and opportunities, utilizing Geospatial Information Systems platforms where appropriate. As Center master plans are completed or updated and approved, the portfolio will be updated. While accomplishment of specific proposed projects set forward in the Center master plans is subject to Headquarters approval based on evolving NASA mission requirements and the availability of funds, the master plans will provide an invaluable framework for conducting advance facilities planning.

Finally, a 20-year Capital Investment Program Plan (CIPP), including funding resources, will be developed for each Center and rolled up to an Agency-level plan, indicating existing facility sustainment and improvements, as well as new or eliminated Center capability. This plan will reside within the above-mentioned Agency portfolio and will be a roadmap for development. In consonance with the President's Management Agenda for responsible stewardship of all capital assets, NASA's CIPP will include an overview of all facility investments, thereby also capturing Center expenditures. The broad categories, or project groups, for the CIPP are Sustainment, Renewal, and Transition (not to be confused with the NASA Transition activity previously defined), as follows:

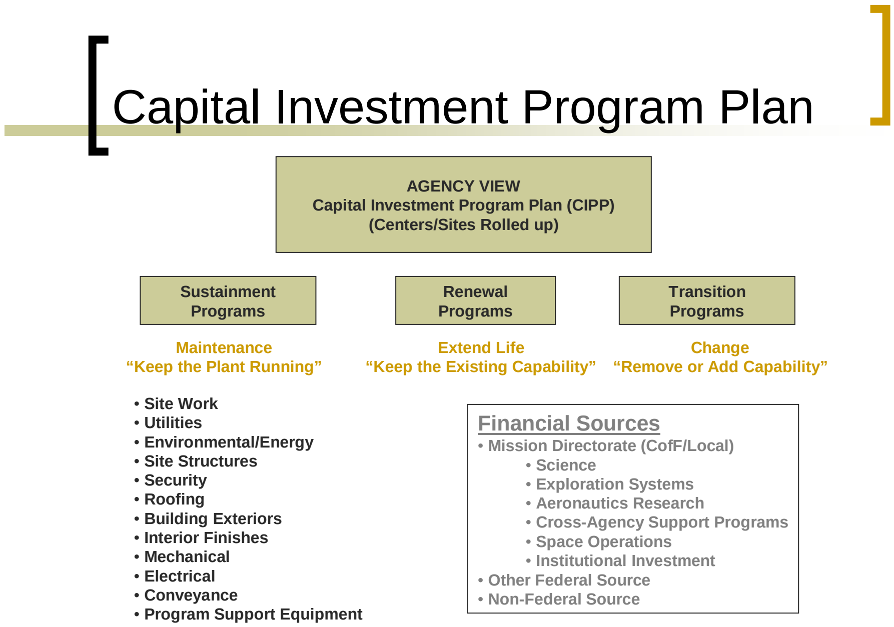
<u>Sustainment</u>: Sustainment programming shall consist of projects in groups, generally by systems that repair or replace existing systems, to maintain the physical facilities. SCAP is a potential source of funds for maintaining existing capabilities in facilities.

<u>Renewal</u>: Renewal programs shall consist of projects in a group, generally of a specific facility or area, that tend to maintain the "status quo" capability at a Center. Such programs may be focused on:

1. Renovations to modernize existing facilities,
2. Consolidations of facilities to improve efficiencies and operational relationships,
3. Demolition of facilities not needed or costly to maintain in readiness, and
4. New construction replacing existing facilities but maintaining existing capability.

<u>Transition</u>: Transition programs shall consist of projects in a group, generally of a specific facility or area, that tend to significantly increase, decrease, eliminate, or create capability at a Center. (Note: The term "transition" here denotes a category of Capital Investment Program Plan programs, i.e., a subset of the broader NASA Transition effort.)

These categories for NASA's CIPP are displayed in Figure IV-A, below. Each Center is divided into area developments that may cross-cut the three broad categories. Funding sources are categorized into specific programs (e.g., Science, Exploration Systems, Aeronautics Research, Cross-Agency Support Programs, Space Operations, or Institutional Investments), non-NASA Federal funding, and non-Federal funding. The three project groups for CIPP are characterized as follows:



Capital Investment Program Plan (Figure IV-A)

V. The Construction of Facilities Program Process

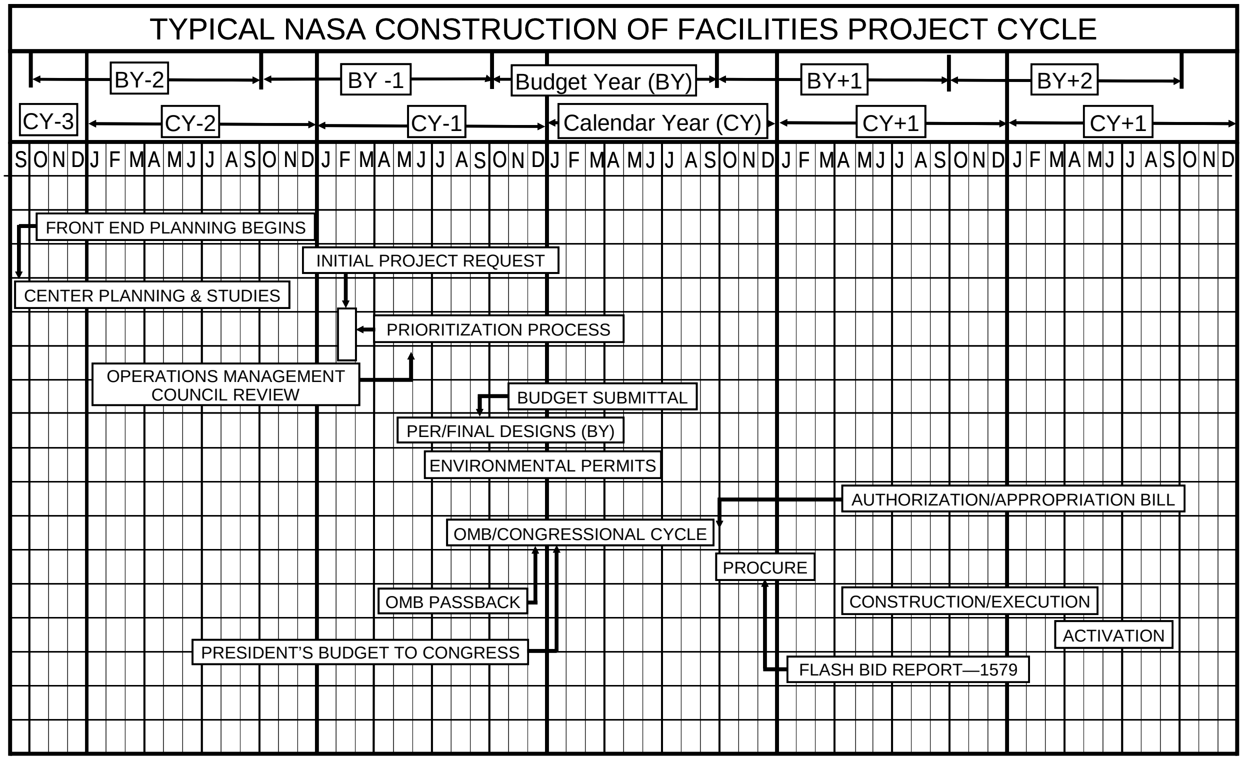
This section addresses capital project planning and assessment of the Capital Facilities Investment Program (design, construction and repair, or traditional CoF) at the following 10 NASA Centers:

