PREFACE

P.1 PURPOSE

The purpose of this directive is to provide instructions for the Planning of GSFC facility projects. This includes all planning efforts to support both mission and institutional requirements.

P.2 APPLICABILITY

This instruction applies to all projects planned by the Facilities Management Division (FMD) for the Greenbelt and Wallops Flight Facility (WFF) sites. This procedure does not apply to projects executed at remote sites planned and executed by separate Directorates and Project Managers.

P.3 AUTHORITY

NPR 8820.2F, Facility Project Requirements
NPR 8831.2E, Facilities Maintenance and Operations Management
NPR 9250.1B, Property, Plant, and Equipment and Operating Materials

P.4 REFERENCES


P.5 CANCELLATION

None

P.6 SAFETY

Safety of all employees is a critical component of all facilities project planning. Projects shall be planned to comply with all applicable facility safety requirements.
P.7 TRAINING

All Planners who develop facilities projects will be trained in the Procedures outlined in this document.

P.8 RECORDS

All project planning records will be retained in the Maximo Computerized Maintenance Management System (CMMS) in use at the Goddard Space Flight Center.

<table>
<thead>
<tr>
<th>Record Title</th>
<th>Record Custodian</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximo project Planning work orders</td>
<td>Maximo CMMS managed by FMD</td>
<td>NRRS 8/56A(1). Destroy when 5 years old</td>
</tr>
</tbody>
</table>

*NRRS – NASA Records Retention Schedule (NPR 1441.1)*

P.9 MEASUREMENT/VERIFICATION

Determine the completeness (applicable to the type of project being planned) of project planning packages to ensure that project requirements are clearly defined and communicated so workable drawings and specifications can be developed; identify trends to make process improvements or take corrective actions.

PROCEDURES

1. Introduction

The facilities project planning process is performed to define and refine the objectives, and document the total scope of the effort required to attain those objectives.

The first stage of the project planning process is Project Formulation. In Project Formulation, the customer’s needs and project requirements are identified, alternatives to meet the needs are explored, and a suitable conceptual scope to meet the needs is determined. The use of and impact on all building systems are considered in the process to arrive at a conceptual scopes.

With a Conceptual Scope, the project planning process moves from the Project Formulation stage to the Project Planning stage. In this stage, the necessary elements that must be performed to implement the conceptual scope and meet all ‘compliance requirements’ are determined. During the project planning stage, a final scope is developed, accounting for the potential impact of compliance requirements.

1.1 Programming of Projects

Facilities projects are generally funded from one of three major fund sources, Customer funds, Center funds, or Headquarters funds.
This instruction provides the basic guidelines governing the process of project planning for all projects, regardless of the project funding mechanism. Depending on the complexity of the project, the scope and content of the planning process outputs may vary; however, the underlying principals followed in the project planning process are the same regardless of the type of project.

**Customer Funded Projects** - Projects are often funded by the Directorate customer. These may be small in scope and cost or significant investments. The funding and approval process for these follow procedures of the individual customer and are independent of the Center programming process. These projects are funded by using customer accounts. Projects that are above the Construction of Facilities (CoF) Program dollar threshold require the customer funds to be reprogrammed through HQ into CoF programmatic funds.

**Center Funded Projects** - Proposed projects for Center funding will be reviewed and prioritized against other projects competing in the same category in a procedure outlined in Appendix F, Figure 2 “Programming Process.” The annual “Facilities Requirements Call Handbook” and other directives produced by the Planning Branch provide the guidelines for what types of projects can compete for funding in each program. These guidelines are used to select and rank projects competing for funds in that program. In this review, all projects are examined to make sure that they have been properly planned and are prioritized in accordance with the “Facilities Requirements Call Handbook.” Subsequently, the Class III sub-program projects are submitted to the Facilities Review Committee (FRC) for final prioritization and approval.

**Headquarters Funded Projects (CoF)** - Projects proposed for HQ funding will be reviewed and prioritized against other projects competing in the same category in a procedure outlined in Appendix F, Figure 2 “Programming Process.” Federal appropriations require “Full Funding,” meaning that the project budget includes sufficient funds to complete a useful segment of a capital project (investment) before any funds are obligated for that segment. In establishing a project scope, Planners must include all of the necessary elements in a single project to avoid fragmentation or the appearance of fragmentation. Planners should be aware when considering scope changes that affect budget, that reprogramming other funds into CoF can take considerable time.

### 1.2 Project Identification

This is a multiple step process that results in the identification of a project requirement at GSFC. The specific sequence of events resulting in a project requirement may vary depending on the project. Projects may come from customer needs or institutional requirements. In general, customer Directorates will generate requirements for programmatic changes to support new and emerging technical or programmatic needs. It is expected that discussions between Directorate Planners and the customer (Directorate staff) have occurred and the needs are already known by the time the project requirement comes to FMD.
Institutional projects for repairs and/or maintenance normally are generated by Institutional Planners from the condition inspection system process or from information provided by the maintenance staff in FMD. In either case, the project planning process starts, in Greenbelt, with the submission of a work request to the Code 200 Customer Service Office. Currently this is done in the eMOD system and then entered into the Maximo CMMS system as a work order. For additional information about these IT systems see other work instructions. The EMOD system is not currently available at Wallops. At Wallops, facility project planning is typically initiated by the Code 228 Planner/Engineer for institutional projects. Programmatic projects are usually initiated through meetings/discussions with the customer, followed by a written (email) request.

1.3 Facility Project Planning Criteria

FMD categories of work (preventive maintenance, repairs, new construction, service requests, renovations, etc.) are designed to eliminate redundant or unnecessary efforts associated with planning, designing, procuring, and sustaining facilities. The objective of these criteria is to safely and responsibly deliver the right planning product with the right amount of engineering and construction oversight through either in-house or contract execution at the optimum lifecycle cost.

Different types of work requests require different levels of planning. For work requests that require an evaluation of any of the topics listed below, the Project Planning process outlined in this PG will be followed.

1. Possible Master Plan impacts
2. Construction of new space (addition of square footage)
3. Change in Functional Occupancy of the space.
4. Technical function relocation
5. Incompatible Adjacency issues
6. Cultural Resource (Historic facility, Archeological) implications
7. NCPC (National Capital Planning Commission) review
8. Notable Energy Usage implications
9. Notable Environmental, Safety or Health impacts (per the checklist)
10. Accessibility (People with Disabilities)
11. Life Safety implications
12. Facility deconstruction (loss of square footage)

Should the proposed project not require an evaluation of any topic listed above, then the work request/project shall bypass the formal planning process. The work request/project will proceed directly to the implementation organization (Codes 224, 227, or 228) as a work request. Note that any work request that does not have an approved fund source must go to the Planning Branch for response to the customer and proper denotation as a backlog project in Maximo. For those work orders that proceed directly to the implementation organization, there are implementation processes to ensure that all required documents are prepared. These documents are given in Section 4.8.
2  Project Planning Process

This section describes the steps of the project planning process as outlined in the project planning process workflow shown in Figure 1.

The project planning process is typically led by a planner in the Planning Branch (Code 221) or in Code 228. The formal documentation of the planning process starts at the time the Planner receives notice that a project has been assigned to them.

Stakeholders (including the customer as a stakeholder), both internal within FMD or external from other Directorates, should be involved in the planning process.

While progressing through the Planning Process, all stakeholder input as well as conceptual scope and final scope information shall be documented in the Functional Requirements Document (FRD) form (see Appendix D).
3  Project Formulation

In Formulation, project goals (customer needs) and facilities objectives are documented. Alternatives to meet the customer’s needs are explored, and a suitable conceptual scope to meet the needs is determined. The conceptual scope considers all building systems to ensure a fully functional and compatible design. These systems include, as applicable, architectural, structural, mechanical HVAC, plumbing, power distribution, lighting, fire protection, and civil site work. While the scope is not refined at the conclusion of the Formulation stage, it is known in its entirety. The conceptual scope can vary widely depending on the complexity of the project goals and objectives. Some examples of conceptual scopes are:

- Instrument Development Facility – A budget constrained project with a $42M budget, the project is to address Center needs to renew AETD assets, collocate instrument development disciplines of optics, and lasers. The project is to be a building at the interface of Engineering and Science neighborhoods. Historical information allows a reasonable estimate of the size of the building so organizations can be selected as candidates for the building. At the end of the formulation phase, the scope is known to be a mixed use technical/office building; further refinement of the scope cannot be done until the planning phase is performed.

- Add additional electrical supply to a laboratory – When a customer contacts FMD and wants to add electrical capacity to a laboratory, the full need is known. Several things are not known, however, such as (1) electrical panel capacity, (2) air conditioning capacity to support heat load from new equipment, (3) space utilization for the new layout. To know the true project scope these items must be determined. If a worst case approach is taken, and a concept design indicates a new electrical panel (assuming primary distribution capacity), HVAC modification and no space utilization needs, a concept cost estimate can be developed. This is used to test budget feasibility. Project Planning must take place to determine the true scope of the project.

- Replace carpet and repaint walls – The customer need is simply to replace carpet with current standard, and paint walls with current standard. The full scope of the project is understood as soon as the needs are understood.

3.1  Document Project Information

In the early steps of the Formulation stage, the customer and staff from the Facilities Management Division may begin to discuss the goals of the project, in general terms. Even though these discussions are informal, they are a part of the project planning process. The formal project planning process begins when a planner is assigned to the project in Maximo and the process begins to be documented. Once

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assigned, the planner documents basic information about the work being requested. The basic project information includes:

- Requested completion date
- Basis for completion date
- Project Title
- Customer(s)
- Location
- Project advocacy

3.2 Assess Needs

In this step of the Formulation stage, the Planner works with the customer to document the need and the general (high level) requirements of the work request.

