

# SECTION 06 SCHEMATIC DESIGN PHASE

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*Unless stated otherwise, the standards in this Facilities Design Manual (FDM) are directed to the Design Professional to incorporate into the Project.*

*Changes to this Division since the last issuance are indicated with **yellow highlighted text**.*

*Links to Support Documents, external webpages and other FDM sections are shown in underlined text.*

## 06.01 GENERAL

### A. REFERENCE ABBREVIATIONS

1. O-DP Sample Agreement Between Owner and Design Professional or executed Agreement

### B. AGREEMENT BASIS

1. This phase of the Capital Planning Process is based on the sample Agreement for Architectural projects.
2. In the Engineering project version, this phase is named the Study and Report Phase and requires different services and deliverables.
3. This phase is normally not included in the sample Agreement for Special Services projects.
4. For a brief description of the sample Agreements for Architectural, Engineering and Special Services projects and their differences, see paragraphs under subsection 00.02 in FDM Part 1/[Sec 00 Introduction.pdf](#).

### C. DESIGN PROFESSIONAL RESPONSIBILITIES

1. For responsibilities of the Design Professional, including those referenced under 06.01C, consult the sample Agreement for Architectural or Engineering projects at (<http://www.fpm.iastate.edu/planning/professionalconsultants/>) or, if the Project is active, the executed Agreement.
  - a. For general administrative responsibilities, see paragraphs under subsection 01.03 in FDM Part 1/[Sec 01 Working Relationships.pdf](#).
  - b. For general design phase responsibilities, see paragraphs under subsection 01.04 in FDM Part 1/[Sec 01 Working Relationships.pdf](#).
2. Create Schematic Design Concepts based on the approved Building Program and publish in Adobe Portable document format (PDF) to the Owner's project web site for review by the Owner's Representative and the Planning Committee.
  - a. The number of Schematic Design Concepts will vary with project complexity and with the level of experience of the Design Professional with the project type.
    - 1) Minimum number: 3
  - b. Develop Schematic Design Concepts until Building Program requirements are met and a Schematic Design Concept is selected.
  - c. For requirements of each concept, see subsection 06.02.
3. To become familiar with the process required to create Building Automation System specifications for the Project, review FDM Part 2/[Div 25 Building Automation](#). Consult with Owner's Representative and ISU Energy Management on project specific BAS requirements and process.
4. Create a report describing the final selected Schematic Design Concept and publish in Adobe PDF to the Owner's project web site for university approval following requirements in subsection 06.03.
5. Create and submit a summary booklet in hard copy of the final selected Schematic Design Concept for approval by the Board of Regents, State of Iowa, following requirements in subsection 06.04.
6. Publish interim documents in Adobe PDF to the Owner's project web site as needed or as requested by the Owner's Representative.
7. Communicate responses to review comments by the Owner using the Owner's Microsoft Excel template (see FDM Part 1/Support Docs/[Review Comments.xls](#)) published to the Design tab > Schematic Design > SD Review on the Owner's project web site.
  - a. In the XLS file(s), for each comment, enter a response in the yellow "Follow Up Comments" column that describes how the issue(s) will be addressed.
  - b. If there is not agreement by the Owner's Representative concerning how an issue will be addressed, work to attain a mutual resolution with the Owner's Representative.
    - 1) Record the revised follow up to the comment in the "Follow Up Comments" column.
  - c. Enter the follow up completion date in the yellow "Complete" column for each comment.

## D. OWNER RESPONSIBILITIES

1. For responsibilities of the Owner, including those referenced under 07.01D, consult the sample Agreement for Architectural or Engineering projects at (<http://www.fpm.iastate.edu/planning/professionalconsultants/>) or, if the Project is active, the executed Agreement.
  - a. For general administrative responsibilities, see paragraphs under subsection 01.05 in FDM Part 1/ [Sec 01 Working Relationships.pdf](#).
2. The Owner will furnish a certified site survey containing data requested by the Design Professional and approved by the Owner.

