Chapter 5
DESIGN DEVELOPMENT

501 - GENERAL

A. Based upon Schematic Design Documents reviewed and accepted by the University, prepare Design Development Documents which establish and describe the size, scope, character, material composition, systems, sequence of operation/control and other features of the Project. These Documents shall include the Technical Specifications and recommendations for project-specific supplemental conditions for the State Procurement and General Contract Conditions.

B. The Consultant shall submit a Design Development Design Analysis Report as defined in Chapter 3.

C. The Consultant shall meet with the Project Manager before proceeding with Design Development to review the applicable submittal requirements.

D. The Project Manager will arrange design charrettes and other meetings to assist the Consultant in meeting University planning, program, aesthetic and technical requirements. Participation by the Consultant and subconsultant design and project management staff is required.

502 - DESIGN DEVELOPMENT DRAWINGS

A. Design Development Drawings shall be developed in sufficient detail to define the location, character, material composition, scope and size of the Project; to identify potential problem areas associated with completing the Project and to describe proposed solutions to the problems. These Drawings shall provide overall dimensions, code-required dimensions and clearances, spot elevations and dimensions of existing and adjacent elements, and shall conform to the CSU Design and Construction Standards. The final Design Development Drawings for each discipline must be submitted in printed full size and half size sets, CAD files and PDF files. (Reference Chapter 25)

The DD submittal shall include plans as described in Chapters 13 through 24 and Chapter 29.

B. Drawings shall include building plans, enlarged partial plans, building sections, enlarged wall sections, exterior and interior details, reflected ceiling plans, elevations, parking plan, site plan, study perspectives and study models if required (non-returnable), showing all building spaces and relationships. The Drawings shall fully illustrate all constructed areas, space planning and component sizes, scope, systems, interfaces, spaces, functions, general materials and finishes.

C. The Consultant shall show bid alternates equal to 20% of the construction budget.

D. The Consultant shall prepare and submit one (1) set of presentation drawings and samples of material finishes and boards, which are non-returnable.

E. Civil Drawings: Grading, drainage, paving, fencing, and erosion control plans including existing contours, final contours, horizontal control coordinates, vertical elevations, horizontal and vertical clearances, storm sewer and water lines, drainage structures and details of special structures, power line, fiber and communication lines, natural gas and all other buried utilities.

F. Landscape Drawings: Plants, irrigation, flatwork, site appurtenances.

G. Demolition: Demolition documents identifying the extent of demolition required for construction to proceed, including all systems to be removed, capped and abandoned.

H. Envelope: The design and location of complete and functional enclosure of all building spaces.
I. Structural Drawings: Including but not limited to, foundations plans, caissons plans, excavation
details, nominal sizes, types and cross-sections of structural members and systems, critical structural
clearances, interfaces, modifications to the base building structural systems and details necessary to
define the structural system.

J. Systems Drawings: Defining mechanical and electrical systems, including but not limited to, HVAC,
plumbing, fuel systems, fire suppression, fire alarm, life safety, security, power, fiber optics,
communications, lighting, grounding, lightning protection systems and other special systems which
are appropriate for the Project.

K. Alternatives: Analyses of alternative building components and systems. The analyses shall include
comparisons of construction and life cycle costs, and operational and maintenance advantages and
disadvantages.

L. Signage: Plans, schedules and elevations of building signage, graphics and selective demolition.

M. Interface Drawings: Showing system and facility interfaces with related and adjacent projects.

N. Standard Drawings: Standard drawings, including but not limited to, those furnished by the University,
the Project Manager or the Consultant.

O. Art Program: Plans for incorporating the University's Art Program into the Project where applicable.
Consideration must be given to lighting, structural systems, power, fire suppression systems, finishes
and security. Consult the Project Manager regarding scope of art installation, if any, for the project.

503 - PRELIMINARY TECHNICAL SPECIFICATIONS

A. The Consultant shall prepare a complete set of Technical Specifications for each Project in a format
accepted by the Project Manager.

B. Division 00 Procurement: The State standard “front-end” documents, including but not limited to
procurement, bidding, general conditions of the contract, supplementary conditions and contract
forms will be furnished by the Project Manager and shall be reviewed by the Consultant, who shall
submit written comments to the Project Manager for fitting the front-end documents to the project.

C. The Consultant is responsible for Division 01 General Requirements. See the Technical Standards.

   CSU Facilities Management plans to develop a template Division 01 to assist future Consultants in
development of project-specific General Requirements specifications. The Consultant will review the
template and submit written comments to the Project Manager.

