

PROJECT DELIVERY GUIDE

RELEASE 2014.10.23

DUKE UNIVERSITY FACILITIES MANAGEMENT DEPARTMENT 114 S BUCHANAN BLVD DURHAM, NC 27708

www.fmd.duke.edu

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00 PREFACE

The Duke Facilities Management Department (FMD) regularly maintains, updates and publishes three key reference documents governing project implementation at Duke: the **Campus Design Guide**, the **Duke University Construction Standards**, and the **Project Delivery Guide**.

The Project Delivery Guide (PDG) serves as a procedural reference for FMD personnel, members of the university community, and outside service providers responsible for project delivery at Duke.

The procedures outlined in the PDG apply to all planning, design and construction work at Duke University, except for projects for the Duke Medical Center and Duke School of Medicine/Nursing.

The PDG sets forth the roles and responsibilities of key Duke entities (individuals, groups, committees, offices, departments, etc.), and describes a framework for the initiation, planning, design, construction, and final turn-over of projects on Duke's campus. Important project classifications, stages, benchmarks, and required approvals are catalogued in this document.

The PDG contains supplemental resources for FMD Project Managers and outside service providers, including the latest versions of all standard Facilities Management Department forms and templates.

The Campus Design Guide and the Duke University Construction Standards work in concert with the PDG. The Duke University Construction Standards define minimum requirements for the performance, appearance, and quality of design and construction on campus, while the Campus Design Guide is a visual resource, providing an aesthetic and conceptual framework for landscape and architectural design at Duke.

The Project Delivery Guide, Duke University Construction Standards, and Campus Design Guide are living documents and are periodically revised by FMD. To suggest a revision to any of these policies, please contact the Office of Project Management, and follow the procedure outlined in Section 08.08.00 of the Project Delivery Guide.

01 UNIVERSITY ENTITIES

01.01.00 FACILITIES MANAGEMENT DEPARTMENT

The mission of the Facilities Management Department (FMD) is to provide excellence in planning, design, construction, cleanliness, operations and maintenance for Duke University facilities, landscapes, and utilities in a customer-focused, efficient and sustainable manner.

The Facilities Management Department is organized into specialized functional areas, each committed to providing superior customer service.

For more information on Duke's facilities, visit the FMD website, which may be found in the Additional Resources section of this document.

01.01.01 OFFICE OF PROJECT MANAGEMENT

The Office of Project Management (OPM) is led by the Director of OPM, who reports to the Vice President for Facilities.

The Office of Project Management manages construction, renovation, and repairs for University-funded capital projects on Duke University's campuses. OPM assists end users in the selection and management of qualified design and construction professionals, and delivers quality projects in a safe, expedient and economically responsible manner. The OPM staff includes architects, engineers, community and campus planners with various professional registrations and certifications including LEED-accredited professionals and registered architects and engineers.

The office is organized into two primary functions: Planning and Project Management.

The Planning function provides in-house programming, planning, test-fit and concept design services for select projects. In addition, the Planning function also maintains FMD's building renewal plan and as-built documentation, using Computer Aided Design and Geographic Information Systems (CAD/GIS).

The Project Management function provides owner representation and overall management of project budget, scope and schedule for projects ranging from small renovations to new buildings.

There is one Project Accountant within the Business Services group who works exclusively with OPM for project support.

MAINTENANCE OF CONSTRUCTION STANDARDS AND CAMPUS DESIGN GUIDE

The Office of Project Management directs consultants and contractors in accordance with the planning and design principles that shape Duke's campus environment. These principles, embodied in the Master Plan, guide the process of site planning, historic preservation, and landscape design.

OPM maintains the Duke University Construction Standards, an online resource for consultants, contractors and Duke personnel, which sets forth the minimum functional and aesthetic requirements for all construction and maintenance work performed on campus.

Additionally, OPM upholds the standards for architectural design of all University facilities by advising University officers, Trustees, and committees on planning and building design issues. OPM enforces compliance with design standards for landscape architecture and exterior signage, as established by the University Landscape Architect and documented in the Campus Design Guide.

To access the Duke University Construction Standards, visit the link listed in the Additional Resources section of this document.

To access the Campus Design Guide, visit the link listed in the Additional Resources section of this document.

SUSTAINABILITY

The Office of Project Management ensures that new facilities built on Duke University's campus are designed and constructed in a manner that protects and enhances our environment. OPM supports the Duke University Greening Initiative and its commitment to green building, and the Leadership in Energy and Environmental Design (LEED) rating system established by the US Green Building Council (USGBC). It is Duke's goal that all new construction projects meet the standards for LEED certification, even in cases where the project is not registered with the USGBC.

ARCHIVE MANAGEMENT

The Office of Project Management maintains copies of drawings, specifications, and other documents related to the construction of Duke University facilities dating from 1909 to the present. Documents are made available to authorized personnel for reference and/or copying during normal business hours.

01.01.02 OFFICE OF PLANNING AND DESIGN

The FMD Office of Planning and Design is responsible for the campus-wide implementation of the Duke Master Plan. The Office of Planning and Design works with University leadership, FMD teams, and consultants to develop and maintain a comprehensive vision for the form and function of Duke's campus.

In addition to forecasting and proactively addressing the future building and infrastructural needs of the University, the Office of Planning and Design is a resource within FMD, providing design and planning support on projects managed by the Office of Project Management. The Office of Planning and Design works in concert with DUES, Facility Operations, and other Duke entities to provide guidance on building siting, orientation, massing, and programming consistent with the Master Plan.

01.01.03 UNIVERSITY LANDSCAPE ARCHITECT

The Campus Landscape Architect monitors the evolution of the master plan, oversees the appearance and aesthetics of the campus landscape, establishes standards and guidelines for exterior spaces, designs non-capital landscape/hardscape projects as needed, and consults on issues related to landscape architecture at Duke.

01.01.04 CAPITAL BUDGETS OFFICE

The Capital Budgets Office (CBO) facilitates the planning and financing of capital projects, and communicates the status of University resources, project expenditures, and management decisions to the Board of Trustees and senior officers.

The CBO reviews and approves Capital Project Request forms submitted by FMD Project Managers, and establishes fund codes in order to allocate funding and track project expenditures.

For more information on the Capital Budgets Office, visit the CBO website listed in the Additional Resources section of this document.

01.01.05 DUKE UTILITIES AND ENGINEERING SERVICES

The Duke Utilities and Engineering Service (DUES) functional area manages Duke's utility infrastructure, oversees the purchase and operation of energy resources, and provides specialized engineering and technical support for construction projects, facility operations, and service contracts for the University.

On new construction or renovation projects, DUES may assign a representative – known as a "DUES rep" – to provide specialized project support, working alongside the OPM Project Manager and Quality Assurance / Quality Control (QA/QC) Specialist to maintain Duke quality and design standards.

DUES is a multidisciplinary team that includes Professional Engineers, Analysts, Energy Managers, Licensed Electricians, Steamfitters, Mechanics, Operators, and Utility Locators. Services are managed to meet the changing needs of Duke University customers, while maintaining stability and reliability of the University's critical utility systems.

The Duke Utilities and Engineering Services (DUES) manages:

- 1. Chilled water service
- 2. Steam service
- 3. Electrical and high voltage systems
- 4. Storm, sanitary, and domestic water systems
- 5. Energy/water and resource management programs

01.01.06 FACILITY OPERATIONS

Facility Operations directs, maintains and operates all University facilities, and provides Customer Service Center response to all functions for the Facilities Management Department (FMD) at Duke University. The Operations Team consists of multidisciplinary professionals who integrate support of people, process and technology to ensure the safe, secure and sustainable functionality of the built environment.

Facility Operations provides integrated services supporting over 175 University campus facilities comprised of over 6.8 million square feet of classrooms, research laboratories, vivariums, athletic centers, performing arts auditoriums, lecture halls, administrative offices, Duke Chapel, housing, auxiliary buildings and parking decks.

The Customer Service Center (CSC) processes all Service Requests for FMD services using the EAM Work Management System. *Refer to the Additional Resources section of this document for contact information.*

On new construction or renovation projects, Facility Operations may assign a representative – known as a "Facility Ops rep" – to provide specialized project support, working alongside the OPM Project Manager and Quality Assurance / Quality Control (QA/QC) Specialist to maintain Duke quality and design standards.

01.01.07 LANDSCAPE SERVICES

Duke hosts a diverse and beautiful landscape of quads, open lawns, athletic fields, gardens and plazas. The Landscape Services group is responsible for maintaining the campus landscape. Keeping the Duke landscape healthy requires reseeding of lawns and athletic fields, proper tree maintenance, pruning of shrubs, planting

and caring for the variety of flowers found around campus, as well as an in-depth knowledge of horticulture to provide for the needs of each species of plant properly.

01.01.08 HOUSEKEEPING

Duke Housekeeping Services manages and coordinates various housekeeping functions to ensure the cleanliness of Duke buildings, in addition to maintaining the appearance and functionality of architectural finishes on floors, walls, and ceilings. The Housekeeping Department develops and maintains its policies and procedures for University housekeeping operations, and coordinates its work with other Duke departments to ensure compliance with established best practices.

01.01.09 SANITATION AND RECYCLING

The Sanitation and Recycling units help manage solid waste and sustainability efforts at Duke, while providing tactical support for university-wide special events and conducting routine preventive maintenance of sanitation and recycling equipment. Sanitation and Recycling also manage a composting operation to turn landscaping material into usable topsoil. This unit is responsible for campus-wide sanitation services, recycling, and fleet maintenance.

01.01.10 PROJECT STEERING TEAM

The Project Steering Team is comprised of FMD personnel designated by the Vice President for Facilities, representing OPM, DUES, Facility Operations, Landscape Services and the University Landscape Architect. The committee is chaired by the Director of the Office of Project Management.

The role of the Project Steering Team is to advocate for high-quality, coherent design in the campus environment, consistent with the character and aspirations of Duke University.

The Project Steering team reviews and signs off on all stages of scope definition, project initiation, design review, and project acceptance, to ensure:

- 1. The project is consistent with Duke's Master Plan and other relevant strategic plans
- 2. The design is compliant with Duke's Construction Standards and owner intent
- 3. Any potential conflicts are proactively identified and mitigated
- 4. The project scope definition is comprehensive, and addresses all foreseeable project requirements, building system and utility impacts
- 5. Any proposed exceptions to Duke's Construction Standards are thoroughly reviewed prior to acceptance
- 6. Sustainability goals are clearly identified and pursued, and adequate measurement and verification efforts are carried out

The group also continuously monitors construction and installation activity on campus and provides guidance on the following issues:

1. Highly-localized or incremental projects or repairs, either departmentally-managed or run within the functional areas of FMD, and therefore not subject to the full FMD review

process and/or OPM oversight (for example: installation of outdoor signage or benches in front of a building)

- 2. Small or unexpected installations that alter the appearance of the landscape, or alter the exterior appearance of a building (for example: minor utility work that unexpectedly requires rock to be added to a stream)
- 3. Small or unexpected installations that alter the appearance of interior public spaces (for example: installation of tack boards or writing surfaces in a lobby)
- 4. Small or unexpected installations that impact the maintenance and operation of Duke buildings, equipment or utility systems (for example: storage pod parked on top of a manhole)
- 5. Outdated infrastructure/installations that no longer comply with the Duke University Construction Standards and require replacement (for example: noncompliant stop benches that have been damaged by rot)
- 6. Additions or modifications to signage, traffic control, bike or pedestrian safety infrastructure (for example: new crosswalks)

Before beginning any project—no matter how small—project initiators are required to solicit feedback on the proposed design from the Project Steering Team in order to ensure compliance with the Duke University Construction Standards.

Noncompliant installations or unauthorized modifications identified by the Project Steering Team will be subject to removal.

Additionally, twice per year, the Project Steering Team reviews proposed revisions to FMD's official policy documents: the Project Delivery Guide, the Construction Standards, and the Campus Design Guide.

To contact the Project Steering Team, please call the Office of Project Management. For contact information, please refer to the Additional Resources section of this document.

01.01.11 FMD QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

In order to deliver quality projects that are designed for efficient long-term operation and maintenance, the Duke FMD team includes multidisciplinary Quality Assurance and Quality Control Specialists.