3.2.1 Project Justification

Working with the customer, the Planner documents the project need and develops a justification statement for the project. The justification statement demonstrates that the project is in alignment with the customer, Center and Agency policy. When preparing the justification statement, the planner shall consider the following:

- Larger projects that create new facilities or change the use of a space need to provide information related to alignment with the Center Master Plan, or mission criticality.
- Center Funded projects require a funding justification as to why the investment will benefit the program or the Center, and must demonstrate appropriate budget with respect to scope, accounting for applicable safety, regulatory compliance, and mission criticality requirements.
- Customer funded projects require an appropriate justification as to why the work must be done and that it aligns with their organization.
- Larger projects must be preliminarily assessed as to whether they exceed the Construction of Facilities (CoF) $ threshold.
- Minor projects which do not impact the function of the organization or facility need only a brief, one or two sentence, and justification. The documented justification should also mention facilities objectives such as LEED certification re-utilize existing equipment where possible, minimize O&M costs, etc.
- The Planner should review information (scope, costs, etc.) from past similar projects for efficiencies and to avoid repeat mistakes.

3.2.2 Project Stakeholders
The Planner should list the people or organizations that will be affected by the project or will affect the project.

### 3.3 Conceptual Scope

#### 3.3.1 Evaluate Tradespace

Based on the information gathered in the Program of Requirements step, the planner should evaluate location alternatives (utilizing existing resources or new resources). Assess the proposed facility location and consider the suitability of it as much as practical when multiple locations need to be analyzed. For each alternative, availability and impact on all building systems should be considered. At a minimum, the following topic areas should be considered and documented: functional adjacencies, utilities, safety, environmental and cultural compliance, health/safety, master plan, staging/phasing approach, site access/constructability, and any other special considerations unique to this project.

#### 3.3.1.1 Document the Conceptual Scope

Document project goals and objectives; locations considered; assumptions made; the conceptual scope and the information which must be gathered to determine the full project scope, and document the funding source (for Center funded programs, document the funding program and year and for Customer funded projects, document the source and WBS).

#### 3.3.1.2 Customer Validation

Customer representatives such as the FRC member or other managers validate the requirements of the project.

#### 3.3.1.3 Conceptual Scope Review

The Planner presents the Conceptual Scope to Planning Branch management. In review, Planning Branch management considers the Conceptual Scope’s alignment with customer, Center and Agency policy, as well as the reasonable resources required to execute the project. Planning Branch management will approve a project to proceed to planning if these two parameters are met. Generally, if it is to be customer funded or if it is thought to be a viable candidate for the Center funded Program, the Planning process proceeds. Otherwise, the project is recorded as an FMD backlog project and the customer is notified.

### 4 Planning

During the Planning stage, the Planner more fully explores and evaluates (with support from the project team) the alternatives identified in the Formulation stage. The output of the Planning stage is a Project Planning Package which includes the Final Scope, Planning Cost Estimate, and Planning Schedule. The Final Scope is used to design the project solution.

### 4.1 Project Development

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4.1.1 Project Development Team

The Project Development team includes the Planner and the customer but also must include key stakeholders such as representatives from Operations and Maintenance Branch (System owners and Building Managers) and and the Engineering Branch (Project Manager (PM), Discipline Engineers). The PM will determine the necessary support from discipline engineers or discipline leads. The team may also include representatives from support organizations such as Procurement, Safety, Environmental, Security, or others as needed. The purpose of the team is to gather members with the appropriate skills and knowledge to make the best decisions. This may pertain to validation of existing conditions, knowledge of Agency and Center requirements, technical knowledge in the particular fields of facility engineering, and more. Planning a complex project will take substantial time for all involved. It is imperative that managers of employees understand and commit to the time required to plan projects. Membership is dependent on the size and complexity of the project. It is important to document discussions and decisions made by this team. The team must have the expertise, capability and authority to make decisions so the planning process can move on. A team leader needs to be selected who has worked similar projects and has the ability to deal with a diverse group of experts. The team must understand the principles of effective team work. Small non-complex projects may involve only the Planner and a Project Manager.

4.1.2 Program of Requirements

The program of requirements identifies the levels of performance for the project in terms of space planning and functional relationships. It should address the human, physical, and external aspects to be considered in the design. Some of the diagrams apply only to large building renovations or new construction.

1. Space requirements describing the numbers of occupants and specific types and areas. For example: administrative offices, laboratories, pantry areas, food service cafeteria, storage facilities, conference rooms, mechanical rooms, electrical rooms, elevators, data/computer areas, fabrication areas, hangar space, clean rooms, etc.

2. Adjacency Diagrams to depict the layout of each organization (branch, division, labs, etc.) in the project area. They show the relationship of specific rooms, offices, and sections. The adjacency diagrams must adequately convey the overall relationships between functional areas within the facility.

3. Stacking Diagrams portrays each organization or functional unit vertically in a multi-story building. Stacking diagrams are drawn to scale, and they can help establish key design elements for the building.

4. Material handling requirements: storage facilities to be provided and/or utilized, refrigeration requirements and capabilities, mail/small package delivery, recycling requirements, staging between lab facilities, research and operational requirements.

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5. Finishes - levels of interior and exterior finishes should be defined for the project (i.e. floor walls, windows, trim).

6. Specific requirements for each room considering its functional needs. These requirements will include: furniture/furnishings, equipment, lighting, utilities, acoustics/vibration, high bay, audio/visual, voice/data (communications) and security.

This step in the Project Development stage is where the customer’s requirements are more fully explored and documented. The Program of Requirements step includes, but is not limited to, an examination of the following areas:

1. Architectural – type of facility: office, laboratory, conference, technical, storage, industrial/shop, miscellaneous, plan square footage, ceiling heights, access to the space, finishes
2. Mechanical – temperature and humidity requirements, ventilation and exhaust, sinks or other plumbing fixtures, lab requirements such as compressed air, chilled water, gaseous systems.
3. Electrical – Power distribution, grounding, lighting
4. Structural – new or changes to floor loadings.
5. Equipment – equipment serving a particular space like a Lab, Clean room, Computer room (voice & data – wiring), audio visual etc.
6. Type of furniture/furnishings
7. Telecommunications – telephones, modems, switching equipment
8. Security systems hardware
9. Conceptual layouts/test fits

The Planner shall use the Engineering Discipline checklists (Appendix F) as a tool for gathering the customer’s detailed requirements.

a. Evaluate Sites: The alternatives available to Goddard facility Planners include construction of new facilities on the Center, modification of existing facilities or may include development of capabilities at remote sites (new or existing). The decision must consider economics (cost of project), security, utility redundancy and reliability, agreement with the Master plan, and other factors. The evaluation should be supported by the project stakeholders (Project Manager, Discipline Engineers, System Owners, and Building Managers) who will provide comments on the existing conditions.

b. Evaluate Alternatives: To adequately understand all of the alternatives, a Study may be required. A Study may be needed if the customer cannot clearly articulate their requirements due to technical reasons or if existing conditions are not fully understood. Studies can be performed to determine the most appropriate facility system technology. The first step in evaluating alternatives is to select the evaluation criteria for the project. The next step is to determine weighting factors for each alternative. At this stage, cost estimates are made using a parametric or factor technique. Also, the criticality and risk of the project must be assessed and weighed against the evaluation criteria developed to determine the level of suitability of each proposed alternative.
alternative. The final product of this effort is a weighted comparison of the conceptual scope, estimate, and milestone schedule and resource requirement for each alternative. This is the stage that an economic analysis should begin to be developed. The economic analysis is dependent upon the definition of a clear objective and viable alternatives. For all discrete CoF projects, all alternatives must be evaluated with full life cycle costs for investment and operations costs of the alternative and compared in the Army's economic analysis package, ECONPACK model shown in Section 5.3.

c. Select the Preferred Alternative: The project team should discuss the various alternatives against the stated criteria and select the best alternative. This process should consider constructability of the alternatives, and in particular, constructability in an occupied building, if applicable. The Final Scope will be developed from the preferred alternative.

### 4.2 Final Scope

The detailed requirements gathered in the ‘Program of Requirements’ section should be used to create the Final Scope for the preferred alternative. The Final Scope may include both “Demolition” and “New Scopes of Work” as outlined in the Functional Requirements Document (FRD). The Final Scope information shall be documented in the following format:

<table>
<thead>
<tr>
<th>Project Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Scope Narrative:</td>
<td>In 2 – 3 sentences, describe what the project will do. These sentences should allow the reader to visualize what will be built.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scope Details:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Attach a diagram which outlines the geometry of the space and identify all areas impacted by the project. Include physical dimensions of the room/area including ceiling or hook height. List the number and type of personnel assigned to the room.</td>
</tr>
<tr>
<td>b.</td>
<td>For each of the 9 building systems, list system changes required or system impacts.</td>
</tr>
<tr>
<td>c.</td>
<td>Include other information unique to the project.</td>
</tr>
<tr>
<td>d.</td>
<td>Include any NASA FMD preferences. This might include types of equipment, floor plan shapes, architectural finishes, etc.</td>
</tr>
</tbody>
</table>

| Project Constraints: | List and describe the specific project constraints associated with the project scope that limits the team’s options. |

| Project Assumptions: | List and describe the project assumptions associated with the project scope and the potential impact of those assumptions if they prove to be false. |
The project scope statement describes in detail the project’s deliverables and the work required to create those deliverables. It also provides a common understanding of the project scope among stakeholders. It may contain some explicit scope exclusions that can assist in managing stakeholder expectations. It provides the baseline for evaluating whether requests for changes or additional work are contained within or outside the project’s boundaries. The document can be used to determine how well the project management team can control the overall project scope.

