

CHAPTER 12 – DESIGN

1.0 General Information

1.1 The policies and procedures contained in this section are appropriate for most capital improvement projects designed by a project architect/engineer. The project architect/engineer shall comply with all policies and procedures consistent with the scope of services for the project as negotiated.

1.2 The following chronological outline is for the project architect/engineer to follow during the design phase of most capital improvement project. Not every item will apply to every capital improvement project and should be negotiated with the negotiating committee on unrestricted projects and with the agency on restricted projects.

- Review project program to verify construction budget and program requirements. Notify the project team when the estimated construction cost of the program requirements may exceed the agency's construction budget. When the project architect's or project engineer's construction estimate exceeds the agency's programmed construction budget approved at the initial fee negotiation, it is the responsibility of the agency to assist the firm in identifying options and means (including a decrease in scope, material selection, and/or alternates, etc.) to bring the firm's estimate within the programmed budget.
- Identify all proposed consultants, additional consultants and/or changed consultants for the state agency's and negotiating committee's approval.
- Attend all project meetings (including the Initial meeting) when scheduled by the project team.
- Ascertain pertinent information to aid owner/state agency and DFM planner in contracting for ancillary services such as the site survey, utility information and geotechnical investigation through DFM.
- Prior to the first review, establish schedule for the completion of preliminary design, construction documents and construction that is acceptable to the project team. Dates for all significant reviews should be included.
- Review and analyze all code requirements, standards and laws listed in the project architect's/engineer's contract which are applicable to the project. Develop a code footprint and provide for review and acceptance per chapter 7.
- During the design and prior to the preparation of contract documents, the project team, will determine if plans and specifications will be prepared and a single construction contract let for the project as a whole or **multiple construction contracts** independently let for various other phases of the project.
- Develop concepts and preliminary cost estimate for review, distribute documents and notify the agency to coordinate and schedule a review meeting with the project team.
- Prepare schematics for review, distribute documents and notify the agency to coordinate and schedule a review meeting with the project team.
- After approval of schematics, confirm the target date for design development submittal.
- Prepare design development documents for review, distribute documents and notify the agency to coordinate and schedule a review meeting with the project team.

2.0 Concept Design

2.1 The project architect/engineer shall involve all necessary consultants and develop at least three alternative solutions to the design of the capital improvement project. The alternative solutions shall (when applicable) be within the structure of the agency's program and shall address but not be limited to:

2.1.1 Approach to code compliance for life safety issues, per Chapter 7.

2.1.2 Accessibility compliance, per Chapter 7.

2.1.3 Site limitations, including utilities.

2.1.4 Building location on site.

2.1.5 Vehicular and pedestrian circulation.

2.1.6 Number of floors.

2.1.7 Arrangement of programmed spaces

2.1.8 Itemized inventory of programmed space, indicating surplus or deficiency.

2.2 Concept design submittal shall include the items listed below and shall follow the submittal and review procedures.

2.2.1 Compliance with applicable codes, standards and laws, per Chapter 7.

2.2.2 Site plans, which may be sketched.

2.2.3 Floor plans, which may be sketched but must include all programmed spaces.

2.2.4 Elevations, which may be sketched and need not show all sides of the building.

2.2.5 Written description of proposed mechanical and HVAC systems, principal components and special functional requirements.

2.2.5.1 Include concepts and studies of systems if required by the program or fee negotiations.

2.2.5.2 Include information indicating how Energy Code Compliance will be met (Section 5.0).

2.2.6 Cost estimate of each alternative approach.

2.2.7 LEED Plan, if applicable.

2.2.8 Special considerations.

3.0 Schematic Design

3.1 The schematic design submittal shall include the items listed below and shall follow the submittal and review procedures.

- 3.1.1 Code footprint per Chapter 7 and compliance with all other applicable codes, standards and laws, including accessibility.
- 3.1.2 Site plan showing the location of the building on the site, illustrating the practical use of the natural topography and indicating existing utility locations, service routes, drives, parking, pedestrian trafficways and expansion possibilities if required by the program.
- 3.1.3 Floor plans showing room arrangement, designation, size and changes in floor elevation.
- 3.1.4 Elevation sketches of the exterior indicating the general architectural character of the building.
- 3.1.5 As a minimum, single-line drawings showing mechanical, electrical and plumbing equipment locations, preliminary ductwork and proposed piping runs, routing of major utilities, i.e. sewer and water, and all other engineering elements required for coordination.
- 3.1.6 Compliance with applicable federal regulations due to a federal agency's involvement in the project.
- 3.1.7 Written statement giving the total gross area of the building and estimate of construction costs.
- 3.1.8 Special considerations