- **Ames Research Center:** Ames, Crows Landing Facility near Modesto, CA; Camp Parks Facility near Pleasanton, CA; and Moffett Federal Airfield, CA
- **Dryden Flight Research Center:** Dryden
- **Langley Research Center:** Langley
- **Glenn Research Center:** Lewis Field and Plum Brook Station in Sandusky, OH
- **Goddard Space Flight Center:** Goddard, Multiple Spaceflight Tracking and Data Network (STDN) sites; Wallops Flight Facility in Wallops Island, VA (including offsite facilities)
- **Jet Propulsion Laboratory:** JPL, Table Mountain in Wrightwood, CA; and Deep Space Network Sites (Goldstone, Canberra, and Madrid)
- **Johnson Space Center:** Johnson; White Sands Test Facility in Las Cruces, NM (including Space Harbor); and Space Network (TDRSS) locations.
- **Kennedy Space Center:** Kennedy; Cape Canaveral Air Force Station in Florida; Transatlantic Landing Sites; and Vandenberg Air Force Base
- **Marshall Space Flight Center:** Marshall; Michoud Assembly Facility; Santa Susanna Field Laboratory in California; the Assembly & Refurbishment Facility (ARF); and related MSFC Facilities (SRB element)
- **Stennis Space Center:** Stennis (without tenants)

NASA is developing an Agency-wide 5-year Capital Facility Investment Program (CFIP) that is in accordance with the Agency strategic plan, and that meets external requirements. The CFIP is a Center planning tool that identifies capital expenditures/projects over the upcoming 5 years. In NASA's FY 2007 Facility Data Call to Centers for developing the FY 2009 Facilities Budget, an unconstrained listing of facility project requirements is required, which will be distilled into the Agency-wide 5-year facility plan. This Agency-wide plan will include those projects that support the NASA Mission and priorities and can be funded. A Center's CFIP plan identifies facility project needs that are projected to be required to achieve assigned mission objectives, to provide institutional support, and to revitalize existing facilities. A project's inclusion in the CFIP does not, in itself, commit Headquarters to funding it or the Center to accomplishing it. Available funding and changing mission requirements may require some projects to be deferred beyond the years in which they are initially programmed in the CFIP. CFIP plans will be updated annually based on improved information about mission requirements, existing facilities, budget adjustments, advances in R&D, and mission changes.

The Capital Facility Investment Program includes both Institutional and Program Direct Projects. Programs generally fund all Construction of Facilities (CoF) projects, including facilities planning and design (FP&D), and minor and discrete projects, for the facilities in which they will be the primary beneficiaries. In cases where there are multiple beneficiaries, funding responsibility is directly assigned on a pro rata allocation to each of the benefiting programs in accordance with full cost principles. There is a NASA fund for all Institutional CoF projects within the Institutional Investments program.

In Figure V-A, below, NASA Construction of Facilities Project Cycle, the typical facilities cycle for conventional design-bid-build projects is portrayed. The construction planning process starts several years in advance, with design being funded two budget years prior to construction start. (Note: This process can be expedited with design-build projects; however, facilities requirements must be completely defined in a Facilities Requirements Document for the design-build process to be effective. Construction documents in design-build are performance rather than prescriptive as they are in design-bid-build.)