The Planner should attach the completed Discipline Checklists to the FRD as the method of conveying the detailed information without being repetitive. Consider the 9 major building systems to ensure a fully functional and compatible design. See details in Appendix E – Planning Guide: Nine Building Systems. Additionally, the Planner shall use The
Appendix G – Space Planning/Test-Fit Worksheet. As a tool to document office and space furnishing requirements.

4.3 Project Execution Approach

The Planner should recommend design and construction contract vehicles to accomplish the final scope and get concurrence from the Engineering Branch Head or the O&M Branch Head as applicable.

Under the FaCETS contract, an option is the “No Formal Design” (NFD) process, which is a one task order type of project delivery method in which the contractor will provide a design and construction proposal package that will serve the requirements for construction. Appendix H – NFD Checklist serves as a guidance to determine whether NFD should be used. The planner should coordinate with the project manager and the contractor to ensure agreement on this approach. When presenting the project to Planning Management, the planner will also recommend whether the project should be executed through the NFD process. Additionally, the NFD approach requires the approval of the FMD (Code 220) Chief and the Procurement Associate Chief (210.I)

4.4 Project Cost Estimate

The planner shall develop an initial cost estimate based upon the documented Final Scope. The Planning Cost Estimate covers all of the elements described in the Final Scope (including design, construction, outfitting and activation activities, and contingencies to minimize risks during project execution). A suitable design contingency should be included, and it should be based on the level of uncertainty in the scope.

4.5 Project Schedule

In this stage, the Planner, in coordination with the Project Manager, shall create a project Bar Chart schedule with the main phases (planning, design, construction, activation, and outfitting) as the activities and include review and procurement activities based on the planned contract vehicle. Within each phase noted, the schedule should include key milestones. This step insures that all tasks are identified and carried out in a logical and timely manner.

4.6 Finalize the Solution

The appropriate project stakeholders shall concur with the FRD, containing the Final Scope, final cost Estimate, and Final Planning Schedule, and this concurrence will finalize the solution. If any relevant stakeholders are unwilling to concur with the FRD, the Planner should promptly call for discussion and include management level representation.
4.7 Identify Funding Source and Advocate for Funding

This step is not required for customer funded projects. To request Center (CM&O) funding, the following steps are needed:

a. Finalize the Risk analysis (5x5 matrix)
b. Advocate for Projects in prioritization meetings (Sharktank)
c. Present projects at FRC (Center Funded Class III and CoF)
d. Projects scored by the Planners are validated by a FMD consensus process where every project proposed by any planner is reviewed and challenged by all FMD disciplines and stakeholders (safety, environmental fire protection etc.). This process is repeated by the Facilities Review Committee (FRC) and will be repeated once more at Headquarters for projects nominated for CoF funding.
e. Projects unfunded are placed in FMD “backlogged” status in MAXIMO.

4.8 Transition to Implementation

After all the project deliverables have been completed and the funding is available, the project is transitioned from the Planner to the Project Manager for implementation. It is the responsibility of the Planner to coordinate the transition of the project to the Project Manager and to notify the customer of the transition. As a final step in the Planning stage, the Planner should document project lessons learned.

1. Deliverables from the Planning Process

The result of the planning process is a set of project documents that are submitted to Engineering or O&M for execution. Some of the deliverables below may only be necessary for the most complex projects. All the project documents will be delivered to the Project Manager (electronically and/or hardcopies). These deliverables include the following:

a. **Functional Requirements Document (FRD).** The template for a Functional Requirements Document is found in Appendix C.

b. **PDRI.** The Project Definition Rating Index (PDRI) is a scoring tool to determine the completeness of the project’s scope. A PDRI is required for COF projects. For additional information, please see the website:
Initially, the planner will use the PDRI as a checklist to determine the project areas needing clarification and further study.

c. **Economic Analysis (EA).** An economic analysis must be submitted for discrete level projects. Additionally, this economic analysis must be submitted to substantiate a Life Cycle Cost analysis and determination. NASA requires the Center to use the U. S. Army Corps of Engineers (USACOE) application called ECONPAC. An ECONPAC download is available at the following website:

   [http://www.hnd.usace.army.mil/paxspt/econ/download.aspx](http://www.hnd.usace.army.mil/paxspt/econ/download.aspx). Use the current “Office of Management & Budget Fiscal Year Discount Rates” published annually by OMB. Normally NASA prepared EAs will use the use a constant dollar analysis and the Real Discount Rate, which does not include inflation. ECONPAC analyses (CoF discrete projects) are submitted to NASA FERP, Facilities Engineering and Real Property Division with CoF project submissions.

d. **Program of Requirements.** The template for a Program of Requirements document is provided at Appendix D. Refer to section 4.3.4.

e. **Cultural Resources Management Assessment.** The Historic Preservation Officer will review project scope to determine impact to the Cultural Resources Program, and include any requirements in the FRD.

f. **Study/Report Analysis (S/RA).** Planners should coordinate with the PM on any studies (concepts/technical/engineering) required to assist in the determination of the problem and the development of the solution.

g. **Risk Matrix (5x5).** The score of the risk matrix is a numerical expression of the likelihood and consequence of the risk identified. The risk matrix score is used to prioritize projects for funding. It is only required for CoF or Center Funded projects.

h. **Environmental and Safety Checklist.** (Form GSFC 23-73) The Planner shall complete this form with as much known information as possible.

i. **Project Management Plan (PMP).** A PMP is required for all discrete COF projects. A PMP should also be considered for Minor COF projects. Planners should prepare an

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outline of the PMP during the planning phase. Subsequently, the PM should prepare this Project Management Plan that establishes a schedule for implementing a facility project and assigns roles, responsibilities, and authorities to develop and complete the project. The plan provides a detailed outline of the steps in the facility implementation process with well-defined milestones to measure progress. Reference NPR 8820.2 for further guidance.

j. **Form 1739 Alternative Future Use Questionnaire (AFUQ).** NPR 9250 “Property, Plant, and Equipment and Operating Materials and Supplies” provides guidance on how to fill out an AFUQ. This document is required for any project of any kind where all costs including construction, design and construction administration are greater than $100K. This form is used to determine if any assets need to be capitalized.

The Planner completes as much of the form as possible without knowing the detailed project costs.

k. **NASA Form 1509 and NASA Form 1510.** These forms are available at the NASA forms site:

http://server-mpo.arc.nasa.gov/Services/NEFS/Home.tml NASA Forms 1509/1510 are required for all projects over $100K. Complete instructions are found in Appendix C of NPR 8820.2F, “Facilities Project Requirements”. Planners shall prepare or ensure their assigned CoF projects have a cost estimate. This estimate must include every element described in the project Functional Requirements Document with enough accuracy to have a reasonable expectation of project success. For CoF projects, NASA Form 1510, “Facility Project Cost Estimate”, summarizes this estimate with sufficient detail for review. When applicable to the specific project, estimates for the following major elements are required:

1. Site preparation, utilities, sidewalks, parking lots, and roads. 2. Construction materials and labor. 3. Material and equipment tests performed at the construction site or at an offsite location. 4. Construction management services. 5. Commissioning services during design and construction. 6. Environmental compliance and protection. 7. Collateral equipment. 8. Subcontractor and general contractor cost, overhead, and profit. 9. Insurance bonds and taxes.

1.3 **CoF Quad Chart (Quad)**

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GSFC 3-18 (11/09)
The Quad chart is annually prepared for all CoF projects by NASA Headquarters. A sample program Quad chart is shown below:

The Quad chart is annually prepared for all CoF projects by NASA Headquarters. A sample program Quad chart is shown below:

<table>
<thead>
<tr>
<th>Project Title : Center</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FYxx Institutional CoF Project</strong></td>
</tr>
<tr>
<td>Risk to Mission:</td>
</tr>
<tr>
<td>Total Cost: $xxM (all budget years)</td>
</tr>
<tr>
<td>Demolition Included: $xxM/SF/CRV</td>
</tr>
<tr>
<td>Estimated Facility D&amp;M Costs: $xxM</td>
</tr>
<tr>
<td>Project Fit in Center Master Plan:</td>
</tr>
<tr>
<td>Implements Phase x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement/Scope/Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Requirement: (e.g. Laboratory, Office, Roof Improvement)</td>
</tr>
<tr>
<td>xxx sq. ft. four-story office building will house xxx people; xx; SF will be demolished</td>
</tr>
<tr>
<td>Driving Requirement:</td>
</tr>
<tr>
<td>Estimated savings: $xxM</td>
</tr>
<tr>
<td>ROI: Average payback – x years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Economic Analysis/Alternative Considered:</th>
</tr>
</thead>
<tbody>
<tr>
<td>status quo, leasing, offsite, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommendation Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large decrease in footprint aligns with agency objectives</td>
</tr>
<tr>
<td>260% Return on Investment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State No-Cost Alternative:</th>
</tr>
</thead>
</table>

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Appendix A – Definitions

A.1 **Budget** -- a formal estimate of future revenues, obligations to be incurred, and outlays to be made during a defined period and, when determined to be appropriate, based on accrued expenditures and costs to be incurred.

A.2 **Budget Cycle** -- the period that elapses from the initiation of the budget process to the completion of the budget process for a particular fiscal year.

A.3 **Budget Estimate** -- a fund requirement for an element included in a budget. Collectively, all estimated fund requirements for a particular operating agency or component or consolidation thereof.

A.4 **Budget Process** -- the process encompassing all phases of funding formulation through execution.

A.5 **Budget Year** -- the fiscal year of execution, covering the period from October 1 through September 30 (see "Fiscal Year").

A.6 **Completion Date** -- when the Government formally accepts an item of work from a contractor. The date on which the Government accepts all contract deliverables as the contract completion date.