## 06.02 SUBMITTAL REQUIREMENTS FOR EACH CONCEPT

### A. DRAWINGS

1. Create simple electronic drawings, sketches and diagrams that show the Project's general form, scale, arrangement and relationship of functions and systems that appropriately respond to Building Program requirements.
  - a. Use of Google SketchUp is recommended.
2. Organize electronic drawings to print out on 8-1/2x11 and/or 11x17 sheet sizes.
3. Requirements for electronic sheets
  - a. Consistent drawing orientation and scale
    - 1) Normal minimum scale: 1/16" = 1' - 0"
    - 2) Site plan may be less than normal minimum scale.
  - b. Official Project Title (from the executed Agreement)
  - c. Submittal date
  - d. Design Professional's name
4. Required Drawing Types
  - a. 3D representation requirements
    - 1) Electronic model showing building character and relationship to site
    - 2) Perspective sketches in hard copy may be used to clarify design.
    - 3) Simple physical study models may be used to clarify design.
  - b. Site plan
    - 1) Show building orientation in context with programming requirements, climate factors, site conditions and surrounding area influences.
      - a) Show building and site response to sun angles, prevailing winds and 100 year precipitation.
      - b) Show site setbacks, grade changes and other site restrictions.
      - c) Show access to bicycle and vehicular parking areas and to building entrances and service areas from existing vehicular and pedestrian routes.
      - d) Show approximate connection locations to existing utilities.
      - e) Show major landscape and hardscape elements.
      - f) Show storm water run-off patterns and water retaining areas.
  - c. Building plans of all levels, including existing conditions if the Project is a renovation
    - 1) General requirements
      - a) Show 1 plan per sheet unless approved otherwise by the Owner's Representative.
      - b) Identify spaces with Program Numbers and Names.
      - c) Identify required non-programmed circulation, public and service spaces.

- d) Show major pieces of programmed furniture and other movable equipment.
- e) Note Gross Square Feet (GSF) for the Project on each sheet.
- 2) Show exterior envelope and interior construction.
- 3) Show conveying equipment.
- 4) Show special construction.
- d. Exterior Elevations
  - 1) Minimum number: 1 per building face
  - 2) Show exterior finish materials and colors.
- e. Interior Elevations of Major Spaces
  - 1) Minimum number: 2
  - 2) Show interior finish materials and colors.
- f. Building Sections
  - 1) Minimum number: 2
  - 2) Show interior finish materials and colors.
  - 3) Show major level changes.
  - 4) Show structural system materials.

**B. TABULATION OF AREAS**

1. Create a Microsoft Excel spreadsheet with the following information.
  - a. Spaces identified with Program Name, Number and programmed Net Assignable Square Feet (NASF)
  - b. Schematic Design NASF for each space and amount over or under programmed NASF
  - c. Gross Square Feet (GSF) per floor and total GSF for the Project
  - d. NASF-to-GSF ratio for the Project

**C. STATEMENT OF PROBABLE CONSTRUCTION COST**

1. Provide a Statement of Probable Construction Cost for each concept.
  - a. Show current total amounts and amounts for contingency.
  - b. Provide a multiplier that shows anticipated inflation to reflect conditions at time of bid.
  - c. If Owner employs an independent cost consultant, review and, if applicable, provide a written exception to any part of the report produced by the independent cost consultant.

**06.03 SELECTED CONCEPT DOCUMENT REQUIREMENTS FOR UNIVERSITY REVIEW**

**A. GENERAL**

1. Create electronic documents for the Schematic Design Concept selected by the Planning Committee.
2. Discuss with narratives and graphics the design process and the reasoning behind the selected design.
3. Organize electronic drawings to print out on 8-1/2x11 and/or 11x17 sheet sizes.
4. For required narratives 06.03C7-17, discuss the considered and chosen systems and influencing factors.
  - a. When more than 1 system or material is being considered for an application, include a discussion of the criteria for selection within the narrative.