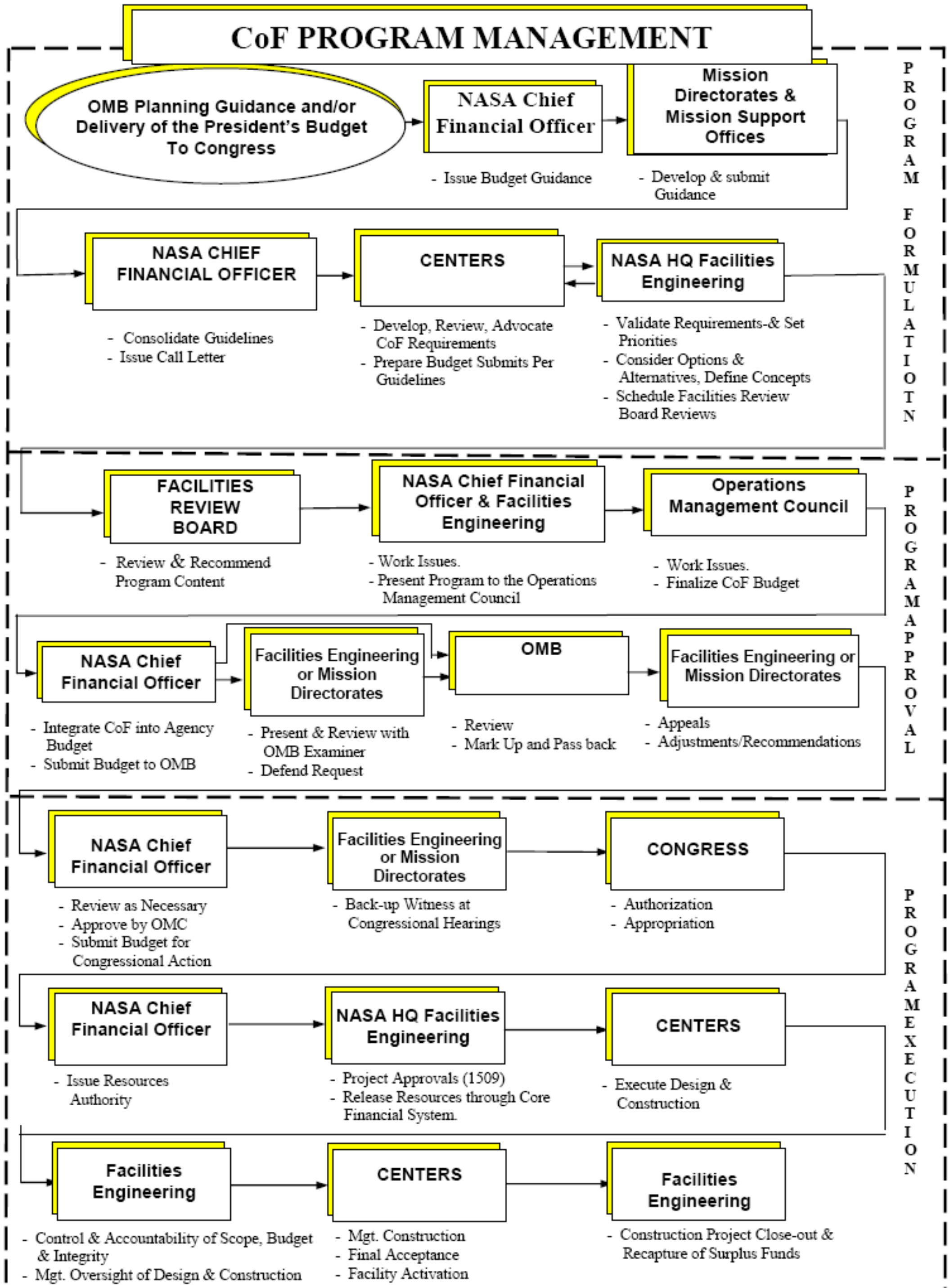


NASA Construction of Facilities Project Cycle (Figure V-A)

The CoF program is developed through a process involving both internal and external stakeholders. This development process is described in the following paragraphs and depicted in Figure V-B, NASA Construction of Facilities (CoF) Program Management Flow Chart, which depicts Program Formulation, Approval, and Execution.

Focusing on Internal Program Formulation, NASA budget guidance is issued from NASA's Chief Financial Officer that considers: OMB guidance and/or the President's budget to Congress and other policy guidance (including NASA Strategic Plan, Performance Plan, Administration and Congressional direction, applicable policies, and NASA Administrator's direction). Program development includes not only the formulation of the proposed facility projects, but also the management and approval of the projects for inclusion in the Agency's budget submittal.

These specific guidelines are incorporated in the NASA Headquarters Data Call to the Centers and programs requesting specific facility project requirements. Centers, programs, and projects evaluate their requirements. Centers submit their CoF project requirements developed in accordance with the NASA Budget Guidance, Data Call and Policy Directives to NASA Headquarters Facilities Engineering and Real Property (FERP) Division.



NASA Construction of Facilities (CoF) Program Management Flow Chart (Figure V-B)

Upon completion of reviewing requirements for Agency-wide priority, which includes Risk Assessment and compliance with NASA Policy, the Director of FERP makes a recommendation to NASA leadership for NASA CoF Project Funding. The project requirements submitted by the Centers (NASA minor and discrete projects) or Capital Improvements Plan projects are the projects that implement the plan necessary to get the Center to its desired end state based on its long-term plans in support of NASA missions. These are the projects that must be consistent with and will affect the Center master plan.

Implicit in each Center Director's Construction of Facilities project submission is the assumption that NASA Project Requirements (NPR) will be met. Examples of project requirements include Deferred Maintenance (DM) reduction due to the project; Facilities Condition Index (FCI); demolition or temporary structure removal involved; health, security, environmental, and safety hazards to be corrected (including Risk Assessment Code); sustainable design features to be incorporated and U.S. Green Building Council, Leadership in Environmental and Energy Design (LEED) Certification intent; Project Definition Rating Index (PDRI) score and interval of performance; consistency with Center master plan; economic payback; Historic/Preserve America initiatives; Americans with Disabilities Act (ADA) in public areas/Uniformed Federal Accessibility Standard (UFAS) in work areas; facility criticality; facility utilization; facility status; and operational cost (utilities and maintenance).

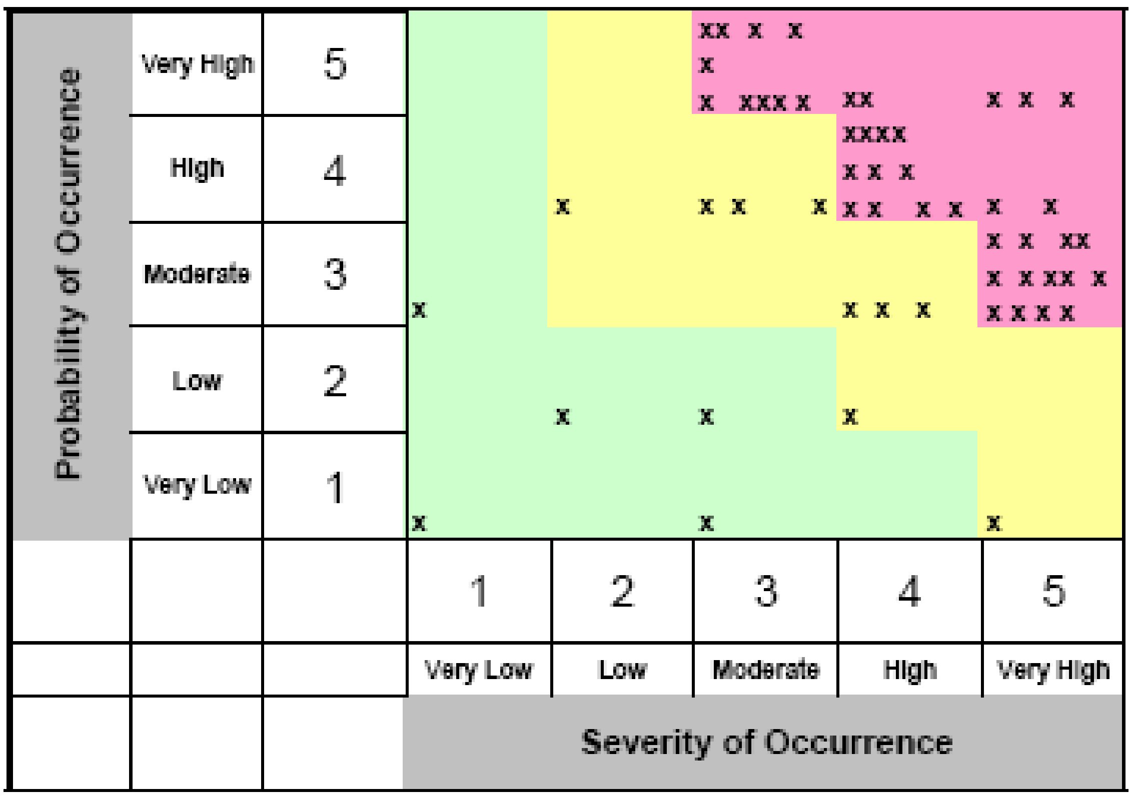
Life Cycle Cost Analyses are required for all projects. ECONPACK Economic Analyses are required for all budget year projects equal to or greater than $5 million. A Business Case Analysis is required for all Program Direct Discreet Projects.