504 - DESIGN DEVELOPMENT DESIGN ANALYSIS REPORT:

A. See Chapter 3 for requirements.

B. Provide Energy and Mechanical Systems Design Criteria Summary as follows:

   ENERGY & MECHANICAL SYSTEMS DESIGN CRITERIA

   1. Project Information
      a. Date
      b. University Project No.
      c. Project Name
      d. Prepared by
2. Outside Design Conditions:
   a. Summer - Degree F dry bulb, degree F wet bulb, percent relative humidity
   b. Winter - Degree F dry bulb

3. Inside Design Condition for Each Zone:
   a. Summer - Degree F dry bulb, degree F wet bulb, percent relative humidity
   b. Winter - Degree F dry bulb

4. Supply Air Design Conditions: (List both cold & hot deck conditions if applicable)
   a. Summer - Degree F dry bulb, degree F wet bulb, percent relative humidity
   b. Winter - Degree F dry bulb

5. Air Change Rate Special Occupancies:
   a. Air Changes/Hour (ach) for outside air or mixed air
   b. Listing of areas with positive or negative pressures requirements

6. Filter Efficiency Each Occupancy:
   a. Percent efficiency using ASHRAE Standards for each occupancy

7. Building Air Systems:
   a. Supply Air
      i. Summer - Total Bldg cfm & cfm/sf
      ii. Winter - Total Bldg cfm & cfm/sf
   b. Laboratory - ach
      i. Fume Hoods
      ii. Biosafety Hoods
      iii. Luminar Flow Hoods
      iv. Storage Cabinets
   c. Animal Rooms - ach
   d. Outside Air
      i. Minimum Ventilation - Total Bldg cfm & cfm/sf
      ii. Minimum Ventilation - cfm/Person
   e. Economy Cycle – cfm
   f. Exhaust Air
      i. Minimum General - Total Bldg cfm
      ii. Toilet - Total Bldg cfm & ach
      iii. Economy Cycle - Total Bldg cfm
      iv. Fume Hoods - cfm per hood & Face Velocity at 12-inch Sash Height
      v. Total Number of hoods & Total Number of fans
   g. Special Systems - Stack heights, filters, design requirements

8. Control Description: Each of the following systems should have a sequence of operation description and a discussion of direct digital versus other control system.
   a. Air Systems
   b. Supply air (incl. hood make-up air)
   c. Return air
   d. Exhaust air
   e. Room Control or Building Pressure
   f. Steam and Condensate
   g. Hot Water heating (incl. reheat)
h. Domestic Hot Water
i. Chilled Water
j. Compressed Air
k. Special (compressed gases, glycol, brine, etc.)

9. Flow Rates or Demand at Design Conditions:
a. Steam - lb/H
b. Gas - cf/H
c. Electricity - KW
d. Chilled Water - gpm and tons, temperature supply/return
e. Hot Water Heat - gpm and Btuh, temperature supply/return
f. Humidification - lb/H
g. Distilled Water - Gals/H (Pure Water)
h. City Water - gpm (incl. dom. hot water)
i. Sanitary Waste - cf/sec
j. Store Waste - cf/sec
k. Acid Waste – gpm
l. Sump Pump – gpm
m. Sanitary Pump - gpm

10. Total HVAC System Loads:
a. Summer
   i. Transmission - Btuh Sensible
   ii. Solar - Btuh Sensible
   iii. Lights - Btuh Sensible
   iv. People - Btuh & N of People
   v. Equipment - Btuh
   vi. Infiltration - ach & Btuh
   vii. Ventilation - Btuh
   viii. Total Sensible - Btuh Total
   ix. Latent - Btuh Total
   x. Combined - Btuh

b. Winter
   i. Transmission - Btuh
   ii. Infiltration - ach & Btuh
   iii. Ventilation - Btuh
   iv. Total - Btuh

11. Equipment Output Capacity:
a. Cooling - Btuh or tons
b. Heating - Btuh

12. Annual Utility Consumption:
a. Steam - lb/year
b. Chilled Water - Ton Days/Y
c. Domestic Water - gals/Y
d. Gas - ccf/Y
e. Distilled Water - Gals/Y
f. Electricity - KWH/Y
   - KW Peak Demand

g. Energy - Total MBtu/sf-Y
   - HVAC MBtu/sf-Y
h. Lighting - MBtu/sf-Y

END OF CHAPTER 5