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Construction Policies & Procedures

Northeastern University Guidelines for Capital Project Design & Implementation

1.0 ABOUT THE NU GUIDELINES

This document is intended to describe in a comprehensive manner the guidelines pertaining to implementation of the university's capital program. The NU project team is responsible for confirming with consultants how much each project can best meet these guidelines. The Guidelines are intended as a reference document only and are not a contract document between the university and any consultant.

1.1 TERMS AND DEFINITIONS

A / E Consultant (consultant): Consultant shall refer to any architect, engineer, designer, landscape architect, provider of professional services, contractor and vendor that is engaged by and contracted with the university to provide professional services related to the scope of university facilities design and construction and / or purchasing of goods and services for the improvement of university facilities.

As-Built - Drawings are prepared at the end of a construction project by the contractor. They show, in red ink, on-site changes to the original construction documents. These drawings are coordinated with changes made throughout the construction process under direction from the design consultants and NU PM.

Basis of Design: A product or process identified to provide a level of quality, performance, assembly, design expectations, and operational requirements expected

for the particular use described therein. Such items shall be considered and alternates provided on a case by case basis by each project's university Project Manager.

Building Information Modeling (BIM): An intelligent computerized 3-D model-based process that provides insight on integration of building systems during planning and, design for the benefit of construction and management of buildings and infrastructure.

Computer Aided Design and Drafting (CADD): Software developed to improve the productivity of the designer, the quality of the design, and the levels of communication throughout a building project through better illustrated documentation.

Contracted Milestones (milestones): Agreed upon dates or points within the design and construction process at which the consultant must deliver progress or completed documentation of the project to the NU Project Manager, Planner or other identified NU staff. These milestones, as well as project schedule and dates, will be defined and agreed upon in each consultant's binding legal contract with the university. The list below is an example of typical milestones for NU projects.

<i>Phase</i>	<i>% of Project Completion</i>
<i>Concept Design / Programming</i>	15%
<i>Schematic Design</i>	30%
<i>Design Development</i>	60%
<i>Construction Documents</i>	90%
<i>Bid Set</i>	
<i>Permit Set</i>	
<i>Final Documents</i>	100%
<i>Construction Administration</i>	
<i>Building Commissioning</i>	
<i>Final Close-out</i>	

Deliverable(s): Any reports, studies, analyses, drawings, and specifications submitted to the university at contracted milestones throughout the design and construction process.

Documents: Contract Documents including all drawings and specifications provided during all project phases for design and construction projects. This includes contract bid documents used for construction pricing and build-out.

Furniture Fixtures and Equipment (FF&E): Movable furniture, fixtures, or other equipment that have no permanent connection to the structure of a building or utilities.

Information Technology Services (ITS): Northeastern University department that is the central provider of technology infrastructure, services, and applications for more than 30,000 students, faculty, and staff at Northeastern University.

Integrated Design: Collaborative process involving all disciplines and project team members from the start of the project to examine the project within its entirety, producing a more efficient end product to fulfill the required program. This design approach examines the interaction of all building systems with the goal of producing a sustainably responsible facility.

Life-Cycle Cost Analysis: Analysis method that estimates overall costs and performance of project systems alternatives with the goal of selecting the design that

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provides the lowest cost of ownership that meets the proposed program. A Life-Cycle Cost Analysis is to be performed in accordance with the project goals outlined within the Guidelines.

Memorandum of Understanding (MOU): A signed agreement between two entities for a specific course of action. NU utilizes the MOU agreement internally between a particular university department and the office of Campus Planning and Development to agree upon program and an estimated budget in order for projects to proceed.

NU: Northeastern University

Planner: Northeastern University Capital Planning and Development Project Planner

PM: Northeastern University Facilities Design and Construction Project Manager

Record Drawings: Record drawings are prepared by the architect and reflect on-site changes the contractor noted in the as-built drawings. They are often compiled as a set of on-site changes made for the owner per the owner / architect contract.