A.7 **Constructability** -- a review of the design documents from a practicality, cost effectiveness, and efficiency perspective. The review includes verifying the integration of the drawings with the various professional disciplines and clarity of the design. It also includes review for maintainability and operability.

A.8 **Construction** -- the erection or modification of real property required to support a new capability, including additions, sidewalks, parking lots, driveways, and upgrades. This includes alterations to existing facilities that change the original purpose of the facility (e.g., remodeling a warehouse, or portion thereof, into office space).

A.9 **Construction Contractor** -- a business entity (i.e., person, corporation, partnership, or joint venture) that has satisfied the CO that they are qualified to perform the work as described in the construction contract documents.

A.10 **Construction of Facilities (CoF)** -- a NASA corporate program that funds planning for future facility needs, design of facilities projects, revitalization projects (repair, rehabilitation, and modification of existing facilities), construction of new facilities, and acquisition of collateral equipment.

A.11 **Contingency (Construction)** -- an allowance included in a construction cost estimate to cover uncertainties during the construction phase of the project, such as changes in site conditions and construction interferences.

A.12 **Contingency (Design)** -- an allowance included in the engineering estimate to allow for added unanticipated costs due to design uncertainties and incomplete or changing user requirements.

A.13 **Contract** -- either an agreement or an order for the acquisition of supplies or services signed by a CO.

A.14 **Current Cost Estimate** -- an estimate that is the latest and best professional cost estimate for a given project at any given time during planning, design, or construction. It is the estimated cost for
labor, materials, and services to complete a planned facility project. It includes an estimate for land acquisition, site work, construction, and the purchase and installation of collateral equipment. It must include a reasonable estimate for contingencies. If a construction agent will manage the project for NASA, this estimate includes the agent's contract cost.

**A.15 Design** -- the process of developing, planning, and communicating project requirements into workable drawings and specifications to accomplish the project within the established scope and objectives. This encompasses both the preliminary design and final design for facility projects. It also includes providing cost estimates for the planned project at each design review stage.

**A.16 Discrete Facility Project** -- a CoF project with an estimated cost of $5 million or more.

**A.17 Emergency Repair** -- restoration of an existing facility or component(s) after a major breakdown or accident, as authorized by the NASA Space Act of 1958, as amended. HQ FERPD defines "emergency" as so urgent that it cannot wait to go through the normal budget cycle or process. For all emergency repairs, the replacement of components or materials will be of the size or character currently required to meet demands or needs.

**A.18 Environmental Analysis** -- the process of making the initial evaluation of the environmental considerations of a proposed action including alternative proposals.

**A.19 Environmental Assessment (EA)** -- one of three possible documents required for compliance with the National Environmental Policy Act (NEPA) process. The three documents in order of increasing effort and cost are a Categorical Exclusion (CATEX), an EA, and an Environmental Impact Statement (EIS). The EA is the correct path when the environmental impact is low, but does not qualify as a CATEX. For details, contact the Center Environmental Management Office.

**A.20 Environmental Impact Statement (EIS)** -- a document developed through the NEPA process when the impact to the environment is significant (e.g., a change in mission to a Center or the Agency with significant environmental ramifications--air/water quality, noise, soil contamination, or an increased risk [perceived or real] to the public). For details, contact the Center Environmental Management Office.

**A.21 Equipment/Property** -- Equipment within NASA is classified as either "personal property (other terms: noncollateral or accountable)" or "real property installed equipment (collateral)." Personal property is equipment whose maintenance, repair, and replacement are the responsibility of the NASA program owning it. All personal property equipment has attached property tags in the form of NASA bar codes. Real property installed equipment is equipment that is capitalized on the Real Property Inventory by the Center Real Property Accountability Officer.

**A.22 Facilities Maintenance** -- the recurring day-to-day work required to preserve facilities (buildings, structures, grounds, utility systems, and collateral equipment) in such condition that they can be used for their designated purpose over an intended service life. It includes the cost of labor, materials, and parts.

**A.23 Facility** -- land, buildings, structures, and other real property improvements including utility systems and collateral equipment. The term does not include operating materials, supplies, special...
tooling, special test equipment, or noncapitalized equipment (see “NASA Financial Management Manual” (http://www.hq.nasa.gov/fmm/9200/9250.pdf) for criteria for capitalized equipment).

A.24 Facility Acquisitions -- the acquisition of an interest in land, buildings, other structures and facilities, or leasehold improvements. The normal facility acquisition methods include purchase, transfer, lease, easement, use permit, and rights of way.

A.25 Facility Project -- the consolidation of facility work items, including related collateral equipment, required to provide a complete and usable facility.

A.26 Facility Project-Brief Project Document (NASA Form 1509, “Facility Project – Brief Project Document”) -- a multipurpose document that must be used for all facility projects estimated to cost $100,000 or more, regardless of location or source of funding.

A.27 Facility Project Cost Estimate (NASA Form 1510, “Facility Project Cost Estimate”) -- the form in which the approved facility project cost estimate (AFPCE) is further detailed beyond the summary in NASA Form 1509.

A.28 Facility Project Manager -- the individual responsible for organizing, managing, and directing the activities to accomplish facility work within schedule and cost. Different individuals may fill this role at different phases of a project.

A.29 Fiscal Year -- the 12-month period from October 1 through September 30 as established each year by the U.S. Government.

A.30 Improvements -- an addition to land, buildings, other structures, and attachments or annexations to land that is intended to remain so attached or annexed, such as sidewalks, drives, tunnels, utilities, and installed collateral equipment.

A.31 Life-Cycle Cost -- an estimate of the economic impact over a selected design life of a project or project alternative. This estimate includes first cost, energy consumption, periodic replacement of equipment or materials, operations, and maintenance.

A.32 Maintainability -- the design, installation, and operational characteristics of an item used for ease of keeping it operational, e.g., designed access to a chiller's coils for easy cleaning.

A.33 New Capability -- a facility project that is needed to support new programmatic or institutional requirements. This includes projects for the rehabilitation/modernization and repair of existing facilities when the facility supports new programmatic or institutional requirements.

A.34 Project -- a specific investment having defined goals, objectives, requirements, life-cycle costs, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs.

A.35 Project Definition Rating Index (PDRI) -- a Construction Industry Institute best practice tool used in front-end planning to determine how well a project is defined. This tool is used throughout project development, but is scored at the 30% design stage. The scoring system is based upon a 1000-point scale, and a low score (i.e. 200 or less) reflects a well-defined project.
A.36 **Project Scope** -- the description of a facility project limits, objectives, and planned result. The scope of a facility project typically includes a description of its location, purpose, capabilities, capacity, physical dimensions, configuration, and utilities affected.

A.37 **Project Team** -- the team responsible for organizing, managing, and directing facility project work. It includes all project stakeholders, such as representatives from the using organization, safety, engineering, fire protection, security, environmental, acquisition, operations and maintenance, and technicians.

A.38 **Real Property** -- land, buildings, structures, utility systems, improvements, and appurtenances permanently annexed to land. The term real property also includes installed collateral equipment.

A.39 **Repair** -- work required to restore a facility or component to its originally intended condition, capacity, efficiency, or capability.

A.40 **Replace** -- see "Repair."

A.41 **Resources** -- actual assets of a governmental unit, such as funds, human resources, and materials.

A.42 **Revitalization** -- substantial renewal and upgrade work on the physical plant to meet current and future needs, thereby extending its useful life; e.g., a facility project that extends the useful service life beyond the original design life.

A.43 **Sustainability** -- An overarching concept incorporating appropriate sustainable design practices, maintainable design elements, building commissioning processes, safety, health and security features into facility planning, design, construction, activation, operation and maintenance, and decommissioning to enhance and balance facility life-cycle cost, environmental impact, and occupant health, safety, security, and productivity. Done properly, sustainability will optimize the facility acquisition process to ensure the "best fit" of the built environment to the natural environment. It requires a practical and balanced approach to responsible stewardship of natural, human, and financial resources.

A.44 **Sustainment** -- a parametric estimated cost to keep facilities in an acceptable condition. This is the lowest recommended funding level for facility maintenance.
Appendix B – Acronyms

AFUQ: Alternative Future Use Questionnaire
CCE: Current Cost Estimate
CII: Construction Industry Institute
CF: Center Funded
CO: Contracting Officer
CoF: Construction of Facilities
CRMA: Cultural Resources Management Assessment
EA: Economic Assessment
ESPC: Energy Savings Performance Contract
FACETS: Facilities Construction, Engineering, and Technical Services
FED: Facilities Engineering and Real Property Division
FCS: Facility Concept Study
FMD: Facilities Management Division
FPM: Facility Project Manager
FRD: Functional Requirements Document
FRC: Facilities Review Committee
GSFC: Goddard Space Flight Center
HAP: Hazard Abatement Plan
HP: Housing Plan
MOD: Management Operations Directorate
NPR: NASA Procedural Requirement
O&M: Operations and Maintenance
OSI: Office of Strategic Infrastructure
P3: Pre Project Planning
PER: Preliminary Engineering Report
PGM: Programmed Maintenance
PL: Planner
PMP: Project Management Plan
POR: Program of Requirements
PRDI: Project Requirements Definition Index
RAC: Risk Assessment Code
RCM: Reliability Centered Maintenance
ROI: Replacement of Obsolete Items, also Return on Investment
SOW: Statement of Work
SSB: Source Selection Board
TCRPD: Technical Capabilities and Real Property Division
UCS: Utility Control System
WFF: Wallops Flight Facility
FMD Project Planning Process

Additional detail for this FMD Project Planning Process is included in the following two pages.