Where possible and necessary a QA/QC Specialist will be assigned to work in concert with the Project Manager, Facility Operations, and the DUES to enforce Duke quality and design standards, and to problemsolve any issues that arise during design or construction. It is the QA/QC Specialist's responsibility to bring any nonconforming work to the attention of the Project Manager, and to offer well-informed ideas for the timely resolution of any nonconforming conditions.

Key duties of the QA/QC Specialist:

- 1. Participate and offer input during initial scope definition meetings
- 2. Lead discussions with PM and CM/GC to determine which professional qualifications, licenses, certificates, and material/system tests are required to insure adequate QA/QC on the project

- 3. Review design documentation for compliance with Duke standards, with special attention to long-term operational and maintenance considerations
- 4. Participate and offer input during construction progress meetings, with the goal of maintaining quality
- 5. Walk construction sites in order to observe and document problems related to quality, operations, or maintenance. Communicate observations to the Project Manager for resolution
- 6. Review commissioning plans
- 7. Review preliminary Testing, Adjusting, and Balancing (TAB) reports and other technical reports associated with MEP systems
- 8. Review turnover documents

01.02.00 OTHER DUKE ENTITIES

The Facilities Management Department coordinates its services with other University Departments to provide comprehensive services on the projects it undertakes.

01.02.01 OCCUPATIONAL AND ENVIRONMENTAL SAFETY OFFICE

The Occupational and Environmental Safety Office (OESO) consists of two groups that interface with FMD: the Fire Safety group and the Occupational Hygiene and Safety group.

The OESO Fire Safety group reviews construction and renovation projects to ensure compliance with fire safety regulations and codes. This group oversees the Hot Work Safety Program and monitors active construction projects to supplement the efforts of Duke staff and contractors who work on the Duke campus.

The OESO Occupational Hygiene and Safety Office provides support for FMD Projects by performing audits covering diverse occupational exposures, including but not limited to: asbestos and lead, confined spaces, and indoor air quality.

01.02.02 DUKE UNIVERSITY POLICE DEPARTMENT

The Duke University Police Department provides support and guidance on FMD Projects that may require security or surveillance systems. They also provide assistance on active construction projects with traffic control, pedestrian safety, and emergency response.

01.02.03 OFFICE OF INFORMATION TECHNOLOGY & DUKE CARD OFFICE

The Office of Information Technology (OIT) provides support in the design of data and communication networks, and is responsible for the ongoing operation and maintenance of these networks. OIT also manages the Duke Card Office, which is responsible for installation and maintenance of card reader systems across the campus.

01.02.04 PARKING AND TRANSPORTATION SERVICES

The Parking and Transportation Services (PTS) group coordinates with FMD to make sure that transportation systems continue to function efficiently during construction projects. PTS also provides input during design of new facilities and renovations so that transportation, parking and accessibility concerns are adequately addressed.

01.02.05 DISABILITY MANAGEMENT SYSTEM

The Disability Management System Office identifies and resolves accessibility issues throughout Duke University's facilities and grounds. Accessibility requirements are specified by the Americans with Disabilities Act (ADA), Americans with Disabilities Amendments Act, Rehabilitation Act, and the North Carolina State Accessibility Building Code. The office supports FMD by providing expertise and developing strategies for ADA compliance in new construction and renovation projects.

01.02.06 FACILITIES PLANNING, DESIGN AND CONSTRUCTION

The Facilities Planning, Design and Construction (FPDC) office provides project management services for new construction and renovation projects at the Duke University Medical Center including Schools of Medicine and Nursing as well as the various hospital and clinics throughout Durham. The FPDC office also includes an Interior Design Services group. FPDC projects are guided by the campus planning principles laid out in the Duke University Master Plan, with the involvement of the University Landscape Architect and FMD planning professionals.

01.03.00 DUKE APPROVING COMMITTEES

Projects are subject to approval by the following committees, based on complexity, scope, aesthetic impact, and cost.

01.03.01 BOARD OF TRUSTEES

The Board of Trustees is the Duke University governing body responsible for the educational mission and fiscal policies of the University. The BOT must review and approve all projects over \$2.5M.

01.03.02 FACILITIES AND ENVIRONMENT SUBCOMMITTEE

The Facilities and Environment (F&E) subcommittee of the Board of Trustees oversees the inception, design, construction and acceptance of capital projects. F&E may grant consent on projects generally less than \$10M in value with certain characteristics.

01.03.03 COMMITTEE ON FACILITIES AND ENVIRONMENT

The Committee on Facilities and Environment (CFE) is an advisory group appointed by the President of Duke University, consisting of members of the faculty, administration, and undergraduate and graduate student bodies. CFE reviews all projects that are destined for consideration by the Board of Trustees, and all others that have an impact on the physical appearance of the campus.

Any project that impacts major public spaces or the exterior of a building must be presented to the CFE for review and to obtain the committee's recommendation for approval. The Project Manager is responsible for scheduling the presentation to the committee. *See Forms for Project Managers: Project Submission Form for CFE*.

02 PROJECT PLANNING AND INITIATION

02.01.00 CAPITAL PROJECTS

Duke University has established procedures governing the inception, administration, and execution of construction, maintenance, and renovation projects at Duke. These procedures are designed to promote campus-wide adherence to Duke's planning principles and design standards, and to guarantee proper administrative oversight of project management, design and construction expenditures. For members of the Duke community seeking to initiate a project, the procedures outlined below will help stakeholders define the scope of work involved, understand what committee or board approvals are needed, and gauge the level of FMD support and oversight their project might require.

02.01.01 DETERMINING THE NEED TO ESTABLISH A PROJECT

If the planned project meets *one or more* of the criteria below, the project must be administered by FMD, and *cannot be managed internally* by the School or Department. *See the FMD website, www.fmd.duke.edu, for more detail.*

- 1. The project will entail modification or replacement of components for mechanical, electrical, plumbing, fire alarm or fire protection systems (for example: installing an air conditioner, or adding electrical outlets)
- 2. The project involves the installation of research or laboratory equipment of any kind
- 3. The project will require a building permit or any other permit for electrical, plumbing, or HVAC work (for example: constructing an addition, or adding plumbing fixtures)
- 4. The project will involve the construction or removal of permanent interior partitions or ceilings (for example: dividing one room into two rooms)
- 5. The project will impact the appearance of the building exterior (for example: installing an exterior awning or a sign)
- 6. The project will alter the appearance of a major interior space (for example: painting a lobby, corridor, or atrium)
- 7. The project will impact the appearance of the campus landscape (for example: cutting down trees or hedges, or adding equipment or furniture)
- 8. The project will modify a means of egress (for example: any modification to an exit door, corridor, or stair)
- 9. The project qualifies as a Capital Project, with an anticipated project cost equal to or greater than \$100,000

If the planned project does not meet any of the criteria listed above, the project may be managed internally by the School or Department that wishes to initiate the project. If at any time the scope of the project should change to meet any of the criteria outlined above, the project initiator must contact the FMD Office of Project Management to request FMD support.

Examples of projects that may be managed internally by Schools or Departments, subject to approval by the Director of the Office of Project Management, include:

- 1. Furniture procurement and installation
- 2. Carpet replacement
- 3. Painting of interior spaces, except for major public spaces (such as a lobby, corridor, or atrium)

All projects—including internally managed projects—must be communicated to the Director of Project Management and the Director of Facility Operations via submittal of a Capital Project Request Form (CPRF) before initiation. The following Duke entities must also be notified by the Project Manager or project initiator when their associated systems or functions are likely to be impacted by the project:

- 1. DUES: Utility infrastructure, including underground utilities and above-ground infrastructure
- 2. Office of Information Technology: Data and voice infrastructure (Ethernet), emergency phones, fiber optics
- 3. Duke Card Office: Card readers
- 4. FMD Key and Lock, HVAC, Electrical, and Plumbing Shops: Door hardware, locks, Mechanical, Electrical, and Plumbing (MEP) Systems
- 5. Public Safety and Duke Police Department: Security, pedestrian, and vehicular safety
- 6. Facilities Management Landscape Services: Grounds and landscaping
- 7. Occupational and Environmental Safety Office: Hazardous materials or workplace safety
- 8. Disability Management System Office: ADA-compliant access to buildings



Figure 02.01.01.01: Determining the need for FMD support

02.01.02 CONTACTING THE FACILITIES MANAGEMENT DEPARTMENT

Projects that require management or oversight by FMD must be initiated through the Office of Project Management (OPM), Duke Utilities and Engineering Services (DUES), or Facility Operations.

Projects managed by DUES or Facility Operations are initiated via the Customer Service Center:

Contact information is listed in the Additional Resources section of this document.

02.01.03 THE FACILITY COORDINATOR'S ROLE

Facility Coordinators within Schools or Departments are responsible for the following tasks:

- 1. Internal space allocation and day to day management
- 2. Faculty and staff interface
- 3. Long term space planning
- 4. Move coordination
- 5. Day-to-day keying, security, voice/data and AV modifications
- 6. Paint/Carpet/Finishes, Furniture & Equipment (FF&E) replacements, subject to the Duke University Construction Standards
- 7. Submission of maintenance items to FMD, including initiation of Work Requests
- 8. Equipment and furniture purchases, subject to the Duke University Construction Standards
- 9. Draft initial Program Statement for Capital Projects
- 10. Develop School/Department-specific finishes and furniture standards subject to Construction Standards
- 11. Define requirements for voice/data/AV/security/keying for Capital Projects
- 12. Inventory existing FF&E prior to relocation or storage during the course of a Capital Project
- 13. Review design documents for Capital Projects and provide comments to the FMD Project Manager
- 14. Coordinate any needed equipment or utility shutdowns with building occupants
- 15. Contact the Director of OPM in order to obtain Project Management services

Facility Coordinators within Schools or Departments may not perform the following tasks:

- 1. Soliciting bids or contracting with architects, engineers and contractors
- 2. Directing architects, engineers and contractors during a Capital Project

- 3. Modifying project scope during a Capital Project (for example: approving a Change Order)
- 4. Determining contingency usage during a Capital Project
- 5. Financial reporting to the Capital Budgets Office

02.02.00 THE PROJECT MANAGER'S ROLE IN PROJECT INITIATION

During project initiation, the Office of Project Management facilitates capital projects by performing the following duties:

- 1. The Director of OPM assigns the appropriate Project Manager with the skill-set best matched to successfully complete the project.
- 2. The Project Manager assists the owner or project initiator in the preparation of a formal program statement.
- 3. The Project Manager researches as-built drawings and other archived documentation that might be useful during design and construction.
- 4. Using the program statement as a reference, and consulting with specialists within FMD as necessary, the Project Manager develops a concise scope of work and list of project goals, and completes Section IX of the CPRF. *See Forms for Project Managers: CPRF.*
- 5. When applicable, the Project Manager fills out the initial draft of the Project Summary Form that will be used to present and track the project in presentations to the Duke Board of Trustees (Tier III Projects ≥ \$2.5M). See Forms for Project Managers: PSF.
- 6. The Project Manager establishes an appropriate preliminary project budget and schedule based on the approved scope of work. The Project Manager may request budget pricing from designers or contractors in order to develop an accurate project budget.
- 7. The Project Manager fills out all applicable sections of the Capital Project Request Form (CPRF) and submits it to the Project Steering Team for review and sign-off. *See Forms for Project Managers: CPRF.*
- 8. When a feasibility study is required, the Director of OPM and the Project Manager suggest qualified consultant firms, and then engage the services of professionals to provide appropriate design options consistent with the client's project goals. The Director of OPM and the Project Manager will discuss the selection of engineering consultants with DUES.
- 9. The Director of OPM and the Project Manager assist with the selection of the most appropriate project delivery method for the work, and the Project manager communicates the selected delivery method to the Project Steering Team.
- 10. The Project Manager engages appropriate groups within Duke University coordinate all aspects of the design and to determine services that may be provided internally.
- 11. The Director of OPM and the Project Manager coordinate with Durham City/County officials, State of North Carolina departments and other regulatory agencies, as required. OPM determines required permitting.

