

CHAPTER 300 PROJECT DESIGN PHASES

SECTION 301 GENERAL

- A. Project design phases prescribed below are reflective of what would be a “typical” new project in a normal built environment. Public projects are not always typical or in a normal environment so there must be some consideration to adapt the specific submittal requirements to the project. For that reason, please contact SCO Review before proceeding to verify submittal requirements.

Note: Some review agencies listed in Chapter 200 may have different submittal requirements. The Designer should contact each agency for submittal requirements that may not be noted in Chapter 200.

- B. It is the Designer's responsibility to determine and show all work required to accurately bid and construct the project. The phrase "As Required" can be extremely problematic during bidding and construction because the Designer has not indicated work required or scope to bid. Likewise “cash allowances” for work not defined are not permitted in public work that requires all work to be bid.
- C. It is clearly stated in the contract documents that the Designer will determine condition/quality.
- D. Verbally describing requirements in the project manual and requiring the bidder to visit the site and inspect the conditions are not substitutes for graphic drawings detailing the work.
- E. The Designer should ensure that he has a copy of all SCO, and other regulatory agencies, procedural and technical guidelines including site investigations and existing conditions, prior to starting design work on the project.
- F. NOTE: **SCO Project ID#** MUST be on all documents and correspondence for prompt handling.
- G. NOTE: It is expected that the Designer has done a thorough job check and design team coordination of documents prior to each submittal. It is not the role of SCO to resolve all errors and omissions in the Designer’s work.
- H. If you have any questions regarding submittals, requirements or review issues, please contact the SCO Design Review Section.
- I. **An Integrated Design approach shall be utilized by the design and owner team. This approach should include team meetings early in the design process, which will better enable the team to provide the owner with a fully-integrated design of the most energy efficient and cost effective building. Refer to www.wbdg.org for more information on the Integrated Design approach.**
- J. **A checklist to assist design team with requirements of energy and water efficient buildings is available in the drop down menu under “Forms” on the State Construction website. (Sustainable Buildings Deliverables Checklist - GS 143-135.35 - .40)**

301.2 REVIEW TIMES

Senate Bill 914 (2002) revised [GS143-135.26\(2\)](#) directing the State Building Commission “To adopt rules for coordinating the plan review and approval for State Capital improvement and community college buildings---“. “The rules shall provide for a specific time frame for plan review and approval

and permit issuance by each agency, consistent with applicable laws.” The times were “to provide for expeditious review, approval and permitting” of those projects. Also the SBC was “To adopt rules exempting specified types of State capital improvement projects and community colleges---from plan review”. The SBC Subcommittee on the Review and Approval Process gathered data on the existing State processes and those of other states and submitted the following proposed rules.

- A. To provide for consistent, concurrent and expeditious reviews for State and community college capital improvement projects, the following review time frames shall apply to any State regulatory agency that reviews and approves or permits these projects, except where other applicable statutes may define other time frames. These times are calendar days from receipt of submittal until completion of the review for each stage of review required and are to be used by Owner/Designer in estimating project schedules.

The times are:

Advance Planning-----	15 days
Schematic Design -----	30 days
Design Development -----	30 days
Construction Documents---	60 days
Final Approval -----	15 days

- B. Meeting these timeframes will be contingent upon: (a) The Owner/Designer providing finished, complete submittals as defined by the State Construction Manual for each stage of design; (b) The project size and complexity being under \$40 million; (c) Review agency staffing being adequate to maintain these time frames during periods of heavy workload.
- C. Informal projects, under \$300,000, may be exempt from the State Construction Office plan review process at the discretion of the State Construction Office. Compliance with the following requirement and statutes is required: (Exempt from SCO review only. Not DoI review.)
 1. Owners shall submit a written application requesting exemption and shall include a description and value of the work and the name of the registered architect or engineer involved.
 2. Compliance with [GS133-1.1](#) (a) and (b) where plans and specifications for public projects shall be prepared by an architect or engineer, including inspection and providing a Certificate of Compliance to the State Building Code.
 3. Compliance with [GS133-1.1](#) (d) on projects where no architect or engineer is required the Owner shall obtain inspection(s) and a Certificate of Compliance with the State Building Code from the local building inspector for the trades involved. A copy of the certificate shall be provided to the State Construction Office for record file.