Reflected Ceiling Plan (RCP): Type of documentation used to convey messaging about equipment and fixtures located within the ceiling of a building that are visible from the floor of that building.

Request For Information (RFI): A standard business acronym for the process of requesting additional information in a documented and legally binding form. In the construction industry, said request is initiated by the contractor to the design consultant during construction administration.

University: Northeastern University

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1.2 DOCUMENTS

- ▶ Documents shall include drawings and specifications and shall conform to the most recent version of AutoCAD or Revit as required.
- ▶ Construction documents shall conform with NU drafting and graphics standards, currently the [*National CAD Standards - V6*](#).
- ▶ All project specifications shall be provided in PDF format (preferred) or the most current version of Microsoft Word format.
- ▶ Contract bid documents are to be dated with the actual date of final submission incorporating the review comments by the Project Team and Stakeholders.
- ▶ *e-Builder* software is used for all project document management. A formal document structure must be adhered to. Facilities Project manager will provide all project consultants with user credentials and training on e-Builder system. More detailed information can be found here: [*Facilities Division - Project Controls*](#)
- ▶ Contract Documents shall follow conventional organizational standards and be organized by discipline in a manner where, if necessary for project phasing, the project may be bid or constructed in multiple packages.

1.3 PROCESSES AND PROCEDURES

This Guideline is not intended to stifle creativity but rather create a framework in which each university project is delivered. The sections below outline multiple factors that are considered essential to the process and deliverables expected by the university at each contracted project milestone. This list is organized by the suggested project phases outlined in the terms and definitions above. These are minimal project expectations.

Each consultant shall examine their contracted project as they see fit to meet the program and budgetary needs of the specific project. A complete outline of the consultant project approach and involvement shall be determined with the university Project Manager as part of project kick-off.

1.3.1 Concept Design / Programming

- ▶ Kick-off and Program review session with NU Planner, PM, and project team.
- ▶ Acknowledgment of review of and intent to comply with all university Guidelines, including Design Guidelines for Capital Project Design and Implementation, Sustainability Guidelines, Engineering and Systems Design Guidelines, Campus Master Plan, and other university standards as provided with signed NU contract.
- ▶ Establish schedule of project status updates from consultant team to NU PM to maintain expected budget and schedule as project progresses. This schedule may be appropriate through all phases of project implementation or may be re-evaluated with each milestone phase.
- ▶ Meetings / Charrettes with NU end users such as appropriate NU academic departments, faculty and staff and other project stakeholders. Number of meetings to be determined on a case by case basis.
- ▶ Meetings with appropriate jurisdictional agencies to ensure full cooperation / compliance with appropriate community plans and applicable codes. Involve NU PM as required.
- ▶ Support NU Campus Planning and Development requirements for materials for the project MOU documentation.
- ▶ Meet with university Facilities Operations Departments to understand university utility demands and constraints as well as systems integration throughout the campus.
- ▶ Meet with university Facilities Operations Departments to understand long term maintenance and operations goals. This shall include a lessons learned exchange of information.
- ▶ Meet with NUPD for expectations of project security systems and site related design to ensure easy access for NUPD and maximize ability to keep faculty and students safe in and around campus facilities.
- ▶ Determine level of support expected to assist NU with marketing, community

outreach, or fundraising materials such as renderings, electronic or printed materials, and physical presence of consultant team at events to ensure project support and funding.