- 12. The Project Manager assumes a fiduciary role for the project and represents the University's best interests during the design, construction, and closeout phases of the project.
- 13. The Project Manager obtains a Fund Code (WBS Element), Budget and Financial Reporting (BFR) code, and Departmental Funding Source Code from the owner.
- 14. The Director of OPM and the Project Manager select the design and/or construction management (CM) team. OPM maintains a list of qualified design consultants and Construction Managers who have either worked successfully with Duke in the past, or have demonstrated their competence through other projects outside Duke.
- 15. The Director of OPM and the Project Manager will select or recommend a design and construction management team well-suited to delivering the project in a successful, timely and cost-effective manner. If the owner has a specific consultant that they prefer to use, strong consideration will be given to use the preferred consultant.
- 16. If the schedule allows, the Project Manager will solicit proposals from several design consultants and/or construction management firms in order to obtain competitive pricing.
- 17. The selection of the Architect must be approved by the Board of Trustees for projects with value greater than \$2.5M (Tier III). The Project Manager is responsible for obtaining this approval.

02.03.00 SCOPE DEFINITION

Scope definition is a critical stage of project initiation, focused on describing the project in sufficient detail to enable design and construction. Scope definition consists of *programming* the project (listing functional and spatial requirements) and *planning* the project (crafting a basic project schedule, budget, and plans for impact mitigation).

The definition of sustainability goals, including energy use targets, environmental impact mitigation methods, and LEED certification goals, is a key part of the scope definition process.

The Project Steering Team reviews the scope of all proposed projects, as documented in Section IX of the CPRF, in order to identify potential conflicts, unforeseen impacts, and coordination challenges. *See figure 02.03.00.01 for an outline of the scope definition, review, and approval process.*

The Project Steering Team meets every two weeks on Wednesday, alternating with the biweekly CPRC session. See Figure 02.03.00.02 for an outline of the PST scope review cycle.

The typical sequence for scope definition, review and approval is as follows:

- 1. FMD receives a request for project support. If a Project Manager is required, one is assigned by the Director of OPM.
- 2. The Project Manager gathers key data, user requirements, and project scope information.
- 3. The Project Manager completes a CPRF, including Section IX, "Anticipated Impacts," to define the scope, duration, and cost of the project. *See Forms for Project Managers for the CPRF.*

- 4. The Project Manager submits the CPRF electronically to the Chairperson of the Project Steering Team, by saving the CPRF as a live Excel file in the applicable PST Meeting folder. CPRF submissions are due at close of business on Tuesday *one week in advance* of the PST meeting.
- 5. The Chairperson of the Project Steering Team distributes the CPRF to all members of the Project Steering Team for preliminary review of Section IX. If members of the Team feel that additional information or clarification is required, they inform the Chairperson, who directs the appropriate functional groups to clarify any unknowns.
- 6. The Project Steering Team conducts a formal review of the CPRF. The Project Steering Team will approve the CPRF as-is, approve with revisions, or return it to the Project Manager pending additional information.
- 7. After the Project Steering Team has approved the CPRF, and the Chairperson of the PST has signed Section X, the Project Manager continues with the project initiation process, and the project is added to the Master Project List. The Project Manager can obtain an electronic copy of the signed CPRF from the PST Meeting folder.



Figure 02.03.00.01: The FMD project scope definition and approval process



Figure 02.03.00.02: The FMD Project Steering Team (PST) Scope Review Process

02.04.00 DETAILED PROGRAMMING AND PLANNING

Following FMD approval of the proposed project scope, detailed functional programming and planning may be initiated. The programming and planning stage develops the requirements of the project to a level of detail sufficient to proceed with design.

DELIVERABLES FOR THE DETAILED PROGRAMMING AND PLANNING PHASE:

- 1. Consultant: Design documents illustrating conceptual options for the design of the project
- 2. Consultant: Schematic summaries of room-by-room floor area (for occupied spaces), or other relevant quantitative information as requested by FMD
- 3. Consultant and Project Manager: Budget pricing and preliminary total project cost budget
- 4. Consultant: Preliminary project schedule
- 5. Consultant: Results of testing and exploration (for example: soil boring geotechnical reports)

FMD typically employs one of the following four methods of detailed programming and planning.

02.04.01 OPT. 1: PROGRAMMING/PLANNING BY OFFICE OF PLANNING & DESIGN

The Office of Planning and Design can provide assistance with determining feasible layouts and basic design schemes for small to medium size projects. It is likely that a General Contractor or Design Consultant will be required to assist with refinement of the design. Projects compatible with this method might include the installation of workstation partitions, or subdividing a room.

02.04.02 OPT. 2: PROGRAMMING/PLANNING BY GENERAL CONTRACTOR/OSP

A General Contractor (GC) or Outside Service Provider (OSP) may draft a simple program in narrative format for a relatively small dollar-value project of limited complexity. Projects compatible with this method might include the installation of new carpeting, relocating a door, or installing a few light fixtures.

02.04.03 OPT. 3: PROGRAMMING/PLANNING BY DESIGN CONSULTANTS

Design Consultants (i.e., architects, interior designers, engineers, etc.) may be utilized for projects of any size when the project scope has already been reasonably well-defined by the project initiator. The Design Consultant will prepare a detailed program and schematic drawings for use in refinement of scope, and to obtain budget pricing. Ultimately, the Design Consultant will prepare construction documents that may be used to solicit bids, to obtain permits, and to direct construction.

02.04.04 OPT. 4: PROGRAMMING/PLANNING VIA FEASIBILITY STUDY

If the project cost is anticipated to be high, and/or the project is too complex to make an accurate guess at the ultimate scope, cost, or duration of work, a feasibility study may be the best approach to project planning. Feasibility studies are typically performed by Planning or Design Consultants. A Feasibility Study may be used to generate and evaluate a set of possible design solutions, and to ensure that all the desired features are included in the ultimate design. Feasibility Studies also help to keep project funding and scheduling in line with the scope and quality of the planned work.

02.05.00 DEVELOPING A TOTAL PROJECT COST BUDGET

The Project Manager will consult with the owner, Facility Operations, Landscape Services and DUES in order to develop a project budget which captures all anticipated costs to be incurred during the course of the project. The sum of these costs is called the "total project cost," and will be used as the basis for requesting funding approvals.

For budgeting purposes, it is essential that project initiators understand the distinction between "construction cost" (the "hard costs," equal to the value of the construction contract) versus "total project cost" (the total of all "hard" and "soft costs," including fees and contingency). *The total project cost may be 10% to 30% higher than the construction cost.*

In addition to construction costs, the total project cost budget will include the following line items:

- 1. Owner's contingency. This is a budget allowance to account for project expenses related to unforeseen conditions or other unanticipated costs. The Project Manager sets the contingency to be carried based on the size, complexity, and timing of the project. The owner's contingency is usually equal to 15% of the anticipate construction cost.
- 2. Project Management Fee. The PM fee line item covers costs related to FMD management of the project. The PM fee will be assessed based on actual expenditures not approved funding. The fee is calculated as a percentage of the actual construction cost, and will be:
 - 4.0% of construction cost for projects under \$2.5M
 - 2.5% of construction cost for projects \$2.5M and larger, up to \$50M
 - Calculated on a project-to-project basis for projects \$50M or larger

See Forms for Project Managers for the Duke Capital Project Guideline document.

02.06.00 PROJECT CLASSIFICATION: TIERS

The procedure for completing a project is governed by the value of the work. Capital Projects must adhere to the guidelines established in the Duke Capital Expenditure Policies and Procedures referenced on the Duke Financial Services website, which classifies projects into four categories according to total project cost:

• Tier 0	Less than \$100,000	Subject to 4.0% FMD fee
• Tier I	\$100,000 to \$250,000	Subject to 4.0% FMD fee
• Tier II	\$250,000 to \$2,500,000	Subject to 4.0% FMD fee
• Tier III	\$2,500,000 and up	Subject to 2.5% FMD fee

03 PROJECT APPROVALS

03.01.00 PROJECT APPROVAL ROLES AND RESPONSIBILITIES

The roles and responsibilities of all Duke University Entities involved in the process of project approval are outlined in Figure 03.01.00.01.

The Duke Entities listed in Figure 03.01.00.01 are responsible for the following actions:

- 1. **Provide Input:** Suggest a preferred course of action on behalf of an entity or group
- 2. **Prepare:** Assemble required documentation in support of FMD's preferred course of action.
- 3. **Review:** Check documentation in order to provide feedback on behalf of an entity or group.
- 4. **Sign Off:** Authorize the release of documentation to be forwarded to the entity responsible for final selection and approval.
- 5. **Recommend:** Forward a proposed course of action to the entity responsible for final selection and/or approval.
- 6. **Select:** Make an authoritative, executive decision on the appropriate course of action. Selection requires subsequent approval.
- 7. **Approve:** Grant final approval of the recommended and/or selected course of action.

	ENTITY	Trustees			Administration				Facilities Management							
Phase	ACTION	Board of Trustees	Facilities & Environment	Business & Finance	President	EVP	PAC / Stakeholders	CFE	Capital Budget Office	Project Steering Team	Office of Project Management	Facility Operations	Utilities & Engineering	Campus Landscape Architect	Landscape Services	Housekeeping
_																
Initiation & Planning	Project Initiation		APPROVES [3]			RECOMMENDS [3]		RECOMMENDS [3]			PREPARES [3]					
	CPRF					APPROVES	SIGNS OFF		PROVIDES INPUT	SIGNS OFF	PREPARES					
	Project Scope Definition (CPRF Sec. IX)					APPROVES [3]	SIGNS OFF [3]			SIGNS OFF [3] Approves [1, 2]	PREPARES	REVIEWS	REVIEWS	REVIEWS	REVIEWS	REVIEWS
	LEED+ Scope					APPROVES				SIGNS OFF	PREPARES	REVIEWS	PROVIDES INPUT	REVIEWS	REVIEWS	
	Measurement & Verification Plan									SIGNS OFF	PREPARES	PROVIDES INPUT	REVIEWS			
	Feasibility Study (Program, Planning, Concept)		REVIEWS			RECOMMENDS [3]				SIGNS OFF	PREPARES	REVIEWS	REVIEWS	REVIEWS	REVIEWS	REVIEWS
	Proceed into Planning & Design	APPROVES [3]	RECOMMENDS [3]	APPROVES [3]		SIGNS OFF	SIGNS OFF	RECOMMENDS			PREPARES					
_																
	Architect		APPROVES [3]	-	SELECTS [3]	RECOMMENDS [3] APPROVES [2]					RECOMMENDS [3] SELECTS [1, 2]					
ultant	Landscape Architect					APPROVES [3]					SELECTS			PROVIDES INPUT		
Cons	Engineers					APPROVES [3]					SELECTS		PROVIDES INPUT			
	Commissioning Agent										SELECTS	PROVIDES INPUT	PROVIDES INPUT			
\equiv	1					1	1					1		1		
	Schematic Design					APPROVES [2, 3]	SIGNS OFF			SIGNS OFF	PREPARES	REVIEWS	REVIEWS	REVIEWS		
	Commissioning Plan									SIGNS OFF	PREPARES	REVIEWS	REVIEWS			
Design	Design Development					APPROVES	SIGNS OFF			SIGNS OFF	PREPARES	REVIEWS	REVIEWS	REVIEWS	REVIEWS	REVIEWS
	Approval of Design - Proceed to CDs	APPROVES [3]	RECOMMENDS [3]					RECOMMENDS [3]		SIGNS OFF	PREPARES					
	Construction Documents									SIGNS OFF	PREPARES	REVIEWS	REVIEWS	REVIEWS	REVIEWS	REVIEWS
								1								
uction	Construction Approval	APPROVES [3]	RECOMMENDS [3]	APPROVES [3]				RECOMMENDS [3]			PREPARES					
	Delivery Method					APPROVES [3]				REVIEWS	SELECTS					
Const	Contractor Selection					APPROVES [3]					RECOMMENDS [3] SELECTS [1, 2]					
	Changes (Design/Field/Submittal)									SIGNS OFF	PREPARES	REVIEWS	REVIEWS	REVIEWS	REVIEWS	REVIEWS
_	1						1					1	1			
Acceptance	Commissioning Final Report									SIGNS OFF	PREPARES	APPROVES	REVIEWS			
	Post Occupancy Assessment						PREPARES			SIGNS OFF	REVIEWS	PREPARES	PREPARES	PREPARES	PREPARES	PREPARES
	Final Project Documents									SIGNS OFF	PREPARES	APPROVES	APPROVES		APPROVES	APPROVES
	Project Acceptance		APPROVES [3]			RECOMMENDS [3]					PREPARES					

NOTES

• [3]: The number in brackets denotes the project tier(s) (1, 2, 3) to which the action applies. For example, "APPROVES [3]" denotes that this approval is required only for Tier 3 projects.