Legend for the following two pages:
FRD = Functional Requirement Document
FRC = Facility Review Committee
MOU = Memorandum of Understanding
= Decision point

Note: For project greater than $1M, please refer to HQ CoF Data Call for additional requirement.
# FMD Project Planning Process

<table>
<thead>
<tr>
<th>Stage/Activity</th>
<th>Formulation</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initiate Planning</strong></td>
<td>FRD Section I</td>
<td><strong>Conceptual Scope</strong> FRD Section II (D, E, F, G, H)</td>
</tr>
<tr>
<td>• Assign a planner in Maximo</td>
<td>• With input from the customer, document the Need</td>
<td></td>
</tr>
<tr>
<td>• Gather project information</td>
<td>• Document stakeholders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Project justification (level of detail varies depending on project type)</td>
<td>• Evaluate trade space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Validate project requirements with FRC member</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conceptual Scope Review ▲</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engineering</th>
<th>Project Development</th>
<th>Final Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify Project Manager (PM)</td>
<td>• With input from the customer, document the program of requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Obtain inputs from stakeholders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Perform survey/study as needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Evaluate alternative solutions and identify preferred solution</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O&amp;M</th>
<th>PM gets help as needed from team discipline engineers and discipline leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>• System Owners &amp; Building Mgrs comment on existing conditions and life safety concerns</td>
<td>• System Owners &amp; Building Managers provide inputs</td>
</tr>
<tr>
<td></td>
<td>• ID maintenance responsibility</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Support Orgs</th>
<th>Review proposed solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide RAC or other regulations requirements</td>
<td>• Engage service providers</td>
</tr>
<tr>
<td></td>
<td>• Define Code 700 requirements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer (Internal/External)</th>
<th>Concur with preferred solution and maintenance responsibility ▲</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide project information: problem statements, basis of needs/justifications</td>
<td></td>
</tr>
</tbody>
</table>
# FMD Project Planning Work Flow

**Planning**

<table>
<thead>
<tr>
<th>Stage Activity</th>
<th>Planning Project Cost Estimate FRD Section V</th>
<th>Planning Project Schedule FRD Section V</th>
<th>Finalize Solution FRD Section VI</th>
<th>Advocate for Funding (Institutional projects only)</th>
<th>Transition to Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>• In coordination with the PM, identify the design and construction contract execution vehicles</td>
<td>• Coordinate with project manager and scheduler</td>
<td>• Provide FRD to applicable stakeholders and obtain concurrences</td>
<td>• Finalize risk analysis (5x5 matrix)</td>
<td>• Ensure funding is in place</td>
</tr>
<tr>
<td></td>
<td>• Prepare planning project cost estimate based on the Final Scope</td>
<td>• Identify major outages</td>
<td></td>
<td>• Advocate for project in prioritization meeting (Share Tank meetings)</td>
<td>• Transition project documentation to the project manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prepare planning project schedule</td>
<td></td>
<td>• Present project to the FRC</td>
<td>• Create MAXIMO request with project planning documents attached</td>
</tr>
<tr>
<td>Engineering</td>
<td>• PM review and concur with the planning project cost estimate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M</td>
<td>• Review planning project schedule</td>
<td>• Review and concur with FRD</td>
<td>• Project review</td>
<td></td>
<td>Management of scope changes post-planning</td>
</tr>
<tr>
<td>Support Orgs</td>
<td></td>
<td>• Review planning project schedule</td>
<td>• Project review</td>
<td></td>
<td>Develop maintenance MOU with customer (if applicable)</td>
</tr>
<tr>
<td>Customer (Internal/External)</td>
<td>• Validate need date</td>
<td>• Review planning project schedule</td>
<td>• Review and concur with FRD</td>
<td>• Authorize and commit to the project</td>
<td>• Project review</td>
</tr>
</tbody>
</table>

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GSFC 3-18 (11/09)
Appendix D – Functional Requirements Document (FRD)

Document Contents:

I. Project Information
II. Need Assessment
III. Alternatives Considered and Scope of Work for the preferred solution
IV. Cost Estimate
V. Draft Project Schedule
VI. Functional Requirements Document Concurrences
VII. Other Related Documents

<table>
<thead>
<tr>
<th>I. Project Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Parent MAXIMO Planning # (K#):</td>
</tr>
<tr>
<td>B. Child MAXIMO # (C#):</td>
</tr>
<tr>
<td>C. Requested completion date:</td>
</tr>
<tr>
<td>D. Basis for completion date:</td>
</tr>
<tr>
<td>E. Project Title:</td>
</tr>
<tr>
<td>F. Customer(s):</td>
</tr>
<tr>
<td>G. Stakeholders:</td>
</tr>
<tr>
<td>H. Location (Bldg/Site):</td>
</tr>
<tr>
<td>I. Work Type:</td>
</tr>
<tr>
<td>J. Planner(s):</td>
</tr>
<tr>
<td>K. Project Advocacy: This section indicates the extent of advocacy for the proposed project, and lists names and telephone numbers of primary user contacts, Center and NASA Headquarters advocates who are knowledgeable about the program(s) to be supported, and who will endorse the need for the proposed facility.</td>
</tr>
</tbody>
</table>
## II. Need Assessment

### A. Customer Description/Problem Statement:

[Facilities - New Program Requirements or Problem to be solved: Address, in the most fundamental fashion possible, the basic facilities new requirement or problem to be solved. Describe the need, not the solution. It should include, if applicable: Existing Conditions: Describe the existing conditions – Describe the related existing facilities conditions, related to the proposed operations that are inadequate. Obstacles/Unknowns: Describe known obstacles or significant unknowns associated with this project that prevent it from being performed with existing facilities infrastructure.]

### B. Basis of Need/Justification:

[History of the new requirement or problem/issue. Discuss how the project relates to GSFC’s mission. Discuss how the project relates to the Directorate’s mission and responsibility. Discuss how the project relates to GSFC’s Master Plan and strategic planning goals and objectives, specific R&D program(s) and/or mission(s) to be supported by the project, and how the proposed project will support the requirements. Discuss the relationship of this project to any follow-on CoF or CF project. Describe what changed to warrant the project. Discuss the impact of delay. List the major program or mission milestones that create the need for the proposed project in the indicated time frame, and summarize the impact, if the proposed project is not accomplished in the indicated time frame. Is this a follow-on phase or the beginning of a new multi-phase effort? What is the total center commitment to the project?]

### C. Project Category

Check or note which category best captures the intent of the proposed solution

| Office Mod |  |
Lab Mod

Computer Room Mod

New Requirement

Other

D. Site or Location Feasibility Assessment

Complete this section when multiple locations need to be or have been analyzed in reaching the proposed solution. Attach weight/prioritized criteria/stoplight chart. Consider the following at a minimum.

[Adjacencies, utilities (building/site), environmental compliance, health/safety, master plan, staging/phasing, site access/constructability, special considerations unique to the problem]

E. Site or Location Feasibility Outcomes/Recommendations:

Summarize the outcomes/recommendations obtained in Section D.

F. Access Issues:

Address any physical constraints or schedule concerns that could impact cost or construction schedule.

G. Preliminary Floor Plans/Diagrams:

Attach pertinent floor plans/diagrams as required.

H. Reviews and Impacts:

- For relevant topics listed below, ensure that the applicable group is contacted; briefly summarize the findings and how they are to be considered in the solution. Indicate “N/A” when a review is not required.
- Discuss ownership of technical equipment as it relates to maintenance and repair [i.e., Customer or FMD].

Health, Safety and Environmental Checklist Submission Date:

Code 350 Safety Reviews:

Architectural Design Review Committee, Review Date:

Master Plan Review:

Operations and Maintenance Review:
National Capital Planning Commission Review:  
Security Reviews:  
ESPC or Energy Conservation Reviews:  
Historic Preservation Review:  
Code 700 IT Review:  
Facilities Review Committee (FRC) Officer Review:  
Proposed Project Manager:  

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### III. Alternatives Considered and Scope of Work for the Preferred Solution

#### A. Alternatives Considered:

<table>
<thead>
<tr>
<th>Alternatives Considered:</th>
</tr>
</thead>
</table>

#### B. General Scope of the Proposed Solution:

<table>
<thead>
<tr>
<th>General Scope of the Proposed Solution:</th>
</tr>
</thead>
</table>

#### C. Discipline Strategies:

Provide details for discipline work and also include areas of concern or discussion points that will clarify a situation for the design team.

[Civil, Structural, Architectural, Mechanical, Electrical, other]

#### D. Demolition Scope of Work:

[Civil, Structural, Architectural, Mechanical, Electrical, other]

#### E. New Scope of Work

[Civil, Structural, Architectural, Mechanical, Electrical, other] Engage service providers, and define Code 700 Communications requirements (or customer needs).

#### F. Outages

<table>
<thead>
<tr>
<th>Outages required (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and spaces affected by the outage.</td>
</tr>
<tr>
<td>Building Manager</td>
</tr>
<tr>
<td>Facilities Operations Manager</td>
</tr>
<tr>
<td>Codes Affected</td>
</tr>
<tr>
<td>Outage restrictions (afterhours, red badge areas, weekends only)</td>
</tr>
</tbody>
</table>

#### G. Phasing Requirements:

Describe potential phases of the work that will improve project delivery
H. Design Strategies:
Options available for design services include A-E Design (outside firm or Small Business), FaCETS, No Formal Design (NFD), No Design Required., etc. Note: Code 200 approval is required for an NFD.

I. Construction Strategies:
Options available for construction services (CoF, Center funded, Repair, etc.) include FaCETS, MAC, FOMS, Small Business, IFB, etc.

IV. Cost Estimate
A. Cost Estimate
Note the category/type of cost estimate (based on the type of project information known at the time the cost estimate was prepared), e.g., square foot, order of magnitude, etc.