**B. INTRODUCTORY ORGANIZATION AND CONTENT**

1. Title Page
2. Table of Contents
3. List of Participants – a list of persons involved in the planning process, including members of the Planning Committee

### C. PROJECT DESIGN NARRATIVES

1. Project Design Statement – a summary of the major intent of the Project
2. Project Systems Coordination Narrative – a discussion of how the Project's various systems coordinate to optimize solutions to Building Program requirements
  - a. Discuss the anticipated systems to be commissioned if applicable.
3. Architectural Design Narrative – a discussion of the Design Professional's interpretation of the design criteria for the Project and steps that led to the final Schematic Design Concept
4. Existing Facility Narrative (if the Project is an addition or a remodel) – an assessment of the following existing building conditions that will impact the addition or remodel
  - a. Functional relationships
  - b. Accessibility
  - c. Structural and exterior envelope condition
  - d. Fire suppression and alarm systems
  - e. Environmental system performance
  - f. Utility availability and capacity
5. Project Demolition Narrative – a discussion of existing elements that will require demolition
6. Site Planning Narrative – a discussion of the site plan and influencing factors, including the following
  - a. University Master Plan (<http://www.fpm.iastate.edu/planning/masterplan/2000report.asp>)
  - b. Surrounding site context
  - c. Site historic ecosystem
  - d. Site surface and sub-surface features
  - e. Availability and location of utilities
  - f. Water control
  - g. If the Owner's Representative determines a National Pollutant Discharge Elimination System (NPDES) Construction Permit is required for the Project, include a discussion of pollution prevention solutions under consideration.
    - 1) See FDM Part 1/Support Docs/[ISU SOP For Development Of NPDES Construction Permits.pdf](#) and example details in FDM Part 1/Support Docs/[ISU NPDES Details 1-13.pdf](#).
7. Foundation and Structure
  - a. Compatibility with soil bearing conditions
  - b. Durability
  - c. Thermal, air barrier and moisture control systems
  - d. Vibration control (steel structural systems and vibration sensitive areas)
8. Exterior Wall
  - a. Aesthetics
  - b. Durability
  - c. Thermal, air barrier and moisture control systems
  - d. Openings
  - e. Resistance to invasion from animals, insects and plants
9. Roofing
  - a. Durability
  - b. Thermal, air barrier and moisture control systems
  - c. Color and appearance, if visible
  - d. Reflectivity Index

- e. Parapets, scuppers and roof edges
  - f. Drainage locations
  - g. Openings
10. Interior Construction Narrative
    - a. Partitions
    - b. Shafts
    - c. Finishes
    - d. Openings
  11. Special Construction Narrative
  12. Conveying Equipment Narrative
  13. Mechanical and Plumbing Systems Narrative
    - a. Heating, ventilation, air conditioning and refrigeration design criteria
    - b. Replacement, maintenance and clearance requirements
    - c. Indoor air quality criteria
    - d. Hydronic systems
    - e. Air handling and distribution systems
    - f. Supply and drain, waste & vent plumbing systems
    - g. Lab plumbing and piping systems
    - h. Roof drainage systems
  14. Building Automation Systems Narrative
  15. Electrical Systems Narrative
    - a. Power and emergency power requirements
    - b. Lighting fixture types
    - c. Location and maintenance issues
    - d. Integration with natural lighting
  16. Life Safety and Security/Access Systems Narrative
  17. Voice, Data and Audio/Video Systems Narrative

#### **D. DRAWINGS**

1. Include drawings required in subsection 06.02A.
2. Add the following systems to existing drawings or to new drawings that match existing drawing format.
  - a. Foundation and structural systems
  - b. Roofing systems
  - c. Diagrammed mechanical and plumbing systems
  - d. Diagrammed power and lighting systems
  - e. Diagrammed life-safety and security/access systems
  - f. Diagrammed voice, data and audio/video systems

#### **E. OUTLINE SPECIFICATIONS**

1. Create an Outline Specification that includes preliminary selection of major building systems and construction materials.