- ▶ LEED Certification determination. This discussion shall include initial reactions, assumptions, intention of whether the proposed program shall be able to meet with the NU expectation that all projects be LEED Platinum Certified whenever possible. (LEED Gold minimum)
- ▶ Meet with and engage NU Commissioning Manager, as coordinated by the PM, to determine commissioning goals and process.
- ▶ Deliverable reports / drawings / specifications during this phase to include the following, as applicable:
 - » *Budget assessment and project cost estimate based on reviewed and agreed upon programmatic expectations.*
 - » *Accessibility analysis of proposed project, especially if renovating an existing facility. Ensure compliance with current code requirements or confirm and provide approved waiver of code due to age or function of project.*
 - » *Site analysis showing project integration with campus master plan, environmental benefits and improvements. Include analysis of ability to service project as required for trash collection and pick-up, loading and deliveries, fire department and emergency vehicle access.*
 - » *Site analysis in relation to planning and zoning requirements of site relating to campus master plan and City of Boston, Boston Redevelopment Authority and other governing agency regulations.*
 - » *Traffic impact study for project implementation and construction as well as final conditions of project. This shall include a parking study and analysis as well as documentation that the project complies with safe accessibility to multiple modes of public transportation available nearby.*
 - » *Life safety analysis of initial concept design.*
 - » *Sustainability Goals analysis shall include integrated project design intent with decision to pursue selection of particular building systems for further analysis as project design progresses.*
 - » *Life Cycle Cost Analysis expectations based on selection of particular building systems for further analysis as project design progresses. This information to inform initial cost estimates.*
 - » *LEED Certification and scorecard analysis based on the expectation of project to meet LEED criteria.*
 - » *Deliverable and design review presentation of conceptual project plans, elevations, sections, models, renderings, and other visual and graphic materials for review by NU Project Team and project stakeholders to determine course and expectations for project progression.*

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- » *Final Deliverable of outline specifications if available.*
- » *Final Deliverable of concept design reports summarizing findings from meetings to date as acceptance of project decisions to date.*

1.3.2 Schematic Design (SD)

- ▶ Continue meetings with project stakeholders to ensure programmatic needs are integrated into final design.
- ▶ Perform detailed check on project program and projected costs in compliance with the expectations outlined in the MOU.
- ▶ Begin integration of NU CADD and BIM standards in document development.
- ▶ Begin in-depth review of site analysis for site work and site testing as it pertains to existing site surveys and newly commissioned surveys, geotechnical surveys and testing, site utilities, and other conditions that may have impact on the project.
- ▶ Begin in-depth review of engineering systems requirements to ensure compliance with NU standards and with sustainability goals located here: [*NU MEP Design Standards*](#)
- ▶ Refine diagrams and other analysis materials from concept design to develop actual floor plans and drawings for final construction documents.
- ▶ Meet with and engage NU Commissioning Manager, as coordinated by the PM, to determine commissioning goals and process.
- ▶ Begin development of interior design schemes and materials to better inform the cost estimate. This includes initial discussions with end-users for preferences and expectations.
- ▶ Engage end users and stakeholders to determine needs and expectations for FF&E to ensure program functions at project completion.
- ▶ Engage NU ITS Department to [plan for the best way to integrate AV technology, data cabling, ceilings, infrastructure etc. Evaluate requirements shared by ITS in coordination with space program and budget.](#)
- ▶ [Engage the Northeastern University Police Department \(NUPD\) to coordinate technology and security requirements.](#)
- ▶ Continue development of sustainable design elements to meet expectations and comply with NU guidelines.
- ▶ Develop preliminary Commissioning Plan for project completion.
- ▶ Schematic Design documents to include but not be limited to:
 - » *Code Analysis*
 - » *Civil Site Plans*
 - » *Architectural Site Plans*

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- » *Floor Plans*
- » *Elevations*
- » *Vertical Building Sections*
- » *Illustrative views, models, etc. as required to convey design progress*
- » *LEED Scorecard to reflect current project assumptions*
- » *Revised project schedule*
- » *Phasing and implementation analysis*