• In cases where no numbers appear in brackets, the action noted applies to all project tiers. For example, "APPROVES" denotes that this approval is required for Tier 1, 2, and 3 projects.

• Items highlighted in blue require action by the Board of Trustees: in order to avoid delays, these actions must be coordinated by the Project Manager and the project delivery team to coincide with scheduled meetings of the Board.

DEFINITIONS

• PROVIDE INPUT: To suggest a preferred course of action on behalf of an entity or group.

PREPARE: To assemble required documentation supporting FMD's preferred course of action.

REVIEW: To check documentation in order to provide feedback on behalf of an entity or group.

• SIGN OFF: To authorize the release of documentation to be forwarded to the entity responsible for final selection and/or approval.

• RECOMMEND: To forward a suggested course of action to the entity responsible for final selection and/or approval.

SELECT: To make an authoritative, executive decision on the appropriate course of action. Selection requires subsequent approval.

APPROVE: To grant final approval to the recommended or selected course of action.

03.02.00 THE CAPITAL PROJECT REQUEST FORM (CPRF)

After the project initiator has decided to initiate a project, has contacted FMD for support, and has gained preliminary FMD approval of the proposed project scope, Duke Capital Projects follow the sequence outlined in Figure 03.01.00.01.

A Capital Project Request Form (CPRF) is required to establish a funded project – the second step in the process illustrated in Figure 03.01.00.01. It is the Project Manager's responsibility to complete the form and see it through the process of approval and fund code assignment.

The CPRF requests funding equal to the anticipated total project cost as calculated in the total project cost budget, which is created by the Project Manager.

The CPRF also defines the scope and anticipated impacts of the project, listed in Section IX of the CPRF and described in Section 02.03.00 of this document.

The steps of the CPRF approval process are outlined in the sections that follow.

03.02.01 FMD PROJECT STEERING TEAM SIGN-OFF

Once the CPRF has been filled out by the Project Manager, it is submitted along with a total project cost budget to the Project Steering team. The PM submits the CPRF by saving a live (unprotected) Microsoft Excel file in the Project Steering Team Meeting folder on the shared (G:) drive. The following members of the FMD leadership team will sign off on the first page of the form, approving the funding request:

- 1. Director of the Office of Project Management
- 2. Director of DUES
- 3. Director of Facility Operations
- 4. Director of Landscape Services

Additionally, as part of the project scope review process described in Section 02.03.00 of this document, the Project Steering Team will review and sign off on the project's scope and anticipated impacts as identified in Section IX of the CPRF. Sign-off on Sections IX and X of the CPRF will be the responsibility of:

1. Chairperson of the Project Steering Team

The electronic copy of the CPRF will be electronically signed and returned to the PST meeting folder on the shared (G:) drive. The Project Manager should use the signed Excel file to obtain additional electronic signatures from the requesting school or department, if necessary. A hardcopy of the physically signed CPRF will be kept on file by the Assistant to the Director of OPM.

03.02.02 SCHOOL OR DEPARTMENTAL AUTHORIZATIONS AND FUNDING

Once the CPRF has been signed off by FMD's departmental leadership and the Chairperson of the Project Steering Team, the Project Manager submits the CPRF electronically to the School or Department's internal funding office for review and authorizing signatures. The electronically-signed CPRF must be returned to the Project Manager after the school or department's funding office has entered the appropriate BFR and backstop codes, and designated a funding source. If the School or Department returns a signed hardcopy of the CPRF to the Project Manager, the Project Manager files the hardcopy and adds the required authorizations to the CPRF by entering the necessary electronic signatures.

The funding source is determined by the requesting school or department and is designated on the Capital Project Request Form as one or more of the following:

- 1. School/Unit Internal Reserves
- 2. Grants
- 3. Gifts in Hand for Construction
- 4. Gifts Pledged for Construction
- 5. Gifts to be raised for Construction
- 6. SIP (Strategic Investment Pool)
- 7. Debt or Working Capital Loan (WCL)

03.02.03 REVIEW BY CAPITAL PROJECT REVIEW COMMITTEE

Once all signatures and codes have been obtained, the capital project is added to the Capital Projects Review Committee (CPRC) meeting agenda for review and approval. CPRC meets biweekly to discuss and approve capital projects.

The Project Manager submits the fully-signed CPRF as a live Microsoft Excel file, with all necessary electronic signatures, by re-saving the file in the PST Meeting folder on the G: drive and notifying the Assistant to the Director of OPM, who transmits it to the CPRC.

03.02.04 REVIEW BY CAPITAL PROJECT EXECUTIVE COMMITTEE

Once the CPRF is approved by the CPRC, the capital project is added to the Capital Executive Committee (CPEC) meeting agenda for review and approval. CPEC meets biweekly to discuss and approve capital projects.

03.02.05 REVIEW BY CAPITAL BUDGETS OFFICE

Once a capital project achieves CPEC approval, the Capital Budgets Office (CBO) establishes a fund code and issues the fund code to the Project Manager for use in payment for goods and services.

At this point, the Project Manager may establish contracts and purchase orders under the fund code issued by the CBO. The CPRF approval process is complete.

03.02.06 ADDITIONAL REQUESTS FOR FUNDING

Commonly, project funding is requested incrementally – phase by phase – as the project progresses from planning, to design, to construction. It is not necessary to request all required funding in a single CPRF.

Each new request for increased funding requires a new CPRF in the project's CPRF "series." These additional CPRFs must be numbered sequentially, and are subject to the same approval process as the initial CPRF. They must be submitted to the Project Steering Team and to the requesting school or department for approval.

Typical project benchmarks for requesting increases in funding include:

- 1. Feasibility study
- 2. Design and preconstruction services
- 3. Construction
- 4. Scope modification



Figure 03.01.00.01: Project sequence

03.03.00 APPROVAL PROCEDURE FOR TIER 0 PROJECTS

The typical procedure for Tier 0 projects is as follows:

- 1. OPM assists owner in crafting a preliminary outline of the project scope, budget, and schedule. The PM fills out Section IX of the CPRF for review and sign off by the Project Steering Team.
- 2. If the anticipated project cost is greater than \$10K, OPM will create and process a complete CPRF (all sections).
- 3. OPM hires vendor(s), consultant(s), as needed, for design and selection of products and equipment.
- 4. OPM obtains review and input from owner and appropriate Duke entities. See Forms for Project Managers: Design Review Announcement, and Design Review Comment forms.
- 5. OPM proceeds to contracting for construction services.

03.03.01 APPROVAL PROCEDURE FOR TIER 1 CAPITAL PROJECTS

The typical procedure for Tier 1 Capital Projects is as follows:

- 1. OPM assists owner to craft a preliminary outline of the project scope, budget, and schedule. The PM fills out Section IX of the CPRF for review and sign off by the Project Steering Team.
- 2. If needed, OPM obtains approval from the Executive Vice President to expend funds for a feasibility study (up to \$75K).
- 3. OPM creates and processes a complete CPRF for a feasibility study.
- 4. OPM hires consultant(s) or vendor(s) as needed, for design and selection of products.
- 5. OPM and consultants assist the owner to establish a more detailed program, budget, and schedule.
- 6. OPM obtains review and input from owner and appropriate Duke entities.
- 7. If the project will involve the construction of a new structure, or if the project will affect a building's exterior, OPM submits the project for review by the Committee on Facilities and Environment (CFE). OPM either obtains approval to proceed from the committee, or returns to step 4 for additional design support.
- 8. OPM fills out (or amends) the Capital Project Request Form (CPRF) for project costs up to \$250K, and obtains appropriate signatures from the school or department.
- 9. OPM proceeds to contracting for construction services.



Figure 03.03.01.01 Project approval sequence for Tier 1 projects
03.03.02 APPROVAL PROCEDURE FOR TIER 2 CAPITAL PROJECTS

The typical procedure for Tier 2 Capital Projects is as follows:

- 1. OPM assists owner to craft a preliminary outline of the project scope, budget, and schedule. The PM fills out Section IX of the CPRF for review and sign off by the Project Steering Team.
- 2. If needed, OPM obtains approval from the Executive Vice President to expend funds for a feasibility study (up to \$75K).
- 3. OPM creates and processes a complete CPRF for a feasibility study.
- 4. OPM hires consultant(s) or vendor(s) as needed, for design and selection of products and equipment.
- 5. OPM and consultants assist the owner to establish a more detailed program, budget, and schedule.
- 6. OPM obtains review and input from owner and appropriate Duke entities.
- 7. If the project will involve the construction of a new structure, or if the project will affect a building's exterior, OPM submits the project for review by the Committee on Facilities and Environment (CFE). OPM either obtains approval to proceed from the committee, or returns to step 4 for additional design support.
- 8. OPM fills out (or amends) the Capital Project Request Form (CPRF) for project costs between \$250K and \$2.5M and obtains appropriate signatures from the school or department, the Management Center, and the Executive Vice President.
- 9. OPM proceeds to contracting for construction services.



Figure 03.03.02.01 Project approval sequence for Tier 2 projects

03.03.03 APPROVAL PROCEDURE FOR TIER 3 CAPITAL PROJECTS

The typical procedure for Tier 3 Capital Projects is as follows:

- 1. OPM assists owner to craft a preliminary outline of the project scope, budget, and schedule. The PM fills out Section IX of the CPRF for review and sign off by the Project Steering Team.
- 2. If needed, OPM obtains approval from the Executive Vice President to expend funds for a feasibility study (up to \$75K).
- 3. OPM creates and processes a CPRF for a feasibility study.
- 4. OPM hires consultant(s) or vendor(s) as needed, for design and selection of products and equipment.
- 5. OPM and consultants assist the owner to establish a more refined program, budget, and schedule.
- 6. OPM obtains review and input from owner and appropriate Duke Departments/groups.
- 7. If the project will involve the construction of a new structure, or if the project will affect a building's exterior, OPM submits the project for review by the Committee on Facilities and Environment (CFE). OPM either obtains approval to proceed from the committee, or returns to step 4 for additional design support.
- OPM fills out (or amends) the Capital Project Request Form (CPRF) for project costs over \$2.5M and obtains appropriate signatures from FMD, the school or department head, the Management Center, and the Executive Vice President.
- 9. The Capital Project Review Committee (CPRC) will review the project. If the project is approved by the CPRC, the CPRC will recommend forwarding the project to the Capital Project Executive Committee (CPEC).
- 10. The Capital Project Executive Committee (CPEC) will review the project. OPM obtains CPEC approval.
- 11. OPM prepares a draft Project Summary Form (PSF) Form. The Project Manager submits the PSF for review by the Director of Project Management and the Contract Manager. OPM obtains approval.
- 12. OPM presents the project to the Facilities and Environment (F&E) and obtains F&E approval.*
- 13. OPM presents the project to the Business and Finance Committee (BFC) and obtains BFC approval.
- 14. OPM presents the project at a meeting of the Board of Trustees (BOT) and obtains BOT approval.

15. OPM proceeds to contracting for construction services.

*Consent projects can be approved by consent at the Facility and Environment Committee meeting, with appropriate funding approvals from other entities. Consent projects are generally under \$10.0M project cost with very little or no impact on building exteriors or public interior spaces.



Figure 03.03.03.01 Project approval sequence for Tier 3 projects

04 **PROJECT MANAGEMENT: DESIGN**

04.01.00 DUKE DESIGN STANDARDS AND EXCEPTIONS

Duke University has established design, construction and product selection standards applicable to all projects on campus, catalogued online in the Duke University Construction Standards. Designers must present any proposed exception to these standards to the Office of Project Management for discussion and internal review by all relevant FMD groups and organizations. FMD will review proposed exceptions on a case-by-case basis.