Note: Under [GS143-135.1](#) State owned facilities are only exempt from local building authority inspections or local codes when plans and specifications are approved by the Department of Administration for all state agencies or by the UNC system for its constituents and approved by the Department of Insurance .

301.3 PROFESSIONAL SEALS

- A. Professional seals identifying the “authors” and/or the “Designer of record” shall be affixed to all Drawings, Specifications and other technical submissions at all design phase submittals. No signature or date is required over the imprinted seals until final bid documents are printed for

release to bidders. Designers may stamp documents as “Review only”, “Not for Construction”, “Design Development” or any other statement accepted by their respective licensing boards. Do not stamp over the seal such that name and license number are obscured.

Note: SCO follows the NC architect and engineer licensing board rules and statutes explicitly as written. Pay particular attention to the use of “all”, “may”, and the definitions of “direct supervision”.

2 NCAC 02 .0206(a) (1) (A) (B) and (5) (A) and (c) (1-6) See [2005 SCO Conference presentation](#) on seals.

SECTION 302 COMBINED SUBMITTALS

Combining schematic and design development submittals (or starting with design development) is acceptable for specific project types and upon State Construction Office concurrence. Concurrence during design contract negotiations would be preferred. The following project types and scope would be representative of projects that may be acceptable as combined SD/DD submittal:

302.1 ARCHITECTURAL: Minor Renovations/Upfits, Small/Metal Buildings, Window Replacement, Roofing Repair/Replacement, Waterproofing, etc.

302.2 CIVIL/STRUCTURAL: Sitework/Utility Infrastructure, Repair/Renovation of Structural Elements, Grading, Paving, and on-grade parking, etc.

302.3 MECHANICAL: Mechanical Equipment Replacement, Fire Sprinkler Upgrade, Life Safety Code Renovations, Mechanical Systems Upfit/Retrofit, etc.

302.4 ELECTRICAL: Electrical Equipment Upgrades/Replacements, Fire Alarm Systems, Telecommunication Systems, Lighting Renovations, etc.

SECTION 303 [DESIGN GUIDELINES AND POLICIES](#)

The following guidelines and policies are intended to assist the Owner/Designer during the design process with the more common policies, regulations, statutes and issues that may impact the project. Many of these are derived from State and Federal laws, regulations and codes. But many are based on good industry standards, best design and construction practices as well as SCO’s considerable field experience and feedback on what works and what doesn’t. Guidelines are available on the SCO website. Not all material is currently available. *Items in italics are available.*

303.1 ARCHITECTURAL

- A. General Construction
- B. *Roofing Design Criteria – 1988*
- C. *LCCA – Building Components*
- D. *Asbestos Abatement Guidelines*

303.2 CIVIL/STRUCTURAL

- A. *Floodplain Compliance*
- B. *Site Grading & Preparation*
- C. *Special Inspections Guidelines*
- D. *Masonry Mortar Policy*
- E. *Criteria for Modular Buildings*
- F. *Metal Building Systems*

303.3 PLUMBING/MECHANICAL

- A. *Chiller LCCA Bidding*
- B. *Life Cycle Cost – HVAC/Plumbing*
- C. *Fire Protection (Dol)*

303.4 ELECTRICAL

- A. *SCO Electrical Guidelines*
- B. *Fire Alarm Guidelines (Dol)*
- C. *Data Communications*

303.5 GENERAL

- A. *Energy Perf. Modeling & Reporting*
- B. *Water Conservation*
- C. *Building Commissioning*
- D. *Building Performance Verification*

SECTION 304 GENERAL STATUTE - CHAPTER 133 – PUBLIC WORKS

This statute contains important requirements for Designers involved in public work. GS133-1 thru 4 is listed below with abbreviated text. These statutes are commented on most often in design review for compliance. The Designer should review the complete statute available on SCO website or the Legislature's website – www.ncleg.net.