VI. CoF Agency-wide Prioritization Process for Institutional Projects Risk Management Plan:

Institutional Projects compete for resources in an Agency-wide CoF prioritization process in which the risk to the Agency of not doing the project is evaluated.

Below, in Figure VI-A, Construction of Facilities Risk Assessment Matrix, projects are plotted in a 5x5 risk assessment matrix. The X axis represents the severity/consequence of occurrence and the Y axis represents the probability of occurrence. Each “x” in the matrix denotes a potential project, plotted from X and Y coordinates. (*Note: the distribution of projects portrayed is notional.)* Definitions of the severity and probability are shown in Figures VI-B and VI-C, Construction of Facilities Risk Assessment Severity/Consequence and Construction of Facilities Risk Assessment Probability Definitions, respectively.

For example, a project is needed as “frequent major system failures (more than three) occur annually” and “system failure will shut down or have major impact on mission efforts on the Center.” In VI-B, the Severity/Consequence of Occurrence Chart, the mission consequence for the project would be a score of “Very High” or “5”. Looking at Figure VI-C, the Probability of Occurrence Chart, the failure rate for the project would be a score of “Very High” or “5”. Thus, the project would be plotted on Figure VI-A, with X coordinate of “5” and a Y coordinate of “5”, the highest category for project funding (red zone).



Construction of Facilities Risk Assessment Matrix (Figure VI-A)

Consequence of Occurrence (DRAFT)

	Very High	High	Moderate	Low	Very Low
Mission Consequence	System failure will shut down or have major impact on mission efforts on the center.	System failure will cause minor delays in major mission.	System failure may indirectly impact mission. Contingent plans will mitigate any delays but may lead to cost increase.	System failure may have minor impact on mission.	System failure has no impact on mission.
or					
Property Damage	System Failure could lead to more than $5 million in damage to facilities or federal property.	System failure could lead to more than $1- million to $5-million in damage to facilities or other federal property.	System failure could lead to more than $500k to $1-million in damage to facilities or other federal property.	System failure could lead to minor damage ($100k - $500k) to property.	System failure could lead to insignificant damage (<$100k) to property.
or					
Personnel injury or Health	System failure could lead to loss of life or permanently disabling condition.	System failure could lead to severe occupational illness.	System failure could lead to minor occupational injury or illness.	System failure could lead to the need for minor first aid treatment.	System failure is unlikely to lead to an injury.
Score	5	4	3	2	1

Construction of Facilities Risk Assessment Severity/Consequence Matrix Definitions (Figure VI-B)

Probability of Occurrence (DRAFT)

	Very High	High	Moderate	Low	Very Low
Current Requirements	System no longer is safe and will not support current requirements. System needs to be replaced	System no longer meets technical requirements or codes. Reliability is highly questionable. Significant corrective work or component replacement is required.	System meets minimum technical requirements. Reliability is questionable and repairs may have minor impact on users. Corrective work is required.	System meets requirements and codes. The system functions as intended. Minor corrective work is required.	Meets current codes and technical requirements. The system is functional and reliable.
or					
Failure Rate	Frequent major system failures (more than 3) occur annually. .	One or two failure events occur annually. System occasionally unable to function as intended. System failure probable.	System not always functional and reliable. System failure is occasional.	System is functional with expected reliability. System failure is remote, but possible in the life of the system.	System is safe, reliable and meets all codes. System failure highly improbable.
or					
Obsolescence	Critical components are obsolete. OEM no longer supports system. No replacement parts exist.	Components are obsolete. OEM no longer supports system. Replacement parts must be manufactured or cannibalized to support repairs.	Parts are no longer manufactured, or manufacture is limited. Parts are only available through remaining stocks or require long lead-time to acquire.	Critical parts are still available; however shrinking supplier base and obsolescence threatens future supply.	Components are available from OEM or other suppliers.
or					
Natural or Man-made Disasters	The probability of an occurrence that could exceed facility or system limits exceeds 15% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is between 10% and 14% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is between 5% and 9% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is less than 5% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is negligible (less than 1%) in 25 years (or system life if less than 25 years).
Score	5	4	3	2	1

Construction of Facilities Risk Assessment Matrix Probability Definitions (Figure VI-C)

VII. Staffing Requirements

The Facilities Engineering and Real Property (FERP) Division of NASA provides facilities management (FM) leadership, policy, and guidance to 10 NASA Centers nationwide.

NASA's FM organizations are particularly challenged to plan for adequate staffing because of three dynamic variables: Changing missions, senior management priorities, and budget uncertainties. The Centers' combined civilian FM staff in FY 2007 is 90 percent of what it was 7 years ago, with 609 employees, compared with 674 in FY 2000. Succession planning is lacking because NASA lacks the resources and authority needed to develop succession plans for the large retirement-eligible workforce. NASA Centers recently reported that an additional 108 civilian FM staff are needed to respond to the three dynamic variables mentioned above.

NASA is extremely dependent upon its contract support staff in the FM arena. NASA currently has 3,599 contractors supporting FM across the 10 Centers, with the Centers reporting a need for an additional 397 to sustain current requirements. It should be noted that the continued shift of workload to the contract workforce drains the civilian staff of institutional memory, which could impair facility knowledge in the long term, resulting in higher operational costs.