4.0 Design Development

- 4.1 The design development submittal shall include the items listed below and shall follow the submittal and review procedures. This submittal should demonstrate a complete understanding of the design requirements to the Owner and should identify items of particular interest to the Owner. Upon the approval of the design development submittal, a design freeze will occur. No significant changes will be made to the approved plans, unless approved by the negotiating committee.
 - 4.1.1 The Construction Document Checklist FPDC Form 223 located in the Appendix is to be used throughout the entire design and construction document phases of the project. It is intended to guide the design team to provide a complete set of construction documents.
 - 4.1.2 Code footprint per Chapter 7 and compliance with all other applicable codes, standards and laws, including accessibility.
 - 4.1.3 Site plan showing the location of the building on the site, illustrating the practical use of the natural topography, expansion possibilities if required by the program, utility locations and potential connections, and vehicle and pedestrian circulation including but not limited to streets, service drives, parking and sidewalks.
 - 4.1.4 Knowledge and indication of problems of rock excavation or controlled backfill.
 - 4.1.5 Floor plans showing room arrangement, overall dimensions of the building(s) and spaces room arrangement, door swings, casework, special equipment and features, furniture arrangement, designation, size and fixed equipment layout.
 - 4.1.6 Elevations showing all exterior wall surfaces.

- 4.1.7 Building sections including longitudinal and transverse sections showing major structural components.
- 4.1.8 Wall sections showing typical and special wall construction.
- 4.1.9 Special interior wall sections
- 4.1.10 Preliminary finish schedule.
- 4.1.11 Structural concept showing the location, type and tentative size of structural members.
- 4.1.12 Mechanical plans showing mechanical room layouts, locations of major equipment and preliminary two-line ductwork layouts. Mechanical room layouts must accommodate more than one manufacturer. Provide graphical indication of code required maintenance/access spaces.
- 4.1.13 Update the written description provided with the concept design to reflect any changes in the systems/equipment or approach to the design, including energy code compliance.
- 4.1.14 Provide a written description of the HVAC control systems with a general outline of function and sequence of operation.
- 4.1.15 Plumbing concept showing pipe chases and roof drainage system. Plumbing designs for laboratories or other special facilities, materials, and designs requiring pumping shall also be included.
- 4.1.16 Electrical concept showing the power source, service to the building, panel locations, types of fixtures, and the foot candle levels. Also included shall be primary and secondary voltages to be used and design criteria for unusual or special electrical requirements. Provide graphical indication of code required maintenance/access spaces.
- 4.1.17 Fire Alarm concept showing panel location(s) and a description of the system. Project architect/engineer to review minimum design requirements to be indicated on construction documents.
- 4.1.18 Fire Suppression concept showing the service entry including back flow preventor, the main drain/inspector test station and a description of the system. Project architect/engineer to review minimum design requirements to be indicated on construction documents.
- 4.1.19 Specifications outline shall include a brief yet concise description of all building systems including methods, materials and finishes. All building components shall be outlined in sufficient detail to afford judgment discussions concerning quality and performance. Include material cut sheets as required to convey a complete understanding of the materials used.
- 4.1.20 Compliance with applicable federal regulations due to a federal agency's involvement in the project.
- 4.1.21 Updated written statement giving the total gross area of the building and an estimate of all construction costs.
- 4.1.22 Rendering as described below or as otherwise negotiated.

5.0 Energy Code Compliance

- 5.1 On all new buildings or additions, a COMcheck report verifying compliance with the 2006 Edition of the International Energy Conservation Code (IECC) or ASHRAE 90.1-2007 shall be provided with the design development submittal. COMcheck is a free program provided by the US Department of Energy and can be downloaded from their website.
- 5.2 When the project is a renovation, retrofit or repair, the COMcheck report, or other specific information, verifying compliance with the 2006 Edition of the IECC or ASHRAE 90.1-2007 will only be required on systems or components being replaced or altered.

6.0 Rendering

- 6.1 If a rendering has been included in the firm's contract, the project team will determine when the rendering should be completed and the firm shall provide the following:
 - 6.1.1 A sketch of the proposed perspective for approval from the project team prior to beginning the rendering.
 - 6.1.2 Unless otherwise directed, computer generated renderings are standard. The agency will have approval on the media used to execute the rendering.
 - 6.1.3 Two renderings, one original and one full size, color copy, a minimum of 400 square inches without the matting.
 - 6.1.4 The building name, agency/institution for which the project is being designed, and the name of the project architect/engineer's firm.
 - 6.1.5 Both renderings shall both be framed with a metal frame, at least a 2" matt on all four sides, and have a wire on the back for hanging.
 - 6.1.6 Two color photocopies of the original rendering reduced to half size.

END OF CHAPTER 12