Design options that do not meet Duke University's design standards may not be presented or shown to project initiators or owners without prior internal FMD Project Steering Team review and approval.

04.01.01 DESIGN REVIEW AND COMMENTS

The Design Review process is FMD's primary process for ensuring project compliance with the Duke University Construction Standards.

Consultants must submit design documentation (drawings and specifications) for FMD review at the direction of the Project Manager. The timing and total number of Design Reviews will be adapted to the scope and schedule of the project, and determined by the Project Manager at the beginning of the design phase. The Project Manager is responsible for communicating review deadlines and requirements to the project team at the beginning of the design phase. Typically, Drawing Reviews are conducted at the following benchmarks:

- 100% SD
- 100% DD
- 70% CDs

Small projects may require fewer reviews, and very large projects may require additional reviews.

DELIVERABLES FOR DESIGN REVIEW

- 1. Consultant: Drawings (plans, sections, elevations, diagrams, schematic layouts):
 - a. One full size hardcopy (for review in the plan room)
 - b. One half size hardcopy (for the PM)
 - c. Electronic copy in PDF format, organized by discipline
- 2. Consultant: Specifications (detailed selection and performance criteria for materials and equipment)
- 3. Consultant: Construction Standards Compliance Form (completed, with all exceptions noted, and signed by the consultant). *See Forms for Project Managers for the Construction Standards Compliance Form.*

THE DESIGN REVIEW PROCESS

The review process follows the following sequence:

- 1. The consultant submits design documentation, accompanied by the Construction Standards Compliance Form and a list of proposed exceptions to the Standards to the Project Manager, in digital and hardcopy formats. *See Forms for Consultants and Contractors for the Construction Standards Compliance Form.*
- 2. The Project Manager updates the online drawing review list and issues a Design Review Announcement in order to initiate review of the documents by all relevant Duke entities. The Project Manager distributes the list of proposed exceptions, along with the Design Review Announcement, to all reviewers and to the Project Steering Team. *See Forms for Project Managers for the Design Review Announcement form.*
- 3. The Project Manager coordinates with the Archive Management specialist to make physical copies of the drawings, specifications, and the list of proposed exceptions available for review in the plan room.
- 4. For each proposed exception to the Construction Standards, the Project Steering Team will determine which designated reviewer is best equipped to provide an informed recommendation on acceptance or rejection of the proposed exception. The Project Steering Team will separately request (via email) a targeted review of each proposed exception by the appropriate FMD reviewer, as necessary. The Project Manager supports this process.

For example: in the case of a proposed exception to Duke's HVAC standards, the Project Steering Team will request that the FMD Facility Operations HVAC specialist conduct a targeted review of the proposed exception.

- 5. FMD relies upon a team-based approach to the review of design documentation in order to conduct systematic, thorough reviews within the stipulated two week review period. The designated representative of each Duke entity is responsible for reviewing and commenting on those aspects of the design relevant to his or her specific area of expertise. It is essential that all designated reviewers take part in the review process and provide comments.
- 6. Within two weeks of the review announcement, reviewers must submit all comments to the Project Manager, using the appropriate software (Bluebeam) to annotate the drawings. [Note: If Bluebeam is unavailable, comments may be submitted in .doc format.]
- 7. The Project Manager will generate a comment summary and transmit this summary to all reviewers, the PST, and the design team at the end of the two-week review period.
- 8. Within two weeks of the review announcement, reviewers tasked with conducting targeted reviews of proposed exceptions (in step 4 above) must submit their recommendations to the Project Steering Team via email. Valid responses include: approval, conditional approval, rejection, and requests for additional information.
- 9. Within two weeks of the review announcement, the Project Steering Team will evaluate all feedback received and will respond to the each proposed exception to the Construction Standards. Valid responses include: approval, conditional approval (including deferral to the recommendation of the assigned specialist reviewer), rejection, and requests for additional information. A summary of the Project Steering Team's responses will be sent to the Project

Manager by the Chairperson of the Project Steering Team, for transmittal to the design team.

- 10. Within two weeks of the close of the Design Review period, the Project Manager and design consultants are responsible for issuing a preliminary response to all comments received from reviewers. The Project Manager and design consultants must provide a written response to all comments, distributed to all reviewers and to the Project Steering Team. Comments requiring more in-depth examination must be identified and acknowledged at this time with a preliminary response.
- 11. Within four weeks of the close of the Design Review period, the Project Manager and design consultants must document their proposed resolutions/responses to all comments including those requiring in-depth examination and distribute this final response to all reviewers.

04.01.02 SIGNAGE STANDARDS

Standards for exterior signage have been established and are enforced in order to provide consistency across the campus. Standards exist for temporary project signage as well as permanent building identification, directional, parking and information signs.

Temporary project identification signs may be produced and installed by contractors. All signs must be approved by Campus Landscape Architect.

Parking and transportation signs must meet design standards, but may be approved, produced and installed by Parking and Transportation Services.

THE SIGNAGE APPROVAL PROCESS

All other exterior identification and way finding signs must follow this process:

- 1. Customer or project design team determines potential needs for signs
- 2. List of requested signs and verbiage is submitted to Campus Landscape Architect for approval
- 3. A mock-up of signs based on Standards is generated by FMD CAD staff
- 4. Campus Landscape Architect approves final sign proposal and locates new signs in field with PM and contractor
- 5. Signs are to be installed by FMD Facility Operations unless otherwise agreed upon.

Signs deviating from above process must be approved by the Campus Landscape Architect.

04.01.03 DESIGN APPROVALS

At each stage of design, the Director of OPM will review project design in consultation with the University Landscape Architect and the Executive Vice President, and the Project Steering Team will sign off on all design documentation, before forwarding the design to the Facilities and Environment Committee for approval.

04.02.00 THE PROJECT MANAGER'S ROLE DURING DESIGN

During the design phase, the Office of Project Management performs the following functions:

- 1. The Project Manager secures funding approvals sufficient to pay for design. No outside contracts (design or otherwise) may be requested before a fund code has been created for the project.
- 2. The Project Manager secures the professional services of a design consultant by processing either a Purchase Requisition or a Professional Services Agreement. *See Forms for Project Managers: Purchase Requisition and Goods Receipt, and Professional Services Agreement Form.*
- 3. The Project Manager monitors and directs the designer towards successful and timely completion of the design. As part of this process, the Project Manager coordinates with the owner to ensure that desired features are included in the final design.
- 4. The Project Manager supports the consultant's fulfilment of all Duke requirements related to the use of BIM on Duke Projects. The Project Manager negotiates and establishes a BIM Execution Plan with the consultant, and enforces the requirements of the BIM Execution Plan.
- 5. The Project Manager coordinates design reviews. *See Forms for Project Managers: Design Review Announcement, and Design Review Comment forms.* The Project Manager solicits and incorporates feedback from the following entities:
 - 1. The Project Steering Team
 - 2. Duke Utilities and Engineering Services (DUES)
 - 3. Quality Assurance and Quality Control Specialists (QA/QC)
 - 4. Facility Operations
 - 5. Landscape Services
 - 6. Housekeeping, Sanitation & Recycling
 - 7. University Landscape Architect
 - 8. Office of Information Technology (OIT) and the Duke Card Office.
 - 9. Occupational and Environmental Safety Office (OESO)
 - 10. Duke University Police Department (DUPD)
 - 11. Other entities as necessary to ensure a thorough review
- 6. The Project Manager periodically updates the project budget to maintain owner awareness of project finances.

04.02.01 REQUESTING DESIGN PROPOSALS

At the request of the Project Manager, or in response to an RFP, the designer should submit a design proposal that specifies the designer's fee, outlines the approved scope of the project, and lists project deliverables for each stage of the project. The designer should resolve any questions regarding the scope of the project through meetings with the Project Manager and the owner. The proposal should include:

- 1. A summary of project scope, as understood by the designer
- 2. Detailed fee proposal, broken down by phase
- 3. Project schedule indicating major milestones in the design and construction process
- 4. A Duke-approved draft BIM Execution Plan, based on Duke's BIM Execution Plan Template, defining BIM deliverables and workflows during design and construction.
- 5. List of consultants, pre-approved by the Duke PM, to be subcontracted for design
- 6. Qualifications and clarifications

04.02.02 CONTRACTING FOR DESIGN SERVICES

The services of a professional design team should be enlisted when drawings and specifications are needed for a project requiring permitting.

04.02.03 DOCUMENTATION STANDARDS

Project Managers are responsible for enforcing Duke's documentation standards during the design and construction processes. Contractors are required to maintain proper as-built documentation, including records of all product/equipment submittals from submission to acceptance.

When the contractor turns the project over to Duke at completion, as-built documentation becomes an important tool for the owner, essential to the successful long-term operation and maintenance of the project.

04.03.00 PHASES OF THE DESIGN PROCESS

By convention, the architectural and engineering design processes are structured into four major phases:

- 1. Schematic Design (SD)
- 2. Design Development (DD)
- 3. Construction Documents (CDs)
- 4. Construction Administration (CA)

These phases are used in order to establish benchmarks for progress, and to structure the design review process. Design fees are often allocated according to phase.

04.04.00 SCHEMATIC DESIGN (SD)

During Schematic Design, the design team develops initial concepts in response to the major requirements of the program document, the site, the budget, and other constraints. The documents developed during SD may illustrate several feasible "schemes" that satisfy the requirements of the program. The objective of the SD phase is the selection of a single design scheme that achieves project objectives, in order to proceed with Design Development.

DELIVERABLES AT 100% SD:

- 1. Consultant: Schematic diagrams, plans, sections, and elevations for the primary design scheme, illustrating the basic configuration and concept of the design
- 2. Consultant: Schematic summaries of room-by-room floor area (for occupied spaces), system capacity and equipment sizing (for MEP systems), or other relevant quantitative information as requested by FMD
- 3. Consultant: Budget pricing and an updated total project cost budget
- 4. Consultant: Updated project schedule
- 5. Consultant: Supporting documentation to illustrate the rationale for selecting the primary design scheme
- 6. Consultant: LEED Plus deliverables as outlined in the Construction Standards
- 7. Consultant: BIM deliverables as outlined in the BIM Execution Plan

04.05.00 DESIGN DEVELOPMENT (DD)

After the conclusion of the Schematic Design phase, the design team begins to resolve more detailed aspects of the design and addresses outstanding conflicts as part of the Design Development phase. By the end of DD, most major decisions about the building and MEP systems have been finalized.

DELIVERABLES AT 100% DD:

- 1. Consultant: Detailed diagrams, plans, sections and elevations of the project
- 2. Consultant: Detailed summaries of room-by-room floor area, occupant loads, support space capacities, system sizing/equipment selection for MEP systems, and other quantitative information as requested by FMD
- 3. Consultant: Schematic Operation and Maintenance plans, as requested by FMD
- 4. Consultant: Schematic measurement and verification plan
- 5. Consultant: Refined budget pricing and an updated total project cost budget
- 6. Consultant: Updated project schedule
- 7. Consultant: LEED Plus deliverables as outlined in the Construction Standards

8. Consultant: BIM deliverables as outlined in the BIM Execution Plan

04.06.00 CONSTRUCTION DOCUMENTS (CDs)

During the Construction Documents phase, the design team compiles the architectural and engineering drawings and specifications (the "drawing set") required to document all design development decisions and to build the project. The design team revises and supplements the plans, sections, and elevations created during the Design Development phase to include all information required for cost estimation and construction. During the CD phase, the Project Manager may request that the design team issue one or more "pricing sets" in order to obtain more accurate, revised budget pricing from the General Contractor or Construction Manager while there is still an opportunity to revise detailed design decisions.