1.3.3 Design Development (DD)

- ▶ Continue review of project scope and program with consultant, NU PM, and project stake holders.
- ▶ Perform detailed check on project program and projected costs in compliance with the expectations outlined in the MOU.
- ▶ Confirm that project schedule and budget are currently on-target.
- ▶ Revise and confirm code compliance with current design scheme and systems assumptions.
- ▶ Begin development of project signage and graphics. Ensure compliance with NU standards for use and placement of NU logo and other trademarks. NU branding guidelines are located here: [*Branding and Logo Guidelines*](#)
- ▶ Coordinate room numbering and naming with NU Project Manager, Campus Planning and Development, and Spatial Systems Manager for compliance with university space standards. Develop project schedules based on approved system for numbering and naming.
- ▶ Ensure that room names are easily identifiable and relate to specific program needs.
- ▶ Develop project phasing to determine any possible needs for development of separate bid packages in order to maintain schedule and compliance.
- ▶ Determine that design and phasing will minimize interruption to adjacent facilities and campus operations during implementation and construction.
- ▶ Determine schedule for submission of permit and other review processes by government agencies for all disciplines in order to ensure adherence to project schedule.
- ▶ Meet with and engage NU Commissioning Manager, as coordinated by the PM, to determine commissioning goals and process.
- ▶ Meet with NU EH&S, as coordinated by the PM, for expectations of project on environmental health and occupational safety controls to keep faculty, staff, and students safe from potential impact of project activities.
- ▶ Make final determination of building systems to perform updated Life Cycle

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Cost Analysis and move forward with project documents.

- ▶ Register Project for LEED Certification. Refer to Section 2.2 for NU LEED and Sustainable Design requirements and expectations.
- ▶ Continue development of landscape architecture or urban site design as integrated part of project design. Ensure compliance with water usage and stormwater management requirements (when applicable).
- ▶ Prior to proceeding with design ideas, give a Design Review Presentation to present current concepts and budget to the university.
- ▶ Determine final scheme for interior design components and general FF&E items to ensure timely integration into contract documents for updated cost estimate as part of DD submittal.
- ▶ Review all unreconciled budgetary items with NU PM.
- ▶ Determine criteria for approval to move project forward to construction document phase.
- ▶ Ensure timely review and response to comments received on DD package from NU PM.
- ▶ Design Development submittal materials to include but not be limited to:
 - » *Revised drawings including further development of documentation from all project team disciplines. Drawings to include a minimum of:*
 - *Architecture*
 - Floor Plans
 - RCP's
 - Life Safety Plans
 - Building Elevations
 - Building Sections
 - Finish Schedules
 - Door Schedules
 - *Structure*
 - Foundation Plans
 - Framing Plans
 - Typical Details
 - *Mechanical / Electrical / Plumbing / Fire Protection*
 - Mechanical Duct Layout
 - Large Scale Plans of Mechanical Rooms
 - Electrical Plans
 - Power
 - Lighting
 - Special Systems
 - One-line Diagrams
 - Plumbing / Fire Protection
 - Floor Plans
 - Riser Diagrams

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- *Civil*
 - Site Survey or Plat of Survey
 - Existing Conditions
 - Site Layout Plan
 - Utility Plan
 - Grading and Stormwater Drainage Plan
 - Stormwater Quality Basin Plan
 - Erosion Control Plan
 - *Landscape Architecture / Urban Design*
 - Landscape and Hardscape plans
 - Irrigation Plans
 - Landscape Details
- » *Revised specifications including all general conditions and up to date project systems and materials assumptions and selections.*
 - » *LEED Scorecard showing refined assumption of project's ability to meet expectations within current budget.*
 - » *Revised project schedule showing all submittal and review dates for all disciplines.*
 - » *Phasing plans as needed if determined that project will be implemented in multiple phases.*
 - » *Revised up to date cost estimate.*

1.3.4 Construction Documents (CD)

- ▶ Review document procedures and expectations with NU CADD Manager and Facilities Department to ensure compliance with naming conventions and layering and usefulness of submitted documents for building maintenance. The university utilizes the following CADD standard: [*National CAD Standards - V6*](#)
- ▶ Review any outstanding unreconciled budget items with NU PM.
- ▶ Hold final meetings with NU PM and all NU end-users and stakeholders to ensure program requirements are met.
- ▶ Integrate any final program requests and changes in a timely manner. Inform NU PM of impact to project budget and schedule.
- ▶ Determine actual needs and costs for any last minute or design impacting program changes.
- ▶ Perform detailed check on project program and projected costs in compliance with the expectations outlined in the MOU.
- ▶ Continue to assist NU with any presentation materials needed for project fundraising, marketing, and community awareness processes.
- ▶ Meet with and engage NU Commissioning Manager, as coordinated by the PM, to determine commissioning goals and process.