Cost Estimate Type: __________________
Cost Estimate attached:
YES ___ NO ___

V. Draft Project Schedule
A. Draft Project Schedule:
Include at a minimum: Customer, Planning, Design Procurement, Design, Construction Procurement, Construction (include as required: IT, phasing, major divisions of work, permits, site prep, and other general conditions), outfitting, and occupancy

Scheduled attached:
YES ___ NO ___
VI. Functional Requirements Document Concurrences

<table>
<thead>
<tr>
<th>Organization</th>
<th>Code</th>
<th>Name</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Customer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Project Manager</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. O&amp;M Mgt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Engineering Mgt.</td>
<td></td>
<td></td>
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</tbody>
</table>

Concurrences required from the organizations listed below for projects with cost estimates $100K and up and as applicable. Facilities Management Division, Chief must sign for NFD projects.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Protective Service</td>
<td>Code 240</td>
</tr>
<tr>
<td>F. Environmental</td>
<td>Code 250</td>
</tr>
<tr>
<td>G. Safety</td>
<td>Code 350</td>
</tr>
<tr>
<td>H. Facilities Management Chief</td>
<td>Code 220</td>
</tr>
</tbody>
</table>

VII. Other Related Documents (attached to the MAXIMO project record as applicable)

<table>
<thead>
<tr>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Project Definition Rating Index (PDRI)</td>
</tr>
<tr>
<td>B. Economic Analysis</td>
</tr>
<tr>
<td>C. Program of Requirements</td>
</tr>
<tr>
<td>D. Historic Preservation Assessment</td>
</tr>
<tr>
<td>E. Study/Report Analysis</td>
</tr>
<tr>
<td>F. Risk Analysis</td>
</tr>
<tr>
<td>G. Draft Project Management Plan (PMP)</td>
</tr>
<tr>
<td>H. Preliminary Engineering Report</td>
</tr>
<tr>
<td>I. Discipline Checklists</td>
</tr>
</tbody>
</table>

Discipline Checklists

<table>
<thead>
<tr>
<th>Discipline</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
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</tr>
</tbody>
</table>

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Civil: YES ___ NO ___  
Structural: YES ___ NO ___  
Architectural: YES ___ NO ___  

<table>
<thead>
<tr>
<th>J. Facilities Concept Study</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>K. Form 1739 AFUQ</td>
<td></td>
</tr>
<tr>
<td>L. Form 1509/1510</td>
<td></td>
</tr>
<tr>
<td>M. List of Equipment and Maintenance Responsibilities</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E – Planning Guide: Nine Building Systems

This is a checklist of questions and considerations to be used in ensuring that a sufficient understanding of the scope is reached and that an adequate level of detail is given in the Functional Requirements Document Scope of Work.

Structure
- New facility required
- Building addition required
- Modification to building structure or foundation
- Equipment loading: can existing structure support new equipment
- Fireproofing of existing/new/modified structures, firewalls
- Vibration requirements
- Soil capacity and other concerns

Exterior
- Modifications to existing entrances and other fenestrations
- Modifications to existing grading, sidewalk configuration
- Storm drainage
- Connections to or relocation of existing underground utilities
- Parking lot and roadway modifications
- Egress considerations for the disabled
- Landscaping, fencing
- MDE SWM/ESC requirements

Roof
- New roof required as part of major rehabilitation or by itself
- Extent of roofing repair/section replacements
- Roof penetrations
- Chemical exhausts
- Roof access and physical controls
- Asbestos sampling
- Reflective coating
- Request for installation of antenna or other equipment on roof

HVAC
- Existing systems’ suitability (tech/lab equipment tied into institutional services)
- Temperature, humidity, ventilation
- Effects on other related systems and projects
- New requirements
- Connections to existing equipment
- Controls systems (UCS) requirements
- Asbestos sampling
- Metering
- Indoor air quality, clean environment
- Criticality
- System betterment (i.e., geothermal, etc.)
- Redundancy
- Energy usage
- Firewall penetrations

Electrical
- Adequate power availability
- Upgrades to electrical system
- UPS requirements/emergency power if available
- Lighting
- Fire detection/alarm systems modifications
- Equipment requirements
- Rehabilitation of existing systems

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
- LAN and telephone systems, Security systems
- Metering, Energy usage
- Equipment grounding
- Lightning Protection
- Redundancy
- Criticality
- Firewall penetrations
- Backup generators

**Plumbing**
- Existing systems’ suitability
- New requirements
- Connections to existing equipment and systems
- Controls systems upgrade requirements
- Asbestos sampling
- Roof penetrations
- Fire protection system requirements
- Domestic water metering
- Chilled water and steam metering
- Sanitary or storm drain discharge
- Firewall penetrations
- Fire Suppression

**Conveyance**
- Elevators
- Service Lifts
- Dock levelers
- Unique systems
- Cranes or hoists
- Stairs

**Program Support Equipment**
- Customer project requirements for equipment, clearances
- Adjacency
- Fire protection and detection requirements
- Connections to existing facilities and utilities
- Maintenance responsibilities
- MOUs
- Connection to FMD Utilities
- Metering
- Suitability of area/equipment
- Space for equipment: customer space or use of FMD mechanical rooms
- Equipment chilled water needs
- Vacuum systems
- Compressed air systems
- Special gases
- Security
- Environmental pollution control
- Special Construction (e.g. SCIF)

**Interior Finishes**
- Compliance with Standard Reference Document (SRD)
- Finishes for unique requirements, special coatings, ESD. RF shielding, noise attenuation
- Asbestos and lead-based paint sampling
- Hardware compatibility for the disabled
- Furniture requirements
- Fire ratings and penetrations
- New doors / demo doors
- Renovation of existing space for new mission requirement

**CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT**
[http://gdms.gsfc.nasa.gov](http://gdms.gsfc.nasa.gov) **TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.**

GSFC 3-18 (11/09)
Appendix F – Engineering discipline Checklists

Architectural Requirements Checklist

**Project Scope:** *Check all that apply*

- [ ] Room reconfiguration
- [ ] Furniture reconfiguration
- [ ] Expansion of existing space
- [ ] Suite Reconfiguration
- [ ] Wall Demolition
- [ ] Wall Additions
- [ ] New Doors
- [ ] Interior Finishes
  - [ ] Flooring
  - [ ] Ceilings
  - [ ] Walls
- [ ] Exterior Building Envelope Affected
  - [ ] Walls
  - [ ] Roof
  - [ ] Windows
- [ ] Specialties
  - [ ] Acoustical
  - [ ] Finishes
  - [ ] Fixtures

**Room Types Affected:** *Check that apply*

- [ ] Office
- [ ] Lab
- [ ] Conf
- [ ] Restroom
- [ ] Storage
- [ ] Other, specify__________________

**Room Types Proposed:** *Check that apply*

- [ ] Office
- [ ] Lab
- [ ] Conf
- [ ] Restroom
- [ ] Storage
- [ ] Other, specify__________________

**Existing Wall Construction**

- [ ] Masonry
- [ ] Dry Wall & Metal Studs
- [ ] Specialty Wall System

**New Wall Construction**

- [ ] Masonry
- [ ] Dry Wall & Metal Studs
- [ ] Specialty Wall System

**Existing Floor Construction**

- [ ] Slab on Grade

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT [http://gdms.gsfc.nasa.gov](http://gdms.gsfc.nasa.gov) TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
____ Raised Floor_____ Carpeted _____ Tile; Depth_______
____ Tile
____ 9”x 9” VAT
____ 12” x 12” VCT
____ Cementitious, Terrazzo
____ Carpet
____ Uncertain

New Floor Construction
____ Slab on Grade
____ Raised Floor_____ Carpeted _____ Tile ; Depth_______
____ Tile
____ 9”x 9” VAT
____ 12” x 12” VCT
____ Cementitious, Terrazzo
____ Carpet
____ Uncertain

Existing Ceiling Construction/Finishes
____ Exposed Beam
____ Exposed Precast Concrete Floor
____ Drywall
____ Suspended Acoustical _____ 2 x 2 _____ 2 x4
____ Spline
____ Bulkheads
____ Other

New Ceiling Construction/Finishes
____ Exposed Beam
____ Exposed Precast Concrete Floor
____ Drywall
____ Suspended Acoustical _____ 2 x 2 _____ 2 x4
____ Spline
____ Bulkheads
____ Other

Existing Lighting
____ Recessed Fluorescent
____ Surface Mounted Fluorescent
____ Cans
____ Other, Specify_________________

New Lighting
____ Recessed Fluorescent

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT
http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
_____ Surface Mounted Fluorescent
_____ Cans
_____ Other, Specify_____________________

**Security:** Check all that apply
_____ Sensitive Compartmented Information Facility requirements
_____ Key card access
_____ Cipher locks
_____ Floor- to-structure Partitions
_____ Sound isolation
_____ One-way glazing
_____ Camera surveillance / infrastructure
_____ Parabolic mirrors
_____ Fencing
**Electrical Requirements Checklist**

**Lighting:**

**Sketch attached:**

- Yes
- No

**Voltage level:**

- Known - Circle voltage (120V) (208V) (277V) (480V)
- Unknown

**Room Fixture type(s)/Quantity**

*Provide fixture quantities if known*

<table>
<thead>
<tr>
<th>Type</th>
<th>Demo</th>
<th>New</th>
<th>Reuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Fluorescent fixtures -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Recessed</td>
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<td></td>
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<tr>
<td>• Surface</td>
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<td></td>
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<tr>
<td>• Pendant</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>□ Accent Fixtures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Wall washer</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Spot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ High Bay Fixtures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Metal Halide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fluorescent</td>
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<tr>
<td>□ Other Fixtures</td>
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<td></td>
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<tr>
<td>• ________</td>
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</tr>
</tbody>
</table>