DELIVERABLES AT 100% CDs:

- 1. Consultant: A complete drawing set, consisting of stamped/sealed drawings by the architect or engineer and all sub-consultants, documenting every aspect of the project including (but not limited to) plans, sections, and elevations illustrating spatial layout and architectural intent, finishes, construction details, MEP system layouts, and all necessary schedules
- 2. Consultant: A complete set of technical specifications in the form of a project manual, documenting the detailed criteria for every aspect of the project, including (but not limited to): materials, installation methods, equipment selection, and performance requirements
- 3. Consultant: Detailed pricing and an updated total project cost budget
- 4. Consultant: Updated project schedule
- 5. Consultant: LEED Plus deliverables as outlined in the Construction Standards
- 6. Consultant: BIM deliverables as outlined in the BIM Execution Plan

04.07.00 CONSTRUCTION ADMINISTRATION (CA): PRECONSTRUCTION

The Preconstruction portion of the Construction Administration phase begins once the drawing set is finalized and the CD set is issued to a GC or CM to generate a Guaranteed Maximum Price (GMP). Alternatively, the set may be issued as part of a bid package in order to solicit bids from multiple GCs or CMs. The design team is responsible for supporting these processes by:

- 1. Organizing a pre-bid meeting, if the project will be bid
- 2. Conducting a site walk to familiarize the construction team with site constraints
- 3. Responding to RFIs, issuing bulletins and addenda as necessary to clarify project requirements

Once the construction contract has been awarded and construction has begun, the design team continues to monitor the progress of construction and to communicate with the Project Manager and the GC or CM in

order to ensure that the project is constructed in accordance with design documents and all applicable specifications. The design team must attend all regular project meetings and site inspections. Timely coordination and communication of design decisions is essential to successful project delivery.

The Project Manager is ultimately responsible for ensuring that the project meets all applicable design and quality standards, and all proposed exceptions to Duke standards must be communicated explicitly to the Project Manager.

DELIVERABLES DURING CA: PRECONSTRUCTION:

- 1. Consultant: A set of conformed design documents (final drawing set and specifications/project manual) sufficient for permitting and completion of the contracted scope of work
- 2. Consultant: Bulletin drawings and partial re-issues of the drawing set as required to clarify intent
- 3. Consultant: Project support materials, such as addenda and meeting minutes, as requested by FMD
- 4. Consultant: Responses to Requests for Information (RFIs)
- 5. Consultant: BIM deliverables as outlined in the BIM Execution Plan
- 6. Contractor: Duke-approved construction-phase BIM Execution Plan, based on Duke's BIM Execution Plan template, detailing BIM deliverables during construction.
- 6. Contractor: Accurate project pricing (bid or proposal)
- 7. Consultant and Contractor: LEED Plus deliverables as outlined in the Construction Standards

05 **PROJECT MANAGEMENT: CONSTRUCTION**

05.01.00 THE PROJECT MANAGER'S ROLE DURING CONSTRUCTION

As the project moves from design into construction, the Office of Project Management performs the following functions:

- 1. The Director of OPM and the Project Manager will select or recommend a qualified General Contractor (GC) well-suited to delivering the project in a safe, successful, timely and cost-effective manner. As with design consultants and construction managers, OPM maintains a list of GCs who have either worked successfully with Duke in the past, or have demonstrated their competence on projects outside Duke. If the end-users have a specific GC that they would prefer to use, strong consideration will be given to use the preferred GC. When at all possible, OPM will solicit proposals from multiple (at least three) GC's in order to keep the pricing for work competitive. The selection of the General Contractor must be approved by the Board of Trustees for projects with value greater than \$2.5M (Tier III).
- 2. The Project Manager secures funding approvals sufficient to pay for construction.
- 3. The Project Manager requests a construction contract.
- 4. The Project Manager acts as the owner's representative during construction.
- 5. The Project Manager coordinates a pre-construction meeting and establishes the schedule for recurring project update meetings.
- 6. The Project Manager establishes a responsibilities list outlining who is responsible for furnishing and installing each major component of the project.
- 7. The Project Manager hires, supervises and directs all operations and compensation for the design team.
- 8. The Project Manager hires, supervises and directs all operations and compensation for the contracting team.
- 9. The Project Manager hires, supervises and directs all operations and compensation for independent testing agencies.
- 10. The Project Manager coordinates specification and procurement of all owner-furnished items.
- 11. The Project Manager communicates with and seeks feedback from the owner, while managing owner expectations.
- 12. The Project Manager filters communication with Duke organizations such as *The Chronicle* and *Duke Today*.
- 13. The Project Manager administers and coordinates all alert notices, hot work permits, utility shutdown requests, parking restrictions, and fire alarm/fire suppression suspensions during the construction period. All requests for alert notices must be made by the Project Manager at least 48 hours before the planned service interruption.

- 14. The Project Manager responds to unforeseen conditions by providing design and construction direction to the project delivery team.
- 15. The Project Manager reviews, approves, and processes pay applications and change orders.
- 16. The Project Manager tracks project cost-to-date versus the approved construction budget.
- 17. The Project Manager, when necessary, submits scope modification paperwork to cover added scope.
- 18. The Project Manager attends and participates in all construction meetings prior, during and after construction.
- 19. The Project Manager oversees all required commissioning and LEED certification for the project.
- 20. The Project Manager coordinates with the Duke Card Office and Facility Operations to grant necessary access to construction personnel.
- 21. The Project Manager works with Duke Police to maintain project and university security during construction.
- 22. The Project Manager is responsible for general oversight of project safety compliance: the Project Manager is responsible for confirming that the GC's safety programs and policies are consistent with OSHA, FMD, and OESO requirements. The Project Manager will promptly alert the General Contractor or CM to any unsafe activities observed during site walks.

05.01.01 SELECTION OF CONSTRUCTION DELIVERY METHOD

The "construction delivery method" describes the overall structure of the contract(s) between Duke University and outside agencies responsible for the organization, insurance, financing, design and construction of a project. The construction delivery method governs the assumption of risk, the hierarchy of project administration, and the relationships among Duke, consultants, and contractors involved in the job.

The Director of OPM is responsible for assessment and determination of the appropriate construction delivery method for each project managed by OPM.

05.01.02 REQUESTING CONSTRUCTION PROPOSALS

At the request of the Project Manager or in response to an RFP, the contractor submits a construction proposal to the Project Manager as an offer for services. The construction proposal forms the basis of the construction contract, and is based on the contractor's understanding of project scope, as defined by the design documents or Request for Proposal (RFP). The proposal should include:

- 1. A summary of project scope
- 2. Detailed pricing
- 3. Project schedule

- Logistical considerations, including definition of project site limits and potential impacts on adjacent spaces
 List of subcontractors, pre-approved by the Duke PM, to be subcontracted for construction
- 6. Summary of the contractor's safety training program and statement of compliance
- 7. Qualifications and clarifications

05.01.03 CONTRACTING FOR CONSTRUCTION SERVICES

Once the project has been approved for construction, contracts have been executed, and the schedule finalized, the process of building can begin.

05.02.00 CONSTRUCTION ADMINISTRATION (CA): CONSTRUCTION PHASE

During construction, the contractor will conduct regular progress meetings with the designer, consultants, and subcontractors to update the Project Manager, Facility Operations, DUES, and owner on project status, and to request direction from the Project Manager regarding issues that emerge during construction. The Project Manager must manage the contractor by attending all meetings, making regular site inspections, and overseeing Contract Administration (CA). The Project Manager serves as the point of contact between the contractor and all Duke University internal organizations; it is the Project Manager's responsibility to manage communications among these groups and request input from Duke organizations as necessary to resolve construction conflicts.

DELIVERABLES DURING THE CA PHASE:

- 1. Consultant and Contractor: Bulletin drawings, shop drawings, and partial re-issues of the drawing set as required, to clarify intent in sufficient detail to support construction
- 2. Consultant and Contractor: Project support materials, such as addenda and meeting minutes, as requested by FMD
- 3. Consultant: Responses to Requests for Information (RFIs)
- 4. Contractor: Contractor's Pending Change Order Log
- 5. Contractor: Contractor's Contingency Log
- 6. Consultant: Arc Flash reports, to be submitted to FMD at least three months before substantial completion
- 7. Contractor: LOTO (Lock-Out Tag-Out) and JHA (Job Hazard Analysis), to be submitted to FMD at least three months before substantial completion
- 8. Consultant and Contractor: LEED Plus deliverables as outlined in the Construction Standards
- 9. Consultant: BIM deliverables as outlined in the BIM Execution Plan

05.03.00 SUBSTANTIAL COMPLETION

When construction has progressed to a level of completion sufficient to apply for a Certificate of Occupancy, the work is considered substantially complete. At substantial completion, the Project Manager and design consultants are responsible for conducting a thorough site walk, reviewing the contractor's punch list of outstanding work, and preparing a complete list of incomplete work, omissions, and defects to be addressed by the contractor.

DELIVERABLES AT SUBSTANTIAL COMPLETION:

- 1. Contractor: Responses by the contractor to all punch listed items
- 2. Contractor: All relevant O&M Manuals (to be furnished to the Project Manager prior to application for a Certificate of Occupancy)
- 3. Contractor: Certificate of Occupancy
- 4. Consultant and Contractor: Project support materials, such as addenda and meeting minutes, as requested by FMD
- 5. Consultant and Contractor: LEED Plus deliverables as outlined in the Construction Standards
- 6. Consultant: BIM deliverables as outlined in the BIM Execution Plan

05.04.00 COMMISSIONING

When construction is substantially complete, the Project Manager oversees the Commissioning phase of the project, during which major building systems are brought online. During this phase, FMD supervises the process of adjusting and calibrating building equipment to provide optimal service.

Commissioning procedures for specific architectural systems, MEP systems and utilities are outlined in detail in the Construction Standards. For information on specific commissioning procedures, please visit the Construction Standards website, referenced in the Additional Resources section of this document.

Commissioning procedures and requirements related to Duke's LEED Plus initiative may also be found in the Duke University Construction Standards.

Commissioning procedures related to LEED Certification are governed by the US Green Building Council (USGBC). For information on LEED Certification, please visit the USGBC website for the most up-to-date information.

DELIVERABLES DURING THE COMMISSIONING PHASE:

- 1. Consultant and Contractor: Project support materials, such as addenda and meeting minutes, as requested by FMD
- 2. Contractor: Commissioning reports
- 3. Contractor: Response(s) to any outstanding punch listed items

- 4. Consultant and Contractor: LEED Plus deliverables as outlined in the Duke University Construction Standards
- 5. Consultant: BIM deliverables as outlined in the BIM Execution Plan

05.05.00 PROJECT TURNOVER

At turnover, the construction site is released by the contractor for normal occupation and use by Duke personnel.

DELIVERABLES AT PROJECT TURNOVER:

- 1. Contractor: All relevant warranty and service information
- 2. Contractor: Equipment lists, information, and procedures data for entry into EAM
- 3. Consultant and Contractor: Project support materials, such as addenda and meeting minutes, as requested by FMD
- 4. Consultant and Contractor: LEED Plus deliverables as outlined in the Duke University Construction Standards
- 5. Consultant: BIM deliverables as outlined in the BIM Execution Plan

06 POST OCCUPANCY

06.01.00 MEASUREMENT AND VERIFICATION

Duke strives for continuous improvement in the performance of University buildings, systems, landscapes, and infrastructure. Post occupancy measurement and verification are critical components of Duke's continuous improvement efforts.

06.01.01 PERFORMANCE

After a project is turned over to the owner and occupied by the end-users, FMD continues to monitor the building or system with a particular focus on the following aspects of performance:

- 1. Verify real-world performance vs. performance predicted by the energy model: is the building performing better or worse than the model predicted?
- 2. Identify the root causes of any deviations: What are the root causes of any deviations from predicted performance? Root causes should be treated as "cautionary tales" to improve the accuracy of future energy models.
- 3. Gauge occupant/user satisfaction: over the long term, can user feedback inform future projects?

Specific methods for measurement and verification of building/system performance will be determined by DUES and Facility Operations in consultation with OPM and other groups within FMD as necessary.

For more information on Duke's energy modeling requirements and the LEED Plus program, please visit the Duke University Construction Standards website listed in the Additional Resources section of this document.

06.02.00 WARRANTY ADMINISTRATION

At project turnover, as described in section 05.05.00 Project Turnover, contractors must deliver all documentation related to warranties on installed equipment, systems, landscape, or other project components to the Project Manager.

FMD documents all warranty information in the EAM database, including the scope, duration, and contact information for each warranty.

Additionally, the Project Manager is responsible for performing a walkthrough of the completed project approximately ten to eleven months after completion – prior to the expiration of the one-year warranty on new work – to identify any equipment, systems, landscaping, or other project components that require replacement under warranty.