NASA continues to benchmark and deploy best practices at its Centers, such as participation in the Engineering Construction Innovations Committee; incorporation of sustainable design elements and project evaluation based on the Leadership in Energy and Environmental Design system; use of the Design Review and Checking System (Dr. Checks), a Web-based software developed at the U.S. Army Corps of Engineers Engineering Research and Development Center; use of the Project Definition Rating Index for building projects; and use of value engineering, letting contractors share in the cost savings found from suggestions that result in lower life-cycle cost without impairing essential functions. Operations and Maintenance (O&M) best practices used by individual Centers include assigning subject matter experts to particular areas (Ames); monitoring utilities consumption with remote electric meters (Dryden); designating buildings and systems "owners," who monitor and execute maintenance and act as contacts for customers in their facility (Glen); using a computerized maintenance management system (Wallops); Quality Assurance contractor monitoring, custodial satisfaction survey, and participation in the O&M Facilities Innovations Team (Jet Propulsion Laboratory); thermography inspections, work element designation for work orders, custodial crew reporting of problems, and a number of prudent operational management practices (White Sands); synergy with the Air Force staff under the joint base operations support contract (Kennedy); a budget-based maintenance management approach that enhances cost control and ensures the maintenance program stays within cost constraints (Langley); and a Utility Control System (Marshall). Best practices by the Center real property staffs include Enhanced Use Leasing (EUL) authority (Kennedy and Ames), benchmarking (Goddard), Web-based work requests (Kennedy), and master planning at all 10 NASA Centers.

Bibliography

1. **2006 National Aeronautics and Space Administration (NASA) Strategic Plan**, "Building Strong, Healthy NASA Centers, p. 23 and "Strategic Management of Capital Assets", pp. 27 & 28.

2. **National Aeronautics and Space Administration Real Property Management Plan, November 2004**.

3. **National Aeronautics and Space Administration (NASA) Real Property Asset Management Plan, January 2008**

4. **National Aeronautics and Space Administration (NASA) Policy Document (NPD) 8820.2C**, **Design and Construction of Facilities**, June 13, 2006 **and NASA Policy Requirements (NPR) 8820.2E, Facility Project Implementation Guide**, October 7, 2003.

5. **National Aeronautics and Space Administration (NASA) Policy Requirement (NPR) 7120.5C, NASA Program and Project Management Processes and Requirements**, 2006.

6. **NASA Headquarters and Centers Web sites, http://www.nasa.gov.**

Appendix A - Definitions

Construction: The erection, installation, or assembly of facilities required to support new capability; improvements, including additions to facilities intended to remain attached or annexed (e.g., sidewalks, parking lots, driveways) and upgrades to facility systems solely to support new capability or increased capacity; and alterations to facilities that change the original purpose or capacity of the facility (e.g., remodeling a warehouse or portion thereof into office space).

Demolition Only Projects: Projects that are purely demolition (that is, not a part of a construction project). The intent is to demolish older, excess facilities, thereby reducing costs, eliminating safety and environmental hazards, and reducing eyesores throughout NASA. Demolition projects will reduce Deferred Maintenance (increasing the Agency/Center Facilities Condition Index), thus improving the overall Agency/Center facilities infrastructure which accomplishes one of the Strategic Initiatives of "Ten Healthy Centers."

Discrete and Minor Projects: Discrete projects are those that are at or above the designated minor/discrete funding threshold of $5 million. Minor projects are $500 thousand and above, but below $5 million.

Local Projects: Those projects below the minor projects threshold ($500K) that are administered locally.

NASA Facilities: Includes not only buildings but also launch pads, test stands, communication towers, roads, and other structures that support the NASA Mission.

Repair: The facility work required to restore a facility or component thereof, including collateral equipment, to a condition substantially equivalent to the originally intended and designed capacity, efficiency, or capability. It includes the substantially equivalent replacement of utility systems and collateral equipment necessitated by incipient or actual failure and work required to enhance, alter, or adjust a facility or component thereof to be more effectively used for its present purpose. For example, bringing facilities up to current codes can be designated as repair. Interior arrangements (such as office reconfigurations) and restorations may be included as repair, but additions, new facilities, and functional conversions must be performed as construction projects. If the function of the facility is changed (e.g., converting a warehouse to office space) or facility capacity is increased (e.g., an addition), it would be termed as "construction."

Repair-by-Replacement: When repair costs exceed a significant percentage of the total value of the project, such as in a structure that is severely deteriorated or that has obsolete building systems, it is often most cost effective to demolish the structure and rebuild in its place. The decision to proceed with Repair-by-Replacement is made based on economic analysis of alternatives.

Repair/Construction Projects: It is possible that a project can be a combination repair/construction project. For example, a new addition to a building would be construction, but replacing the roof of the existing building done in conjunction with the new addition would be repair. In these cases, Centers will provide estimates of both the repair and construction portions of the project.

Sustainment (Maintenance): The recurring day-to-day work required to preserve facilities (buildings, structures, grounds, utility systems, and collateral equipment) in such condition that they may be used for their designated purpose over an intended service or design life. Sustainment minimizes or corrects normal wear and tear and thereby forestalls major repairs. Facilities sustainment includes all aspects of a Reliability Centered Maintenance (RCM) program (planned periodic maintenance, preventative maintenance, and predictive maintenance—testing and inspection), grounds care, trouble calls, and routine repairs. Facilities sustainment does not include operational services (e.g., firefighting services, security guard services, and custodial) or work on noncollateral equipment.

Appendix B - NASA Center and Facility Descriptions

AMES RESEARCH CENTER (ARC)

NASA Ames Research Center, located at the southwest end of the San Francisco Bay, is in the heart of California's Silicon Valley research cluster of high-tech companies, universities, and laboratories. With more than $3.5 billion in capital equipment, 2,800 research personnel, and a $700M annual budget, Ames is a leader in information technology research with a focus on supercomputing, networking, and intelligent systems. Ames conducts the critical research and development for and is a leader in aerospace and thermal protection systems, nanotechnology, fundamental space biology, biotechnology, and human factors research.

DRYDEN FLIGHT RESEARCH CENTER (DFRC)

The Dryden Flight Research Center is NASA's premier installation for aeronautical flight research. Its mission is to research, develop, verify, and transfer advanced aeronautics, space, and related technologies for atmospheric flight operations. Dryden is a tenant organization at Edwards AFB, CA, on the western edge of the Mojave Desert, 80 miles north of Los Angeles. The Center has 200 facilities on 880 acres and employs approximately 1,100 personnel.