Throughout the design process be especially mindful of the statutory requirements for specifications to be as competitive as possible in all public work. Although the "Owner" is not mentioned in these statutes, if Designers & design professionals are employed by the public entity, they may be subject to compliance as well.

GS133-1 states it is unlawful for Designers to specify products or materials in which they have a financial interest.

GS133-1.1 defines the dollar and scope limits that require architects and engineers to be used on public work. Also refers to requirement for seals on all documents.

GS133-2 states it is unlawful for Designers of public work to employ or allow any manufacturer or representative to write, plan or draw any part thereof.

GS133-3 Specifications shall be competitive by using performance specifications or specifying three (3) or more brand names. Owner preferred alternates are permitted and substitutions are allowed prior to bid with Designer approval or disapproval.

GS133-4 Any person, firm or corporation violating GS Chapter 133-3 shall be guilty of a Class 3 Misdemeanor - loss of license to practice profession for 1 year and subject to \$500 fine.

SECTION 305 PROGRAMMING AND ADVANCE PLANNING

The project scope, complexity and/or the Owner's need for clarification and definition of the program, budget, space needs, site considerations, etc., may necessitate or benefit from a pre-design or advance planning effort preferably before preparation of the OC-25 funding request. The contract may be a letter agreement or a limited scope design contract with one designer or different designers. This is also mentioned in Chapter 100 (109.4) for consideration during the designer selection process.

A programming and advance-planning document is cost effective for creating a realistic program and budget as an accurate basis for the project design phases. Typically for State projects, the Schematic Design phase has been lengthy in time and non-constructive due to "moving targets" for budgets programs and even sites. The planning document should expand and refine components of the OC-25 to define design goals and objectives realistically with the budget or to prepare a request for additional funds. Consensus in advance planning will facilitate better communications and understanding of the owner's needs and the designers' direction and goals for the project. A minimum document should establish the following

- A. Define all of the Project Budget components. (See Design Contract 113.4)
 1. Total Project Budget Funds less:
 2. Reserve funds* for furniture, equipment, utilities, landscaping, communications, special inspections, etc. (*Some of these items may not be in design/construction contracts)
 3. Owner Construction Contingency for change orders, testing, soils, survey.
 4. Design Fees for basic services, additional services - programming, CMR contract, models, presentations, etc.
 5. Construction Funds Available (CFA) is the remaining funds available to award a contract.
- B. Evaluate site(s) for regulatory constraints (zoning, use, etc.) physical characteristics, historic and environmental issues, subsurface investigations, flood plain, etc...
- C. Special requirements from the Owner guidelines for energy conservation, sustainable design and construction, life cycle cost evaluations, asbestos, etc.
- D. Provide a detailed space program to identify the primary users and spaces planned for the facility. The program will allow an early test of the project budget assumptions allowing adjustments to be made prior to starting the design phase. The space program should include individual room square footages, primary adjacencies and special requirements (MEP, equipment, structural loading, etc.).
- E. Establish a preliminary project schedule to identify milestone design and construction delivery dates. The schedule should include owner and regulatory reviews times and any special start or phasing requirements. Provide a master schedule if the outcome of this project is contingent upon the starting or completion of other related projects.
- F. Integrate Facilities Condition Assessment Program recommendations and Department of Insurance inspection reports for code compliance and life safety.
- G. **Advance Planning for Sustainable, Energy Efficient Buildings (GS 143-135.35 - .40) Programming Phase (Refer to Chapter 109.2A for applicability);**

1. All State projects that meet the limits stated above shall require that the Project Team identify the following items in the initial project phase:
 - a) Construction cost
 - b) Design fee
 - c) Commissioning cost
2. Designers shall submit written project criteria, design recommendations and rationale that led to their design recommendations to the SCO for the following programming phase design decisions:
 - a) Identify and review potential energy and water conservation strategies for the building type and location.
 - b) Evaluate building geometry, daylighting depth and site development implications for north and south exposure.
3. A checklist to assist design team with commissioning requirements of energy and water efficient buildings is available in the drop down menu under "Forms" on the State Construction website. (Sustainable, Energy Efficient Buildings, GS 143.135.35 - .40, Commissioning Guidelines)

SECTION 306 SCHEMATIC DESIGN PHASE

Note: See previous Section 302 about project types that may skip SD submittal and start with DD.