#### **F. TABULATION OF AREAS**

1. Update the document required in subsection 06.02B.

## G. STATEMENT OF PROBABLE CONSTRUCTION COST

1. Update the document required in subsection 06.02C.

## H. OTHER DOCUMENTS

1. Design Standards Exception Narrative – a brief descriptions of concepts, methods or products that deviate from standards stated in this Facilities Design Manual
2. Project Schedule – a schedule that shows major milestones that meet Project phasing and completion requirements
3. State Building Code Bureau Narrative – a summary that shows compliance with major building code requirements
  - a. Consider this narrative the beginning of the State Building Code Bureau Analysis required in the Design Development Phase (<http://www.dps.state.ia.us/fm/building/index.shtml>).
  - b. Use as a tool to guide decisions on site design, construction type and exiting issues.
4. Life Cycle Cost Narrative – a summary that shows approximate costs for the anticipated life of the Project
  - a. Consider this narrative the beginning of the **Life Cycle Cost Analysis** required in the Design Development Phase.
    - 1) Include a matrix of 15 initial choices for analysis that include the following.
      - a) 3 alternatives for domestic hot water systems
      - b) 3 alternatives for lighting systems
      - c) 3 alternatives for HVAC systems in combination with 3 alternatives for building envelopes.
    - b. Use as a tool to guide design decisions on coordinating and optimizing building systems.
  5. Leadership in Energy and Environmental Design (LEED) Narrative – a summary that includes strategies intended to comply with current requirements for LEED New Construction (LEED-NC) Certification level or higher.
    - a. Consider this narrative the beginning of the LEED-NC Analysis required in the Design Development Phase.
    - b. Use as a tool to guide design decisions to provide the Owner with high performance building systems and reduced negative impact on the environment.
    - c. For a check list of LEED points required by the Owner, see FDM Part 1/Support Docs/[Minimum Required LEED Points for ISU New Construction Capital Building Projects.xls](#).

## 06.04 REVIEW AND APPROVAL PROCESS FOR SELECTED CONCEPT

### A. UNIVERSITY REVIEW

1. Publish the selected Schematic Design Documents in Adobe PDF to the Owner's project web site.
2. If published documents are considered by the Owner's Representative to be insufficiently complete for Owner review, revise and republish documents by a mutually agreed date and time at no additional cost to the Owner.
3. After acceptance by the Owner's Representative, submit to the Owner's Representative the following documents in the quantity defined in the table under paragraph 15.3.2 in the executed Agreement.
  - a. Drawings as required under 06.03D
  - b. Outline Specifications as required under 06.03E
4. Documents will be reviewed in detail by the following groups.
  - a. Planning Committee
  - b. Department representatives not on the Planning Committee
  - c. Department of Environmental Health and Safety
  - d. Facilities Planning and Management
  - e. Other administrative and academic personnel

5. During review, comments will be published in 1 or more Microsoft Excel (XLS) files to the Owner's project web site by the Owner's Representative.
  - a. Respond to comments using the process described in paragraphs under 06.01C7.

**B. BOARD OF REGENTS, STATE OF IOWA, REVIEW AND APPROVAL**

1. If the Project budget is \$2,000,000 or more for new building, major addition and renovation projects, prepare an 8-1/2x11 Schematic Design Booklet in hard copy for review and approval by the Board of Regents, State of Iowa.
  - a. Submit a draft booklet to the Owner's Representative for review and approval by the Board Office.
  - b. After a draft booklet has been approved by the Board Office, submit to the Owner's Representative the quantity of booklets defined in the table under paragraph 15.3.2 in the executed Agreement.
  - c. Comply with current booklet requirements of the Board of Regents, State of Iowa, located in FDM Part 1/Support Docs/[BOR State of Iowa Schematic Design Booklet.dot](#).

**C. UNIVERSITY APPROVAL**

1. After approval by the Board of Regents, State of Iowa, and after all review issues have been resolved, the Owner's Representative will provide written approval to proceed to Design Development Phase.
2. After approval, publish updated Schematic Design Documents in Adobe PDF to the Owner's project web site.

**END OF SECTION 06 SCHEMATIC DESIGN PHASE**