GLENN RESEARCH CENTER (GRC)

The Glenn Research Center is distinguished by its unique blend of aeronautics and space flight expertise, with research, technology, and systems development experience for aeronautics, aerospace, and space applications. The Center's main site, Lewis Field near Cleveland, OH, is a 350-acre campus supporting a staff of more than 2,500 personnel. The campus consists of more than 140 buildings, including 24 major test facilities and more than 500 specialized research and test facilities. The Plum Brook Station site, 50 miles west of Cleveland, offers four large, world-class facilities for space technology and capability development on a 6,400-acre campus.

GODDARD SPACE FLIGHT CENTER (GSFC)

The mission of the Goddard Space Flight Center is to expand knowledge of the Earth and its environment, the solar system, and the universe through observations from space. This includes operating worldwide space flight tracking networks and unmanned scientific spacecraft. The GSFC Greenbelt Facility occupies 1,270 acres in Greenbelt, MD, with 33 major buildings providing more than 3 million square feet of research, development, and office space for 10,000 civilian and contractor personnel.

JET PROPULSION LABORATORY (JPL)

The Jet Propulsion Laboratory located near Pasadena, CA, supports a staff of approximately 6,000. With 200 buildings on 176 acres, the Center is very constrained for space, requiring that some functions, such as parking lots, be located offsite. Approximately 60 to 70 percent of the buildings on the Center are best classified as industrial or specialized rather than commercial, including high bay buildings and test simulators. JPL's primary missions are related to unmanned space flight, deep space exploration, and robotics.

JOHNSON SPACE CENTER (JSC)

Johnson Space Center is located in the Clear Lake City district of Houston, TX, about 30 miles southeast of downtown. Johnson Space Center's primary missions are human exploration and astromaterials. Johnson Space Center has many unique facilities, including the Shuttle Mission Simulator, the Space Environment Simulation Laboratory, and, of course, the well-known Mission Control Center (MCC).

KENNEDY SPACE CENTER (KSC)

The primary mission of the Kennedy Space Center in Cape Canaveral, FL, is launch operations. KSC occupies 1,051 facilities on 140,000 acres of land and water on Merritt Island on the coast of the Atlantic Ocean. However, only a small portion of the land is used by NASA; the remainder is a wildlife refuge. There are approximately 12,000 personnel who work at KSC. The 15,804-acre Cape Canaveral Air Station, operated by the Air Force Space Command, provides additional support for KSC. The facilities are scattered and include services such as launch complexes, missile assembly buildings, and other launch-related operations.

LANGLEY RESEARCH CENTER (LaRC)

NASA Langley Research Center in Hampton, VA, is a world-class research and development center for space exploration, aeronautics, science, and systems analysis. Langley employs approximately 3,300 civil servants and contractors who conduct research in 386 facilities on 800 acres of land. Over the decades, Langley has pioneered numerous aviation breakthroughs, conducted groundbreaking climate research, and contributed to space programs from Mercury and Apollo to the Space Shuttle and International Space Station. Currently, Langley is a key contributor to NASA's mission to explore the Moon, Mars, and beyond with human and robotic crews.

MARSHALL SPACE FLIGHT CENTER (MSFC)

The Marshall Space Flight Center, which occupies 289 facilities on 1,800 acres in Huntsville, AL, is one of NASA's most diversified installations. Marshall manages the key propulsion hardware and technologies of the Space Shuttle, develops the next generation of space transportation and propulsion systems, oversees science and hardware development for the International Space Station, manages projects and direct studies that will help pave the way back to the Moon, and handles a variety of associated scientific endeavors to benefit space exploration and improve life here on Earth.

STENNIS SPACE CENTER (SSC)

The John C. Stennis Space Center, located in Bay St. Louis in southern Mississippi, is America's largest rocket test complex for rocket propulsion testing at 13,500 acres. It has a unique waterway system (barge access for large rocket motors) and a 125,000-acre acoustical buffer zone that enables testing of large-scale rocket engines and components. Stennis Space Center is a multiagency Center with more than 30 resident agencies comprising approximately 4,500 personnel, including 3,500 U.S. Navy personnel.

MICHOUD ASSEMBLY FACILITY (MAF)

The Michoud Assembly Facility is a Government-owned, contractor-operated component of the Marshall Space Flight Center located in New Orleans, LA, on 830 acres of Government-owned land. Michoud's mission is to support the continuing development and operations of the NASA Space Shuttle Program. With 2,000 employees, the facility features one of the world's largest manufacturing plants (43 acres under one roof) and a port with deep-water access for the transportation of large spaceflight structures.

WALLOPS FLIGHT FACILITY (WFF)

Wallops Flight Facility is a 6,000-acre Center located on the narrow southern peninsula of the eastern shore of Virginia. Wallops is the primary orbital tracking station for the Mid-Atlantic region, and the sounding (research) rocket program. It has a heavily instrumented research airport capable of supporting unmanned aerial vehicles (UAVs), which also supports National Oceanic and Atmospheric Administration (NOAA) and U.S. Navy flights. WFF supports more than 1,000 full-time NASA employees, more than 300 Navy personnel, and approximately 100 NOAA employees. WFF is operated by its parent center, Goddard Space Flight Center.

WHITE SANDS TEST FACILITY (WSTF)

The NASA White Sands Test Facility (WSTF), located on the west slope of the San Andres Mountains between Las Cruces, NM, and the White Sands Missile Range, is a component of the Johnson Space Center. WSTF provides a wide variety of test and laboratory research and development support to all NASA Centers, the Department of Defense, other Government agencies, and private industry.

Appendix C - NASA Program Requirement (NPR) 7120.5C,
NASA Program and Project Management Processes and Requirements

Paragraph 3.2.1.2.f Analyze project infrastructure needs.
Working with the real property and industrial property offices, the Project Manager shall ensure that a comprehensive analysis of project infrastructure (real property/facilities, aircraft, personal property, and information technology (IT)) needs is performed. This analysis should include infrastructure required for: staff office space, test (including ground and flight facilities) and integration functions, research facilities, data systems, logistics and maintenance facilities, aircraft, and personal property and equipment.

1. The Project Manager, in coordination with the cognizant Center functional office, shall assess existing Agency-wide capabilities to meet infrastructure needs, and also assess whether facilities in other Government agencies, industry, academia, and international organizations can be utilized to reduce project Life Cycle Cost (LCC) and risk. The Project Manager should work with the Program Manager, the Mission Directorate Associate Administrator (MDAA), Office of the Chief Engineer (OCE), Chief Information Officer (CIO), the Office of Infrastructure, Management, and Headquarters Operations, and other Headquarters offices to identify means of meeting infrastructure requirements through synergy with other programs and projects, thus avoiding costly duplication of supporting infrastructure.