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- ▶ Prepare documents for all permitting submittals including all required NU and governmental applications as required.
- ▶ Establish level of support expected for consultant during bidding and permitting phases of final construction documents.
- ▶ Construction Document submittals during this phase may include but are not limited to:
 - » *90% or greater construction drawings and specifications.*
 - » *Revised LEED Scorecard and assumptions.*
 - » *Final report on integration and implementation of sustainable design strategies. Coordinate with NU PM and other staff to ensure compliance with all NU Sustainable Design Guidelines and Programs.*
 - » *Submit estimated construction schedule based on project assumptions.*
 - » *Submit revised cost estimate for comparison to proposed bids.*
- ▶ Bid Set
 - » *Consultant shall support NU PM during bidding process.*
 - » *Consultant shall attend any pre-bid conferences and respond as required to any requests for information during the bidding process.*
 - » *Consultant shall evaluate any proposed alternates and substitutions.*
 - » *Consultant shall attend all bid openings as required by the NU PM and shall assist with any bid evaluation and determination of final scope and implementation approach.*
- ▶ Construction Documents for Permit
 - » *Consultant shall manage any and all permitting and approval processes as necessary.*
 - » *Consultant shall perform due diligence and provide all necessary documentation required for permitting and approvals process.*
 - » *Consultant shall participate and manage process of response to permit review comments and resubmit as needed in coordination with NU and any selected construction professionals.*

1.3.5 Construction Administration

- ▶ Consultant shall attend any pre-construction meetings.
- ▶ Consultant and contractor to determine document review and submittal processes to ensure compliance with project schedule.
- ▶ Support and engage in discussions for construction innovation and opportunities or cost savings during implementation.
- ▶ Update and provide any and all supporting documentation for revised drawings, addenda, bulletins, etc. as well as develop conformed set of contract documents.
- ▶ Attend regular site meetings as established at beginning of project process or as required to meet established schedule.

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- ▶ Consultant shall provide NU PM with field reports and documentation on observations.
- ▶ Respond to RFIs and submittal reviews within a timely manner. Provide additional sketches as required.
- ▶ Review and coordinate with contractor's proposed changes, any change orders, and scope changes.
- ▶ Punch list preparation and inspection.
- ▶ Document project for substantial completion with NU PM and contractor.

1.3.6 Commissioning

- ▶ Support project or university selected commissioning agent.

1.3.7 Project Close-Out

- ▶ [For more in depth information, please refer to our NU Requirements for Project Close-Out Deliverables.](#)
- ▶ Review submitted Operations and Maintenance manuals for final training and submittal to NU Facilities.
- ▶ Provide final fire egress diagrams with appropriate display system as needed.
- ▶ Provide final sustainable design assessment, final LEED Scorecard and manage submittal process for LEED Certification.
- ▶ Provide NU with final as-built documents in required format in both print and electronic submittal.
- ▶ Schedule any photographic documentation of new projects prior to final occupancy of facility by student body.

1.4 NU Global Regional Graduate Campus Locations

- ▶ Respect and encourage the aesthetic and engineering design goals and implementation practices of the host communities for NU Global locations.
- ▶ Where no design requirements exist for NU Global Regional Graduate Campus locations, the goals and practices outlines within the NU Guidelines for Capital Project Design and Implementation as well as the University Guidelines of Sustainable Practices and Operations Guidelines shall provide the basis for design for all NU capital improvement and construction projects.