07 **PROJECT CLOSEOUT**

07.01.00 CLOSEOUT REQUIREMENTS

Upon completion of the project and before final payment is issued to consultants and contractors, the Project Manager must verify that all closeout requirements have been met.

At closeout, the Project Manager is responsible for collecting all as-built documentation, equipment lists, and relevant turnover information from consultants, contractors, and other outside service providers involved in the project. These deliverables are specifically enumerated below, and may also be found in *Forms for Contractors and Consultants: Record Drawing Submission Requirements* and *Forms for Consultants and Contractors: BIM Execution Plan.*

Following receipt of all required close-out documentation, the Project Manager will authorize the release of final payment to consultants and contractors. Release of final payment requires the approval of the following FMD leadership:

- 1. Director of the Office of Project Management
- 2. Director of DUES
- 3. Director of Facility Operations
- 4. Director of Landscape Services
- 5. Chairperson of the Project Delivery Team

See Instructions for Contractors and Consultants: Record Drawing Submission Requirements. See BIM Execution Plan for project-specific details

DELIVERABLES AT PROJECT CLOSEOUT:

- 1. Consultant and Contractor: As-Built documentation as follows:
 - One full-size hard copy print set of record drawings, separated by discipline (drawings only, no specifications)
 - One half-size hard copy print set of mylars or record drawings
 - One CD/DVD containing .DWG files of the record drawings: if design was executed using BIM software, .DWG files must be exported directly from the as-built, federated BIM model.
 - One CD/DVD containing .PDF files of the record drawings
 - One CD/DVD containing .PDF files of project record specifications/manual
 - Where stipulated by the BIM Execution Plan, consultant and contractor must provide one federated Building Information Model that includes all as-built conditions accurately modeled, with accurate associated as-built

metadata. This model is to be delivered in a suitable electronic format as specified in the project-specific BIM Execution Plan.

- 2. Consultant and Contractor: O&M information as follows:
 - One hard copy of each applicable O&M manual, separated by discipline (except for generator and automatic transfer switch O&M manuals, see below)
 - Two hard copies of each applicable O&M manual for generators and automatic transfer switches
 - One CD/DVD containing .PDF files of all applicable O&M manuals, separated by discipline
- 3. Consultant and contractor: Warranty information as follows:
 - One hard copy of all equipment warranties, separated by discipline
 - One CD/DVD with .PDF files of all warranties, separated by discipline
- 4. Consultant and contractor: Testing and verification documentation as follows:
 - One hard copy of all applicable TAB reports
 - One hard copy of any maintenance-related certification or inspection report obtained for the project (for example: elevator, pressure vessel, etc.)
 - One CD/DVD containing .PDF files of all applicable TAB reports
 - One CD/DVD containing .PDF files of any certifications or inspection reports obtained for the project, including LEED certification and Certificate of Compliance
- 5. Consultant and contractor: Equipment inventory / COBie information as follows
 - One CD or DVD containing a Microsoft Excel spreadsheet the documents all equipment requiring preventive maintenance
 - Where stipulated by the BIM Execution Plan, the consultant and contractor are to deliver COBie-formatted data exported from the BIM model for automated entry into Duke's EAM system. This data is to be delivered in the appropriate electronic format specified in the project-specific BIM Execution Plan.
- 6. Consultant and contractor: Any additional requirements as requested by the Duke Project Manager, including photographs or supplementary information.
- 7. Consultant and Contractor: LEED Plus deliverables

8. Consultant and Contractor: Final project reports as required (Project Team Evaluation, Final Project Report, etc.)

08 **PROJECT ADMINISTRATION PROCEDURES**

08.01.00 MANAGING COMMUNICATIONS

During design and construction, the Project Manager is Duke's point-of-contact and serves as the primary vector for all communications with contractors, consultants, and project owners.

The Project Manager and the Director of Project Management are the *only individuals* authorized by Duke to direct consultants and contractors. All communication between Duke personnel and outside service providers must pass through the Office of Project Management.

Contractors are *not guaranteed payment* for work performed at the direction of Duke personnel other than the FMD Project Manager in charge of the project. Contractors who receive direction for non-authorized Duke personnel must contact the Project Manager immediately for clarification and direction.

The Project Manager works directly with the assigned DUES Representative, Facility Operations, and QA/QC specialist to enforce Duke quality and design standards, and to problem-solve issues that arise during construction.

The Project Manager is additionally responsible for facilitating communication and coordination to support specific design- and construction-related tasks, as outlined below.

08.01.01 EMERGENCY COMMUNICATION

Once a project has been initiated and before construction begins, an emergency communication plan should be established along with a contact list for all parties to be notified in case of emergency. Duke Police and OESO contacts should be included on this list, and should be notified once a project begins.

All inquiries from organizations external to FMD, including university publications and City of Durham agencies or media outlets, must be directed to the Director of the Office of Project Management. Project Managers, Facility Coordinators, and other FMD Staff are generally not authorized to provide information or statements on the behalf of Duke University.

08.01.02 MEETINGS

Regular progress meetings are essential in order to maintain constant communication between the contractor, designer and owner. The Project Manager is responsible for coordinating a recurring meeting schedule that is practical for all stakeholders, including the contractor, designer, and owner. In addition, the Project Manager is responsible for maintaining a record of all meetings. Depending on the scope of the project, the project meeting record may take the form of meeting notes typed up by the Project Manager, or more formal meeting minutes composed and distributed by the General Contractor or Construction Manager.

08.01.03 COORDINATION OF SHUTDOWNS

When a construction or repair project requires the temporary shutdown of utilities, equipment or building systems, the Project Manager is responsible for coordinating the necessary shutdown with DUES, Facility Operations, and affected building occupants.

For safety reasons, Duke has strict policies governing who may conduct equipment and system shutdowns. Contractors and consultants are not permitted to operate steam or water valves, electrical panel disconnects, etc. without direct DUES or Facility Operations support. **Contractors who energize or de-energize Duke**

systems without direct DUES or Facility Operations support will be escorted off the campus and disqualified from performing future work at Duke.

The normal procedure for facilitating a shutdown is laid out below:

- 1. The contractor or consultant contacts the Project Manager to request a shutdown. In order to minimize operational disruption, contractors and consultants are required to request shutdowns at least two weeks in advance of the needed shutdown.
- 2. The Project Manager obtains an estimate of the duration and scope-of-impact from the contractor or consultant who requested the shutdown.
- 3. The Project Manager contacts all Facility Coordinators, Building Managers, and/or departmental contacts who oversee operations in the building(s) or area(s) that will be affected. The PM communicates the estimated timing, duration and scope-of-impact to this group of stakeholders. The PM and stakeholders discuss possible "windows of opportunity" for conducting the required shutdown, as well as any temporary services that will be required. The PM, in consultation with stakeholders, defines a preferred timeframe for the shutdown, along with at least one alternate timeframe.
- 4. The Project Manager confirms that the contractor or consultant is able to conduct the shutdown during the preferred timeframe.
- 5. The Project Manager confirms the availability of any temporary services or special accommodations required (for example, temporary outdoor lighting, or temporary workspace for faculty).
- 6. The Project Manager contacts DUES or Facility Operations at least one week in advance of the planned shutdown. The PM confirms, via telephone or email, that the required DUES or Facility Operations personnel are available to conduct the shutdown within the preferred timeframe. If support is unavailable during the preferred or alternate timeframes, the PM returns to the stakeholder group (in step 2) to discuss other alternative dates and times.
- 7. If the required Duke support is available, the PM then submits a Utility Shutdown Request to DUES, and submits a Work Request using EAM. *See Forms for Project Managers: Utility Shutdown Request.*
- 8. The Project Manager communicates the confirmed shutdown timeframe to the contractor or consultant. The PM facilitates any necessary communication between the contractor and Duke support personnel.
- 9. As soon as the availability of DUES or Facility Operations support has been confirmed, and the shutdown schedule has been finalized, the Project Manager is responsible for issuing an Alert Notice to announce the scheduled shutdown to building occupants who may be impacted. The Project Manager fills out the Alert Notice form, and sends it to Facility Operations; the Facility Operations Customer Service Center distributes the Alert Notice to the Facility Coordinators, Building Managers, and/or departmental contacts who oversee operations in the impacted buildings. Alert Notices must be submitted at least three business days prior to the scheduled shutdown. *See Forms for Project Managers: Alert Notice*.
- 10. The Project Manager supports the shutdown by following up to ensure that all work is completed and operations are not disrupted beyond the planned timeframe.

08.01.04 RISK MITIGATION

Duke FMD administers a Risk Mitigation process that is designed to prevent damage to utilities, buildings, paving, landscaping, and other physical assets during construction and maintenance tasks. Before engaging in any activity that has the potential to damage campus infrastructure, contractors are required to present the proposed work and associated risk mitigation strategies to the Risk Mitigation Committee, at the direction of the Project Manager.

Examples of contractor activities which require risk mitigation include, but are not limited to:

- 1. Excavation of any kind
- 2. Crane setup
- 3. Stockpiling of materials
- 4. Demolition of existing structures
- 3. Any activity that applies higher-than-normal loads to paved or unpaved areas
- 6. Any work performed within a "high risk area" as defined by FMD

See the FMD website or consult DUES to determine whether the planned work is in a "high risk area."

The procedure for risk mitigation is as follows:

- 1. The Project Manager or General Contractor identifies a potential risk requiring mitigation.
- 2. The Project Manager contacts the Risk Mitigation Committee directly, or through the DUES Representative assigned to the project. The Project Manager requests that the project be added to the Risk Mitigation agenda at least two weeks before the planned date of the work in question.
- 3. The Project Manager assists the General Contractor in completing the Risk Mitigation Plan form.
- 4. The Project Manager and the General Contractor submit the Risk Mitigation form and sketches, drawings, or other materials to explain:
 - A. Scope of the planned work
 - B. Anticipated risks that might arise from the planned work
 - C. Planned measures to mitigate all anticipated risks
- 5. The Project Manager and the General Contractor attend the Risk Mitigation Committee meeting as scheduled in step 2 above. The General Contractor explains his/her risk mitigation plan.
- 6. The Risk Mitigation Committee responds to the proposed Risk Mitigation Plan. Valid responses include: acceptance, conditional/partial acceptance, rejection, or a request for additional information.

7. The Project Manager and the General Contractor follow up based on the outcome of step 6 above. When the Risk Mitigation Committee has granted acceptance of the Risk Mitigation Plan, work may proceed.

See Forms for Project Managers: Risk Mitigation Plan.

STOP WORK ORDERS 08.01.05

When an unsafe condition exists on-site that presents an imminent hazard to personnel, university, or city infrastructure, contractors may be ordered to stop work immediately until the condition is corrected. Contractors must comply with such "stop work" orders, and must immediately report the nature of the "stop work" order, and the name of the person issuing the order, to the Duke Project Manager. Only the following Duke personnel are authorized to issue "stop work" orders:

- 1. The Duke Project Manager responsible for the job
- 2. Duke DUES personnel
- The Directors of OPM, DUES, Facility Operations, and Grounds 3.
- 4. Personnel so authorized by the City of Durham, NC DENR, or other regulatory agencies with jurisdiction over the project

08.01.06 **MONTHLY REPORTS**

On Tier III Capital Projects (and other projects as requested by OPM), the contractor is required to submit monthly reports to the Project Manager. The Project Manager will make the contractor's monthly report available to DUES and Facility Operations for internal review. The contractor's monthly report should include the following information:

- 1. Executive summary
- 2. Items completed by month
- 3. Submittal log
- 4. Request for Information (RFI) log
- 5. Change Order (CO) log
- 6. Schedule update, including a variance report
- 7. Budget summary
- 8. Project photos

08.01.07 **INTERNAL REPORTING**

On all Tier 3 Capital Projects, the Project Manager is responsible for compiling monthly reports in order to keep Duke senior leadership apprised of progress. These internal reports contain summaries of the project's

PROJECT DELIVERY GUIDE

financial status, schedule, safety, communications, quality, workmanship, LEED certification status (if applicable), key processes, project photographs, and references.