- A. The Designer shall consult with the Owner to review the program and establish or verify the project scope and budget requirements. The program shall include the Owner's goal for energy conservation and energy use; sustainable design and construction including life cycle cost evaluations and the application and suitability of these goals for the particular project. The Designer shall confirm in writing such requirements to the Owner with a copy included in the SD submittal to the State Construction Office. Integrate into the project SCO Facilities Condition Assessment Program recommendations and Department of Insurance annual inspection reports for needed code compliance and life safety.
- B. The Designer and his consultants shall confer jointly and with the Owner on the most economical and appropriate location and orientation of the facility on the proposed site(s). This effort should consider the feasibility of the site and the implications for the various building systems. **Energy Modeling (where required to satisfy the requirements of GS 143-135.35 -.40 for Sustainable, Energy Efficient Buildings)** and LCCA results (civil/structural, general and PM&E) should be used as well as the space requirements, functionality and any special conditions should be reflected in the program. A code analysis should be initiated to confirm that the proposed facility is, at this level of development, within the current NC Building Code.
- C. When the scope involves site modifications, a current site survey is necessary. The Designer shall define the scope of the survey as appropriate to the project requirements and contract with the surveyor for these services (unless the Owner elects to contract these services directly). The Owner will pay the costs from the Owner's project contingency. Designers and Owners are reminded that surveying activities are professional services that cannot be bid competitively and must use appropriate Qualification Based Selection procedures.
- D. When the scope of the project requires a structural and foundation design, the Designer shall

initiate a basic soils investigation program and, after consultation with the Owner, shall select a geotechnical engineering consultant using Qualification Based Selection procedures (subsurface investigation and geotechnical engineering activities are professional services that cannot be bid competitively). The exploration and contract will be arranged and coordinated by the Designer. The contract will be between the Designer and the selected firm. (The Owner may also elect to contract directly for these services). The Owner will pay the cost from the Owner's contingency. The results of the soil investigation shall be provided in a formal report and a copy provided to the SCO with the Design Development submittal. *The Designer shall consider the report's recommendations during formulation of the project design, plans and specifications. A copy of the report shall be included in the bid documents and noted as for the bidder's information only. Referencing the report "recommendations" shall not suffice in lieu of properly evaluated and prepared specifications and plans by the Designer.*

- E. For Sustainable, Energy Efficient Buildings (GS 143-135.35 -.40), the life cycle cost analysis (GS143-64.10 -15) shall be submitted at the Schematic Design Phase and for all other buildings in the Design Development Phase to ensure all preliminary decisions on site issues, orientation (including internal room arrangements and fenestration) are being optimized to accommodate early life cycle cost decision making for all building systems. The LCCA shall be sealed, signed, dated and then updated at each future submittal to reflect any changes to the project. The Designer shall use LCCA in all decisions throughout the project design process. Projects without the appropriate LCCA report for the appropriate submittal will not be approved to continue to the next phase.
- F. The Designer shall prepare schematic design drawings and other data illustrating the recommended implementation of the program and project requirements. It is essential that consultants for site work, structural, mechanical, electrical, etc., be involved in the early planning process. Submittal of the schematic design phase shall be forwarded concurrently to the Owner, the State Construction Office and regulatory agencies having jurisdiction (see Chapter 200) such that all reviews are concurrent. The Owner, regulatory agencies or Designer shall forward a copy of their review comments to the State Construction Office for review and consensus.
- G. Please indicate on the transmittal letter any reviewing agencies receiving copies for review.
- H. **Important:** The Designer should verify any additional scope of work and submittals required by the Owner for design phases such as presentations to numerous groups or stakeholders, additional design documentation at early design stages, phased construction, CMR involvement, etc. See 113 Design Contract.
- I. The schematic design submittal shall include, as a minimum, the following:
1. A written narrative and general description of the project based on the Designer's studies and program describing the proposed construction materials; framing systems; and mechanical, electrical and plumbing systems. Outline or narrative specifications are acceptable and desired but **no full specifications** please. Full specs will not be reviewed at this level. If a numbering system is used, then CSI Master Format 1995 or 2004 should be used throughout and for all submittal phases.
 2. A scaled site plan, with a north arrow, showing the location and size of the proposed facility in relation to existing property lines, buildings, roads, walkways, parking and existing utility services. Importance shall be placed on the early determination of the adequacy and availability of all existing utility services. The Designer shall be responsible for examining all existing conditions and reviewing available as-built drawings related to the project.