2. A **business case** justification shall be performed for any proposed acquisition or major modification of infrastructure (e.g., facilities, IT).

3. The **business case** shall include full life-cycle cost (including operations, sustainment, and disposal), benefit estimates, alternatives and sensitivity analyses, and risk assessments. (For more information on full cost and practices, see Volume 7 of the NASA Financial Management Requirements.)

i. The business case shall be approved by the cognizant MDAA and by the cognizant NASA Headquarters functional office, or their designee(s).

ii. First in coordination with the cognizant Center functional office and then with the Headquarters Office of Infrastructure, Management, and Headquarters Operations, and/or the CIO, as appropriate, the Project Manager shall develop plans for any necessary upgrades or new developments, including those needed for environmental compliance (see paragraph 3.2.1.2j), and then document them in the Project Plan, Part 2, Resources.

4. The Project Manager shall comply with the provisions of *NPD 7900.4, NASA Aircraft Operations Management* and *NPR 7900.3, Aircraft Operations Management,* before entering into agreements to procure or operate aircraft that might be necessary to the success of the project. The Project Manager shall directly coordinate with Center Chief of Flight Operations or the Headquarters Aircraft Management Office during the planning stage.

Appendix D – FY 2008 Construction of Facilities Institutional Project List (Procurement Dollars)

Center	Project	Repair Cost ($000)	Construction Cost ($000)	Total Cost ($000)
ARC	N258 (NASA Advanced Supercomputing Facility) Electrical Supply Reliability Improvement Phase IA		2,600	2,600
ARC	Replace Steam Vacuum System Cooling Tower at N234A		4,800	4,800
ARC	Restoration Electrical Distribution System Phase 7A		3,200	3,200
DFRC	Construct Consolidated Information Technology Center		4,950	4,950
DFRC	Repair B4853 Fire Pumping Station	1,500		1,500
DFRC	R&M Storm Drainage Facilities	500	500	1,000
DFRC	Repair Paving: Thompson Ave & Radar Site Roadways	1,600		1,600
GRC	Security Requirements for Lewis Field Main Gate Area, Phase 1	3,000		3,000
GRC	Repair Sewer Systems, Phase 8	900		900
GRC	Repair Water System, Plum Brook Station, Phase 2	2,300		2,300
GRC	Repair Steam Regulator Stations, Phase 1	1,000		1,000
GRC	Repair Parking Lots & Roads, Phase 3	1,700		1,700
GSFC	Repair of Airfield Lighting and Control Systems, Wallops	1,200		1,200
GSFC	Restoration of Site Steam Distribution System, Phase VI, Greenbelt	3,000		3,000
GSFC	Replace Central Power Plant Equipment, Building 24, Greenbelt	1,200		1,200
GSFC	Repair Roofs, Various Buildings, Greenbelt & Wallops	1,600		1,600
GSFC	Upgrade Fire Alarm Systems, Various Buildings 1, 6, & 7, Greenbelt	1,500		1,500
GSFC	Repair of Storm Drainage Structures, Wallops	1,200		1,200
GSFC	Repair Central Power Plant Equipment, Building 24, Phase 1B	2,300		2,300
JPL	Upgrade Sewage Lift Station, B224	850		850
JPL	Fire Suppression Systems, Various, TMO	750		750
JPL	Replace HVAC System, SFOF, B230	2,500		2,500
JPL	Re-roof B107, 111, 156, 161, 202, 234, 251, 264, 277, 301, 303, Phase 1A	2,400		2,400
JPL	Upgrade 2.4kV Electrical Distribution to 16.5kV, Phase 7	1,650		1,650
JSC	Construct New Office Facility, Phase 2 of 2		12,000	12,000
JSC	Replace Underground Natural Gas System, JSC	3,600		3,600
JSC	Repair and Upgrade 100 and 400 Area, Phase 1A WSTF	1,500		1,500
JSC	Upgrade Central Heating and Cooling Plant and Assoc. Equipment, (24)	4,000		4,000

FY 2008 Construction of Facilities Institutional Project List (Continued)

Center	Project	Repair Cost ($000)	Construction Cost ($000)	Total Cost ($000)
JSC	Replace Electrical Equipment, Avionics Systems Laboratory (16)	1,000		1,000
JSC	Upgrade Emergency Power Bldg. (48)	3,500	500	4,000
JSC	Repair Sprinkler and Fire Alarm Systems, Various Buildings, Phase IIA	2,500		2,500
KSC	Renovation of Operations & Checkout Building, Phase 3 of 5	11,000		11,000
KSC	Revitalize Engineering Development Laboratory	3,000		3,000
KSC	Revitalize Prototype Shop	2,500		2,500
KSC	Replace Air Handlers, KSC Hq, Phase 1A	3,000		3,000
KSC	Replace Seawalls, NASA Causeway	4,600		4,600
LaRC	New Town - Admin Office Building 1		28,800	28,800
LaRC	Rehab of Building 1251	4,800		4,800
LaRC	Rehab of Building 1268	800		800
LaRC	Rehabilitation of HVAC Systems, B1232 / B1244, Phase 1A	1,600		1,600
LaRC	Rehab of HVAC Systems, B1202 / B1208	1,800		1,800
LaRC	Replace Electrical Power Cables, B1266	1,900		1,900
LaRC	ADA Upgrades, Various Facilities, Phase IV	1,300		1,300
MSFC	Construct Replacement Building 4602		30,000	30,000
MSFC	Replace and Repair Roofs at Various Buildings, Phase 3 (4708)	3,000		3,000
MSFC	Upgrade Utility Control System (Site Wide) Phase 2	1,400		1,400
MSFC	West Test Area Industrial Water System Refurbishment, Phase 1A	3,500		3,500
MSFC	Construct Additional Bays (4604)	1,500		1,500
MSFC	Replace Asbestos Siding and Provide Energy/Safety Upgrades to Bldg Systems (4705), Phase 2	8,900		8,900
SSC/M	Rehabilitation of HVAC Systems Various Locations	2,100		2,100
SSC/M	Repairs to High- and Low-Voltage Electrical Systems	3,000		3,000
SSC/M	New Cryogenic Control Building		1,300	1,300
			Total =	**197,100**