**Room Lighting Level:**

- Standard – (50FC Office) (60-70FC Lab) (80-100FC Cleanroom)
- Special – ________ FC
- TBD by Engineering
- Night lights Required

**Lighting Controls**

- Wall switch

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT [http://gdms.gsfc.nasa.gov](http://gdms.gsfc.nasa.gov) TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
- 3 Way  4 Way  Qty________
- Dimmer
- 4 Way  4 Way  Qty________
- Motion Sensor (PIR/Dual Technology)
- Timer
- Remote Controls -  
  - Radio control
  - Infrared
- Other________________________

**Power:**

Sketch attached

_____ Yes  
_____ No

*Check all that apply;*

**General Purpose Receptacles:**

_____ Standard Recessed Duplex/Quad receptacles (Minimum 1 per wall /1 per 10’)
  - Other interval ________________________________

_____ Standard Surface Mounted Duplex/Quad receptacles (Minimum 1 per wall /1 per 10’)
  - Other interval ________________________________

_____ Wire mold raceway
  - Mounting height
    - Standard - 48” Top Wall, 96” Top Ceiling mounted
    - Other________
  - Wire mold Type
    - 2000  Duplex/Quad Receptacles at _____ foot intervals  N  S  E  W wall Clg
    - 4000  Duplex/Quad Receptacles at _____ foot intervals  N  S  E  W wall Clg
    - 6000  Duplex/Quad Receptacles at _____ foot intervals  N  S  E  W wall Clg

**Special Power Outlets:**

*Indicate Receptacle Quantity for each location - Add “Prefix for UPS, “C” Non-UPS*

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT  
http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
**Type** | **N Wall** | **S Wall** | **E Wall** | **W Wall** | **Under floor**
--- | --- | --- | --- | --- | ---
☐ NEMA L5-20 | | | | | |
☐ NEMA L6-20 | | | | | |
☐ NEMA L6-30 | | | | | |
☐ NEMA L14-20 | | | | | |
☐ NEMA L14-30 | | | | | |
☐ | | | | | |
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☐ | | | | | |
☐ | | | | | |

**Notes:**

*Indicate proposed power source if known i.e. UPS or power panel designation.*

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

**Special Equipment:**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Volts</th>
<th>Amps KW/KVA</th>
<th>Source</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Grounding:**

☐ Under floor Ground grid (RAF areas only) connected to Building counterpoise

☐ Ground bar connected to building Counterpoise
  ☐ Standard 4”x24” Bar at 48” AFF  Quantity:_____
  ☐ Other

☐ Special Requirements
Mechanical Requirements Checklist

HVAC:

- Temperature requirements in each room: ________ (degrees F), +/- ________ (degrees F)
  - Different than SRD? (Y/N) ________
- Humidity requirements in each room: ________ (% RH), +/- ________ (% RH)
  - Different than SRD? (Y/N) ________
  - Plant steam humidification acceptable: (Y/N) ________
  - Clean steam/ultrasonic humidification required: (Y/N) ________
  - If YES, local DI cartridges: (Y/N) ________
  - If NO, RO/DI plant required: (Y/N) ________
  - If YES, confirm acceptable mechanical room location for RO/DI equipment (i.e., not above labs).
- Customer equipment loads in Btu/h: ________
- Floor area per room: ___________
- Ceiling height per room: ___________
- Number of occupants per room: ___________
- Which existing HVAC system currently serves the space(s): ___________
  - Print a color ARCHIBUS floor plan highlighting rooms in the project outer boundary envelope that are within the scope of work.
- List all affected utilities. E.g., chilled water, steam, condensate, heating water, etc.
  - I.D. locations for all means of isolation for utilities.
- List all anticipated outages. E.g., HVAC, chilled water, steam, condensate, heating water, etc.
  - and the expected outage duration.
- Confirm any required phasing of the project, and whether the customer has any requirement for work or outages to occur during normal hours, subset of normal hours, or nights and weekends. (The design will require layout and construction notes accordingly.)
- Confirm all hourly ratings of walls/ceilings/floors and their locations. Establishes fire stopping and fire (smoke) damper requirements for respective penetrations.

Exhaust System Requirements:

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT 
http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
☐ Confirm all new exhaust duct routes with customer to avoid running through prohibited spaces.
☐ General lab exhaust required? (Y/N) ________
☐ Fume Hood exhaust required? (Y/N) ________
  ○ If YES, I.D. customer preferred hood location in room.
  ○ If YES, is fume hood customer-furnished? (Y/N) ________
  ○ If YES, customer to provide fume hood dimensional data cut sheets, including full sash-open face area, installation manual and utilities/connections requirements.
  ○ Confirm who installs the fume hood (customer or FMD contractor): __________
  ○ Confirm whether hood is for NANO work or chemical exhaust: __________
     (NANO particle hood has lower face velocity than chemical hood. Hood face velocity affects exhaust CFM, exhaust duct air velocity and stack discharge velocity. NANO requires all welded galvanized duct.)
  ○ If NANO hood, confirm if requires bag in/bag out HEPA filter housing after exhaust fan: (Y/N) ________
  ○ If Chemical hood, get customer chemical list and forward to Safety (or an on center chemist, etc.) to confirm any compatibility issues and also establish exhaust duct material, whether galvanized, stainless steel, PVC or FRP. Safety to confirm if all welded construction is required for metal exhaust ducts depending on the application.
☐ Other Exhaust or vents required? (Y/N) __________
  ○ Serves customer equipment (Y/N) __________
  ○ If YES, provide customer equipment manual/data/cut sheets
☐ Confirm all exhaust system general routing and approximate termination/discharge locations with customer and Code 250 and Code 350 to ensure all parties agree, prior to design and construction, to avoid rework once installation complete.

Make-up Air System Requirements:

☐ Conference Room make-up air ventilation required? (Y/N) ________
  ○ Can use existing building air system or new dedicated make-up air equipment required: (Ex./New) ________
☐ Fume Hood make-up air system required? (Y/N) ________
  ○ Can use existing building air system or new dedicated make-up air equipment required: (Ex./New) ________

Clean Room Requirements:

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
☐ Specify if designing to ISO or 209E standards: _____________
  ○ Cleanliness class: __________
☐ Clean Tent, Stick Built or Prefab: __________
☐ Customer furnished or FMD furnished: __________
☐ Ducted HEPA’s or Fan Powered HEPA’s: __________
  ○ If Fan Powered, motor HP and voltage: __________
☐ HEPA size(s) and quantity(s): __________
☐ Existing HVAC or new dedicated HVAC: __________
☐ Customer final cleans or FMD final cleans: __________
☐ Customer certifies or FMD certifies: __________

**Computer Rooms:**

☐ Confirm computer system cooling type, whether CRAC unit under floor air distribution (hot aisle/cold aisle, or bottom fed racks); rear rack door mounted cooling coils (process cooling water) supplied by cooling distribution units (CDU’s, chilled water cooled); in rack HVAC modules; on chip process water cooled servers; ambient air cooled; other.
  ○ Confirm whether customer furnished or FMD furnished for all equipment: __________
  ○ Confirm whether customer installed or FMD installed for all equipment: __________
  ○ For CRAC equipment connecting to existing chilled water/other piping, include in the scope to provide new ball valves next to any existing gate valves at main branch connections, since the old gate valves rarely hold when performing pressure testing of the new piping.
☐ Locate computer room cooling equipment system on a sketch indicating customer preferred locations.
☐ Provide customer computer equipment loads.
☐ Confirm if HVAC redundancy is required and include the requirements for all redundant equipment. Further, confirm whether the planning scope is requiring DX versus second chilled water CRAC unit as the required form of redundancy, etc.
☐ Clearly establish the required data center temperature/humidity operating temperatures for the computer room equipment. Trade journals continue to promote higher and higher data center operating temperatures noting advancements in computer designs and the need for energy conservation.

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
Plumbing:

☐ Confirm any kitchenettes including location and list/layout of required plumbing fixtures and amenities.

☐ Provide a list of all new plumbing fixtures and/or emergency fixtures required in the scope of work.
  - List all required utilities for the fixtures.
  - For emergency fixtures, indicate if recirculating domestic hot water within Code required proximity for use with a mixing valve: (Y/N) ________
  - If NO, indicate requirement for an electric tepid water mixing assembly.

☐ Locate all new plumbing and emergency fixtures on new floor plan sketch indicating customer preferred locations.

☐ Confirm existence and approximate locations of all applicable existing utilities. E.g. CW, HW, SAN, VENT, vacuum, LN2, GN2, CA, etc.
  - Indicate location of remote sources and utility route to project location if utilities not already in proximity.
  - For LN2 confirm vacuum jacketing piping system.
  - For GN2 indicate if brazed ACR with nitrogen purge or other.

☐ Compressed air source required: (Y/N) ________
  - Owner of existing compressed air source will share with this customer: (Y/N) ________
  - New compressed air source required: (Y/N) ________
  - If YES, confirm suitable mechanical room location for new equipment.

☐ For gaseous terminations in clean rooms (e.g. CA) specify if HEPA filters required at terminations. E.g. if piped to air bearings for laser/optic tables.

Customer Chambers:

☐ I.D. all customer chambers and locations on new floor plan sketch.

☐ Provide installation manuals for all customer chambers in the scope of work and include all utility requirements.

Maintenance:

☐ Establish owner for all new equipment and who will be responsible to maintain, whether customer or FMD: ________

Misc.:

☐ State any special sustainability requirements, i.e. LEED, BIM, EISA etc.

☐ Highlight any known building envelope issues such as single plate glass in areas where there is a new lab/clean room humidity requirement and condensation may occur. Recommend to include window replacement, window film or other such mitigation within the Planning statement of work.