08.01.08 ESCALATION PROCESS

The Office of Project Management has established the procedures to govern the escalation of the decisionmaking process during design and construction. The decision escalation process is outlined in Figure 08.01.06.01, on the following page.

The escalation process is used to build consensus and for resolution of issues including:

- 1. Selection of architectural and engineering teams
- 2. Selection of commissioning agent
- 3. Project scope definition
- 4. Sustainability targets
- 5. Building MEP systems selection
- 6. Plan review comments and responses
- 7. Exceptions to the standards set forth in the Construction Standards
- 8. Project change orders altering the original scope
- 9. Project budget and contingency management
- 10. Resolution of issues that arise during construction, in the field
- 11. Turnover and acceptance issues
- 12. Escalation must occur in a timely manner to allow for resolution and incorporation into project at current phase



Figure 08.01.06.01: The FMD decision escalation process.

08.02.00 MANAGING THE PROJECT SCHEDULE

The Project Manager must review and coordinate the project schedule with the contractor and owner to meet project scheduling goals and constraints. The Project Manager is responsible for notifying the owner, the Director of OPM and the Director of Facility Operations immediately whenever unforeseen events impact the project schedule. When project delays impact the owner's operational plans, it is the Project Manager's responsibility to pursue all available options to recover lost time and minimize the impact of delays.

08.03.00 MANAGING THE PROJECT BUDGET

The Project Manager is responsible for creating, maintaining, reporting and enforcing the project budget. The Project Manager must update and report to the Director of OPM the evolving status of the project budget during construction to ensure that the project comes in at or under the projected budget.

08.03.01 PAYMENT APPLICATIONS

Contractors and designers should submit monthly pay applications to the Project Manager for approval and release for payment. The contractor must have the designer review, certify and sign his payment application prior to submission to the Project Manager. The Project Manager checks the payment application for accuracy, and then submits the signed application to the Director of OPM for authorization. *See Forms for Consultants and Contractors: Contractor's Pay Application*.

08.03.02 PAYMENT INQUIRIES

The Project Manager can inquire as to the status of payments using the SAP instructions. See Instructions for Project Managers: Instructions: How to Check the Status of Pay Orders and Payments.

08.03.03 CHANGE ORDERS

When unforeseen conditions or approved scope modifications result in changes to the value of the construction contract, the contractor must submit a written request for a Change Order (CO) to the designer and the Project Manager. The designer and Project Manager must both review the request to verify that the request is valid and the value and terms of the proposed CO conforms with allowable markups as established in the construction contract. After the designer and the Project Manager have approved the CO, the Project Manager will submit the request to the Director of OPM for authorization. *See Forms for Contractors and Consultants: Contractor's Change Order, and Pending Change Order Log.*

Additionally, any Change Order which will result in unanticipated impacts to utilities, building systems, or other university infrastructure must be documented via revision of Section IX of the CPRF. The Project Manager must submit a revised Section IX for review and approval by the Project Steering Team.

08.03.04 CONTINGENCY MANAGEMENT

The project budget includes a line item for owner contingency. The Project Manager is responsible for overseeing and distributing these funds to cover cost overruns related to unforeseen conditions. Contingency should not be expended for scope additions requested by the owner, or for items that result from contractor or designer negligence.

If the owner requests scope changes, the Project Manager must report these requests to the Director of OPM. Pending internal FMD approval, the Project Manager may then submit paperwork requesting additional approved funds via a "scope modification" CPRF.

When an item is funded from owner contingency, the Project Manager is responsible for updating the project budget and Cost-to-Complete report to show the actual cost allocated and the reduction in owner contingency. *See Forms for Project Managers: Project Budget Cost to Complete (CTC), and Contingency Update.*

08.03.05 COST AT COMPLETION/COST-TO-COMPLETE

Throughout the project, the Project Manager must maintain and update the Cost-to-Complete spreadsheet to accurately track the actual project cost against the approved project budget. This includes documenting all changes in scope and allocation of owner contingency. At close-out, the Cost-to-Complete spreadsheet forms the basis of the final Cost at Completion. *See Forms for Project Managers: Project Budget Cost to Complete (CTC)*.

08.03.06 INVOICING

The Project Manager must receive and review all design and construction invoices prior to processing for payment. The Project Manager submits the approved invoice for payment to Business Services via the Assistant to the Director of OPM. The submission must include the fund code and the contract number, and the Project Manager must verify via SAP that adequate funds are available to pay the invoice.

Final payments require sign-off by the Director of Duke Utilities and Engineering Services (DUES), the Director of Facility Operations, and the Director of the Office of Project Management (OPM).

08.04.00 SELECTING CONSULTANTS AND CONTRACTORS

The Office of Project Management is responsible for the selection of qualified Consultants and contractors to execute projects at Duke. The selection of consultants and contractors is subject to the approval of the Director of OPM.

In order to evaluate prospective outside service providers, the Office of Project Management may issue a Request for Qualifications (RFQ) to a group of preselected consultants and contractors, followed by a Request for Proposal (RFP) to the most qualified service provider(s).

08.04.01 REQUEST FOR QUALIFICATIONS (RFQ)

When considering consultants, contractors or vendors for a project, it is often appropriate for the Project Manager to solicit, from each prospective service provider under consideration, a summary of qualifications. The Project Manager requests this information by issuing a Request for Qualifications (RFQ). The project team then receives and reviews responses to the RFQ (Statements of Qualifications) in order to aid in the selection of the most qualified contractor or vendor. *See Forms for Project Managers: Request for Qualifications (RFQ)*.

08.04.02 REQUEST FOR PROPOSAL (RFP)

Once consultants, contractors or vendors have been deemed qualified to submit a proposal, the Project Manager may issue a Request for Proposal in order to obtain a detailed proposal, including accurate design fee proposals and construction pricing. *See Forms for Project Managers: Request for Proposal (RFQ)*.

08.05.00 ESTABLISHING PROFESSIONAL SERVICES AGREEMENTS & CONTRACTS

Throughout design and construction, the Project Manager is responsible for reviewing the consultant or contractor's proposal and subsequently requesting a contract from the Director of OPM via the Contract Administrator. Examples of types of contract include: lump sum, stipulated Sum, cost plus a fee. Once the terms of the contract have been successfully negotiated between OPM and the consultant or contractor, the appropriate request form must be completed by the Project Manager. **08.05.01 PROFESSIONAL SERVICES AGREEMENT**

For contracts with designers or consultants, use the Professional Services Agreement form. See Forms for Project Managers: Professional Services Agreement.

08.05.02 CONSTRUCTION CONTRACT

For construction contracts, use the Request for Construction Contract form. See Forms for Project Managers: Request for Construction Contract.

08.05.03 DOCUMENTATION REQUIRED TO ESTABLISH A PSA OR CONTRACT

After completion of the appropriate form, the Project Manager must submit it to the Contract Administrator along with the following:

- 1. Copy of the executed CPRF
- 2. Copy of the SAP budget worksheet
- 3. Copy of the proposal from the consultant or contractor

08.05.04 PURCHASE ORDER

The Project Manager is responsible for requesting purchase orders for goods and services by submitting a Purchase Order Requisition to the Assistant to the Director of OPM. See Forms for Project Managers: Purchase Requisition & Goods Receipt.

The completed form should be accompanied by a copy of the proposal from the consultant or contractor.

08.06.00 INSURANCE

Designers and contractors employed by Duke are required to provide proof of insurance to the Project Manager for verification and documentation by the Assistant to the Director of OPM.

08.07.00 SAFETY

Duke FMD recognizes that a safe work environment is essential to the health and wellbeing of all employees, students, faculty, visitors and contractors. Safety is at the top of FMD's 10 Strategic Initiatives, and the FMD goal is 100% productivity through *zero* accidents and injuries, and compliance with all Environmental Health and Safety (EHS) and FMD Safety program and requirements.

Through programs, audits and training, Duke's goal is to communicate that Safety is Job #1.

Project Managers must verify that the contractor maintains and enforces a safety program that is in full compliance with all OSHA, Duke University and FMD requirements.

08.08.00 ADMINISTRATION OF FMD POLICIES AND STANDARDS

The current policies and standards related to project delivery at Duke may be found at any time on the FMD shared hard drive, organized by document title, in the following locations:

G:\Project Management\[PDG] PROJECT DELIVERY GUIDE\LIVE CONTENT

G:\Project Management\[DUCS] DUKE UNIVERSITY CONSTRUCTION STANDARDS\LIVE CONTENT

G:\Project Management\[CDG] CAMPUS DESIGN GUIDE\LIVE CONTENT

The content of these folders is "mirrored" in the FMD website, so that it can be easily accessed by outside service providers.

At any time, the file locations listed above will contain <u>only</u> the current, in-effect policies and standards of Duke University. These files may be edited <u>only</u> by the Policy Administrator, who reports to the Director of the Office of Project Management.

Project Delivery Guide, the Duke University Construction Standards, and the Campus Design Guide are periodically reviewed and revised by Duke FMD. During the course of project delivery, opportunities to improve the quality, serviceability, and efficiency of Duke's facilities frequently emerge. For this reason, FMD has established a procedure for any member of FMD to suggest revisions to Duke's official policies and standards related to construction. This procedure is outlined below.

- 1. Discuss the potential revision with your supervisor. Please do not submit revisions that you have not discussed with your supervisor.
- 2. Write up your proposed revision, save it (in .DOC format), and email it to the Policy Administrator. Contact the Office of Project Management for the name of the Policy Administrator.
- 3. The Policy Administrator will file your proposed revision in the appropriate "PENDING REVISIONS" folder on the FMD shared hard drive.
- 4. The Project Steering Team will review all proposed revisions twice per year during a special extended session of the normal biweekly PST meeting. Proposed revisions will be accepted, modified, or rejected.
- 5. After PST review, the Policy Administrator will "soft-launch" all accepted revisions by incorporating them into the active FMD policy documents located in the "LIVE CONTENT" folders listed above. The "PENDING REVISIONS" folder will be cleared.
- 6. All accepted revisions will be subject to a 30-day probationary review period, administered by the Policy Administrator, during with others within FMD will have the opportunity to comment on all revisions by sending their remarks to the Policy Administrator.
- 7. After the 30-day review period, the "soft launch" is complete and all revisions are final.
09 ADDITIONAL RESOURCES

ONLINE RESOURCES:

Facilities Management Department

Web: www.fmd.duke.edu

Duke University Construction Standards

Web: www.fmd.duke.edu/guidelines/design/index.php

Capital Budgets Office

Web: http://finance.duke.edu/budget/depts/capbud.php

CONTACTS:

FMD Customer Service Center (CSC)

Customer Service Center 114 S. Buchanan Blvd., Bay 1 Durham, NC 27708-0144 T: (919)-684-2122 Web: https://request.fmd.duke.edu/

FMD Document Archives:

Bay 2, Room 218 Smith Warehouse 114 S. Buchanan Blvd.

Durham, NC 27708-0144 T: (919) 660-4213

Adem Gusa

Assistant Director, Planning and Design Box 90144 114 S. Buchanan Blvd., Bay 4 Durham, NC 27708-0144 T: (919) 660-1483

Bryan Hooks

Director, Landscape Services Box 90152 Durham, NC 27708-0152 T: (919) 684-1877

Mark Hough, ASLA

Campus Landscape Architect 114 S. Buchanan Blvd. Box 90144 Durham, NC 27708-0144 T: (919) 684-3989 68

John Noonan Vice President for Facilities Box 90144 114 S. Buchanan Blvd., Bay 4 Durham, NC 27708-0144 T: (919) 684-4243

Paul Manning

Director, Office of Project Management Box 90144 114 S. Buchanan Blvd., Bay 4 Durham, NC 27708-0144 T: (919) 660-4221

Albert Scott Director, Housekeeping, Sanitation and Recycling, and Duke Marine Lab 114 S. Buchanan Blvd. Box 90144 Durham, NC 27708-0144 T: (919) 660-4222

Russell Thompson Director, Utilities and Engineering Services (DUES) 114 S. Buchanan Blvd. Box 90144 Durham, NC 27708-0144 T: (919) 660-4222

Thomas Trabert Director, Facility Operations 114 S. Buchanan Blvd. Box 90144 Durham, NC 27708-0144 T: (919) 684-4222