Appendix E – FY 2008 Construction of Facilities Program Direct Project List (Procurement Dollars)

Center	Project	Cost ($000)
GSFC	Construct Exploration Sciences Building	20,000
JPL	Construct Flight Projects Center	14,200
JPL	Revitalize Water Transmission and Distribution System at GDSCC (Deep Space Network)	625
JPL	Replace Building G-86 HVAC Equipment &MCC at GDSCC (Deep Space Network)	835
JPL	Upgrade Fire Protection at Echo and Mars sites at GDSCC (Deep Space Network)	650
JPL	Replace Generator Switchgear at GDSCC (Deep Space Network)	700
JPL	Modify Electrical Distribution System at CDSCC (Deep Space Network)	300
JPL	Replace “B” Bank Generator Switchgear at CDSCC (Deep Space Network)	690
JSC	Construct CEV Avionics and Integration Lab	22,000
KSC	Modify Vehicle Assembly Building	31,200
KSC	Replace Roof and Doors, B836, Vandenberg AFB (Launch Services)	2,200
KSC	Revitalize Roof and Gutters, PHSF (Launch Services)	1,400
KSC	Revitalize HVAC System, PHSF (Launch Services)	1,100
MSFC	Modify Dynamic Test Stand 4550	5,000
MSFC	Modify Structural Strength Test Facility, Building 4572	1,500
MSFC	Modify Cryogenic Structural Test Facility, Building, 4699	1,000
MSFC	Modify TPS Development Facility, Building 4765	2,100
SSC	Modify A-1 Propulsion Test Facility	6,600
SSC	Modify J-2X Engine Assembly and Warehouse, Building 9101	700
SSC	Modify B-2 Propulsion Facility	3,300
	Total =	**116,100**

Appendix F – FY 2008 Demolition Only Project List (Demo Costs are Procurement Dollars)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
ARC	14-Ft Wind Tunnel Facility	N218	5,000	102	30
ARC	Crop Growth Facility	N214	57	21	20
ARC	Modular Office Building	T27-A	86	26	60
ARC	Modular Office Building	T27-B	86	23	60
ARC	Modular Office Building	T20-F	58	19	20
ARC	Office Trailer	T6-C	10	1	20
ARC	Office Trailer	T6-D	17	5	20
ARC	Office Trailer	T12-A	20	9	8
ARC	Office Trailer	T6-B	10	2	20
ARC	Office Trailer	T28-B	12	6	20
ARC	Office Trailer	T28-A	12	4	20
ARC	Office Trailer	T3-B	12	6	20
ARC	Office Trailer	T20-C	17	7	20
ARC	Pressurized Ballistic Range	N209	35	0	64
ARC	Recycle Office Trailer	T127-D	6	15	20
ARC	Underground Ballistic Range	N208	53	0	64
DFRC	Demolition of Facility B4819	4819	29	5	5
GRC	Demolish Unused Research Test Cells	5, 23, 37	2	0	0
GRC	Demolition of Abandoned Structures at SPF Site, Plum Brook Station	1452, 1431, 8336	1,000		
GSFC	C-015 Projects, WFF	C-015	123	8	6
GSFC	D-101 Optical Lab, WFF	D-101	44	4	3
GSFC	H-030 Four-Car Garage / WEMA, WFF	H-030	28	2	0
GSFC	V-065 WEMA Recreation Facility(GS Station), WFF		250	5	5
GSFC	V-070 Observation Tower, WFF	V-070	4	1	1
GSFC	W-025 POMB Maintenance Material Storage, WFF	W-025	3	1	0
GSFC	W-096 Assembly & Checkout / Mobile Shelter, WFF	W-096	56	2	1
GSFC	W-100 Scout Utility Building, WFF	W-100	6	0	0

Appendix F – FY 2008 Demolition Only Project List (Continued)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
GSFC	W-105 Winch Shelter, WFF	W-105	2	0	0
GSFC	W-110 Guard House (Mark II Scout), WFF	W-110	1	1	0
GSFC	W-116 Service and Storage, WFF	W-116	2	0	0
GSFC	W-125 Scout Launcher Service, WFF	W-125	3	1	0
GSFC	W-126 Trailer Shelter, Paint, WFF	W-126	4	1	1
GSFC	W-128 Environmental Control Equip, WFF	W-128	3	1	1
GSFC	Y-038A Launch Fire Control Center, WFF	Y-038A	2	1	0
GSFC	Y-064 Electrical Distribution Center, WFF	Y-064	3	1	1
GSFC	Y-067 Radar Support Cubicle, WFF	Y-067	1	0	0
GSFC	Z-042 Launch Pad Terminal Bldg, WFF	Z-042	5	0	0
JSC	Demolish Electrical Equipment (16, 16A)	16/16A Equip.	50	2	0
JSC	Demolish Fire Suppression CO_2 Systems	Site	50	500	0
JSC	Demolish Incinerator, Compressor Lean-To and Concrete Pads (B262)	262/262b (partial)	100	8	1
JSC	Demolition of Two Tanks Next to TS401, WSTF	TS401	100	0	0
LaRC	Demolition of 30x60-Ft Full Scale Tunnel, Building 643	643	4,992	500	1
LaRC	Demolition of 60-Ft Sphere Blower House	1295E	1	1	0
LaRC	Demolition of Conference Center and Anechoic Noise Facility	1218 & 1218A	130	41	13
LaRC	Demolition of Microwave-Vhf Communications Facility	1299E	5	1	0

Appendix F – FY 2008 Demolition Only Project List (Continued)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
LaRC	Demolition of Operations Support Facility No. 1	1299A	4	1	0
LaRC	Demolition of Operations Support Facility No. 2	1299B	4	1	0
LaRC	Demolition of Operations Support Facility No. 3	1299C	3	1	0
LaRC	Demolition of Operations Support Facility No. 4	1299D	7	3	0.5
LaRC	Demolition of Refrigeration Facility	1259A	5	1	1
LaRC	Demolition of Storage Facility	1229A	45		
MAF	Office Trailer	T36-A	18	1	1
MSFC	Visitor Center/Public Affairs, MAF	943	556	55	27
SSC	Demolition of Auxiliary Cranes, A-1 and A-2 Test Stands	4120 4122	200	0	0
SSC	Demolition of Butler Building	2436	225	3	4
	Demolition Design Funds		1,443		
		Totals =	**15,000**	**1,393**	**559**