3. Single line drawings of the proposed floor plan(s) that shows the rooms and spaces, including mechanical and electrical rooms, service areas, etc. Rooms shall be identified by name or use for consideration of code implications.
 4. A statement of probable construction cost based upon gross area, volume or other appropriate units. Separate line items shall be provided for site work, utility extensions and other items *outside* the structure. Provide a complete budget summary showing the breakdown of total appropriated funds and all line item funds reflected in the design contract. This is to verify Designer has a clear understanding of the design contract line items and the cost estimate summary. (See Chapter 113.4)
- J. IT IS EXPECTED THAT THE DESIGNER WILL HAVE DONE A THOROUGH JOB CHECK AND COORDINATION PRIOR TO EACH SUBMITTAL. IT IS NOT THE ROLE OF SCO TO RESOLVE SIMPLE ERRORS AND OMISSIONS IN THE DESIGNER'S WORK.
- K. The Designer should secure from the Owner and the State Construction Office written approval of the schematic submittal before proceeding into the next phase. This is important to the Designer should there be substantial changes be made in the schematic design later in the process. If the submittal does not sufficiently outline these basic elements of the project, it will receive a "Not Approved" and may require re-submittal for further development.
- L. Sustainable, Energy Efficient Buildings, GS 143-135.35 - .40
1. Designers shall submit the following data, along with the forms provided in this section, to the State Construction Office with the Schematic Design Phase:
 - a) Daylight Factor Calculations to confirm proportion and characterize programmed spaces and areas where daylighting is desirable or allowed by the owner's program.
 - b) Base building characteristics that are to be used for an hourly energy performance simulation model based on specific building geometry.
 - c) A baseline energy simulation model to establish a base building that meets the ASHRAE 90.1 2004 baseline and is NC Code compliant.
 - d) LCCA report with preliminary calculations of the cost to construct the ASHRAE 90.1 baseline building and the alternate buildings, along with their projected payback.
 - e) Energy strategies for variable building elements that investigate each of the following categories:
 - (i) Building envelope.
 - (ii) Lighting control and lighting design.
 - (iii) HVAC system control and design.
 - (iv) Service water heating systems.
 - f) Submit a report of the integrated design process activities.
- M. Commissioning Authority shall review the SD design package against the modeling assumptions and makes written comments to the design team for incorporation into the project by the design team. Refer to the "Building Commissioning" in the drop down menu under "Guidelines" on the State Construction website.