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
Fire Protection/Life Safety Requirements Checklist

Note that completion of this document does not ensure compliance with all applicable building, fire, or life safety codes and standards. It only serves as an aid for evaluating spaces.

Building: __________ Room(s): ________________

Future occupancy (Circle the one that matches most closely):

- Assembly
- Business
- Industrial
- High-Bay Industrial
- High-Hazard
- Mercantile
- Storage
- Other

Future use (e.g. Common area, conference room, office, computer lab, server room, lab [type], restaurant, etc.): ________________

Existing buildings: Is the use or occupancy changing?

☐ Yes – The affected area must meet building/fire codes and standards for new buildings.
☐ No – Ensure that the area meets current codes for existing buildings and for new work, new buildings.

Special hazards: List all hazardous materials or equipment beyond what is typically found in an office environment: ________________

Building Demolition: Is a building to be demolished?

☐ Yes ☐ No

When the building is to be “demolished/deconstructed” then all utilities should be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. See 29 CFR part 1926 subpart T-demolition.

Or is the area adjacent to a hazardous area?

☐ Yes ☐ No

Egress:

Will the work affect theoretical (NFPA 101) occupant load or exit/egress capacity?

☐ Yes – Verify capacity is sufficient for the new load. ☐ No

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
Does the area directly open to a stairwell?

☐ Yes – Area must be a typically occupied space.  ☐ No

Will the work affect to corridors, stairwells, or exits?

☐ Yes – Ensure required exit/egress access remains code compliant.  ☐ No

Are there clear and adequate egress paths?

☐ Yes  ☐ No

Minimum corridor width: ________________ Minimum aisle width: _____________________

Mezzanines (only if present): (Limited to 1:3 area ratio. 1:2 in industrial occupancies)

Total mezzanine area: ______________________ Total unenclosed lower level: ________________

Shafts:

Is a shaft or floor opening created, or is the room adjacent to multiple floors within the building?

☐ Yes – Enclose in appropriate fire rated construction.  ☐ No

Walls, floors, doors, and ceilings:

Will or are walls, floors, or ceilings be penetrated with pipes, conduit, ducts, etc.? Are there existing penetrations not properly fire stopped?

☐ Yes – Fire stop fire barrier walls to meet rating, ceilings/floors to meet a 2-hr rating.  ☐ No

Will ducts or air transfer openings penetrate floors or fire barrier walls?

☐ Yes – Add fire, smoke, or fire/smoke dampers as required.  ☐ No

Will walls, doors, windows, corridors be removed, moved, modified, or installed?

☐ Yes – Ensure egress, sprinklers, fire alarm, fire rating, etc. remain compliant.  ☐ No

Will doors excessively obstruct egress corridors or fire alarm devices when swung or fully opened?

☐ Yes – Rework the doors.  ☐ No

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT 
http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
Is or will the area be enclosed with or adjacent to fire barrier walls?

☐ Yes – Label the fire barrier walls in accordance with NASA-STD 8719.11A.
☐ No

Is the area enclosure or adjacent to an operation that is significantly more hazardous than that of the remainder of the building?

☐ Yes – Consult AHJ or knowledgeable person, and NASA-STD 8719.11A for separation requirements.
☐ No

Will there be or are there access-controlled doors?

☐ Yes – Verify/install motion sensors and push-to-exit buttons, unless unlocked from egress side.
☐ No

**Suppression:** (All areas of building require sprinkler coverage even closets, electrical rooms, loading docks, etc.)

Does/will the room/area contain a supervised, automatic sprinkler system throughout?

☐ Yes
☐ No – Install sprinklers or present justification otherwise to AHJ.

Are the sprinklers obstructed within 18” vertical distance below heads? Storage along wall is exempt.

☐ Yes – Relocate obstructions, or relocate or add additional heads per NFPA 13 Ch. 8.
☐ No

Would new or existing sprinkler discharge at the ceiling be blocked by suspended equipment or mezzanines (at any height) greater than 4’ in width?

☐ Yes – Install sprinkler heads under the obstruction per NFPA 13 Ch. 8.
☐ No

Does the space contain water sensitive/reactive or very high value equipment susceptible to water damage?

☐ Yes – Consider adding shields for equipment or suppression system if acceptable to the AHJ.
☐ No – Maintain proper sprinkler coverage throughout.

Is the sprinkler system otherwise deficient (spacing, coverage, incorrect sprinkler/system type)?

☐ Yes – Sprinkler head is more than 7.5’ from nearest wall. Add/relocate sprinklers.
☐ Yes – Sprinkler heads are more than 15’ apart. Add/relocate sprinklers
☐ Yes – Sprinkler heads are closer than 6’ apart. Remove/relocate sprinklers.
Yes – Wet-type sprinklers in unconditioned space. Install dry-type sprinklers or dry-pipe system.
Yes – Does not appear to be enough sprinklers per hazard or coverage requirements.
Yes – Other

Unknown/Possible
No – System is perfect in every way.

Clarify if there is a requirement to center sprinkler heads in the ceiling tile.

**Alarm/Detection/Special Hazards:**

Is this an essential electronic area, providing critical NASA mission or project services (e.g. center-level IT/Telecom, flight hardware processing, etc.) or protecting irreplaceable or high-value (> $1M) assets?

Yes - The area must meet NASA-STD 8719.11A Sec. 10.4 and Sec. 6.2.1.3.
No
Unknown (consult AHJ)

If an essential electronic area, is the potential cost from fire or water damage to the construction of the area, the contained equipment, and potential for data/information loss exceed $25M?

Yes – Install clean agent system in accordance with NASA-STD 8719.11A Sec. 8.4.
No
Unknown (consult AHJ)

Does the area contain record storage that is not backed-up elsewhere?

Yes - The area must meet NASA-STD 8719.11A Sec. 10.4
No

Is the area a laboratory that reacts or combusts chemicals, and may utilize flammable liquids/gases?

Yes – The area must meet NFPA 45 and NASA-STD 8719.11A Sec. 10.4.
No

Are smoke detectors, heat detectors, pull stations, or notifications devices (bells, horns, speakers, strobes) to be moved, or removed, with or without replacement?

Yes – Ensure changes meet NFPA 72, 8719.11A, and AHJ requirements
No

Is the area a common area, or an office that is either more than 300 sq. ft. in area, or house more than 3 people or someone who is hearing-impaired, where there are no fire strobes?

Yes – Visual fire alarm notification devices are required.
No

Is a proper type of fire extinguisher present in or near the space per NFPA 10 and the type of fire hazard?

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT http://gdms.gsfc.nasa.gov TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.
☐ Yes
☐ No – Perform further evaluation to determine the proper fire extinguisher type, size, and location

**HVAC Equipment:**

Does added or modified AHU/ACS equipment serve more than 25,000 cu. ft. of building space?

☐ Yes – Meet NFPA 90A requirements
☐ No

**Emergency Lighting**

Is there emergency lighting and exit signs present as appropriate for the space?

☐ Yes
☐ No – Add appropriate devices.
Appendix G – Space Planning/ Test-Fit Worksheet

Project Name: 
Work Order/Task Number: 
Space Planning Objective: 

- Total number of people to be housed: See Space Utilization forms attached
- Total nsf : “
- Space allocation breakdown: “

Enclosed Rooms:
   # of private offices: 
   # of conference rooms:

Open Area:
   Workstation requirements (Ex: std size, in cubical storage requirement, guest seating): Standard
   Collaboration area requirements (Ex: lounge area, meeting area, breakout space):

Support Areas (describe requirement):
   Copy/Fax-Mail -
   Lunch/Break Room -
   Storage - see above
   Files - see above
   Computer/Server Room ---

Special Areas (Ex. Production Room, Lab, Equipment Storage, Caging): SEE existing sketch attached
   Area 1 –
   Area 2 –

Other Requirements (Lektriever, Space Saver, Plotter): SEE existing sketch attached.
Appendix H – NFD Checklist

The purpose of this document is to provide guidance as to whether the project appears suitable to be done as a “No Formal Design” (NFD). Ultimately the Planner/PM needs to get concurrence from the FaCETS contractor to proceed with the project as an NFD. The Planner also needs to get approval from the 220 Chief and the 210.I Chief.

Will this Project involve any of the following?........

Structural/Architectural
  o New Structural elements (i.e. beams, columns, slabs), or structural demolition
  o Dimensional alterations to corridors, stairwells, or other egress paths
  o Significant wall changes, thereby affecting fire protection coverage or HVAC adequacy
  o New or modifications to food service areas

Mechanical
  o Cooling/load calculations or affecting building water or balance
  o New HVAC equipment, duct, or piping requiring sizing
  o New kitchenette with plumbing
  o Appreciable site survey required to route new work.

Electrical
  o New or replacement electrical panels or any other upstream electrical distribution component
  o Unique lighting requirement such as a high bay
  o A new grounding system
  o UPS installation

Other
  o Life Safety Risks (fire protection design, life safety code implications)
  o Environmental, Usage or other Permits required from outside regulators

If Yes, then this project will likely need a full design.
Appendix I

Program Assignment of $$$

Planning Phase

Customer Funded

SII Program

COF

CLS 3

Multi Year

CLS II

Programmed Maintenance

Replacement of Obsolete Items

O&M Core & Program

CLSI Program

Check the GSFC Directives Management System at http://gdms.gsfc.nasa.gov to verify that this is the correct version prior to use.
**CHANGE HISTORY LOG**

<table>
<thead>
<tr>
<th>Revision</th>
<th>Effective Date</th>
<th>Description of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>5/28/2013</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT [http://gdms.gsfc.nasa.gov](http://gdms.gsfc.nasa.gov) TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.