SECTION 307 DESIGN DEVELOPMENT PHASE

- A. Based on the approved schematic design submittal, the Designer shall prepare the Design Development Documents, which shall set forth in writing and drawings all basic program elements, systems and materials to be used in the project. The Designer and his consultants shall have completed an economic and LCCA study of various PME system alternatives including the building orientation(s), building envelope, materials and finishes. The Designer shall select the systems and materials that are best value for the project over the life of the building.
- B. The design development submittal shall include as a minimum the following:
1. A written response to Schematic Design review comments or questions. An e-copy of review letters can be provided to Designers to facilitate response letter.
 2. A Code Summary sheet, Code Appendix B, that includes the basic code analysis and code decisions made supporting the proposed design. See the NCSBC-Administration and Enforcement Requirements. Department of Insurance has an e-format for use on drawings.
 3. A scaled site plan showing in general; topographic information including proposed grading, benchmarks, site drainage and sedimentation control, utility infrastructure, roads and parking, adjacent structures and other site data furnished on the previous submittal. All site plans shall include information relative to flood plain involvement of this project. (See Floodplain Evaluation Procedures on the SCO website). *See # 6 - site orientation
 4. The soil investigation report and all other reports or studies made for the project shall be considered by the Designer in his design and included in this submittal.
 5. Outline specifications with brief descriptions of building systems and materials in CSI Master Format divisions and numbering – 1995 or 2004. No full specifications at this stage please. There is insufficient time to review full specifications at DD and again at CD.
 6. Scaled architectural floor plans, building cross-sections at appropriate points to show major vertical spaces, and two or more elevations. A typical large-scale wall section detail. Plans must clearly indicate initial results of the building code analysis for the building type such as rated walls, egress and accessibility. Site orientation and building plan orientation should be the same.
 7. Room finish schedule showing basic materials proposed for the floors, walls and ceilings.
 8. Structural submittals to include the following: the subsurface soil investigation report and boring logs; the allowable soil bearing pressure and live loads used in the design; a foundation plan showing the basic elements of the foundation and such additional details and information as necessary to delineate the size, type and probable depth of special foundations i.e., piles or caissons; typical floor framing plan showing size, spacing and type of principal members; a roof framing plan; and the locations of shear walls and/or bracing with such additional details and information as necessary to describe the method of lateral load resistance.
 9. Mechanical drawings showing major HVAC equipment rooms and layout; the basic layout of the heating, ventilating and air conditioning distribution system; a diagram of the temperature control systems; schematic diagram of air, hot water and/or steam systems, chilled water and condenser water systems. Rated walls shall be shown on plans.

10. Plumbing drawings showing general development of the plumbing system. The drawings shall show source of water supply and waste disposal termination; water distribution and waste collection plan diagrams, including fixtures.
11. Fire Protection drawings showing basic distribution and fire sprinkler room location. Indicate source of water and provide a current water pressure/flow test.
12. Electrical drawings: Show the basic electrical service equipment and its location to include; the electrical power distribution components, primary service switches, transformers, generators, main switchgear, motor control centers, and the location of the electrical and telecommunication rooms. Provide single line diagrams of the power distribution systems including primary, secondary and emergency power. Provide similar diagrams for fire alarm, telecommunications, security and all other systems included in the electrical scope of work. An estimated load summary in KVA rating, the connected load, the demand load and the DF are required with this submittal.
Electrical floor plans shall show the basic layout of the lighting, emergency lighting, power receptacles, smoke and heat detectors, data/telecommunications outlets or other systems in the project.
13. A statement of probable construction cost using, as a minimum, the CSI MasterFormat Divisions, 1995 or 2004, using units such as area, volume, linear feet, tons, BTU/hour, KW requirements, fixtures, etc., taking into consideration the actual systems and materials proposed. Provide a complete budget tabulation summary showing the breakdown of total appropriated funds and line items from the design contract. (See 113.4) Site work and utility services shall be shown as separate items.
The Designer shall take careful consideration of the cost estimate at this phase and whether the project is within budget. If the scope and budget are not aligned at this point, it will be costly to the Owner and the Designer in dollars and in time to proceed into construction documents based on a hurried and unrealistic estimate of cost.
- C. The Designer shall include in the submittal, a description of the engineering rationale leading to the utilization of systems shown on the drawings or described in the outline specifications.
- D. Submittal of the completed design development phase shall be forwarded concurrently to the Owner, the State Construction Office and regulatory agencies having jurisdiction for concurrent review. The Owner, regulatory agencies or Designer shall forward a copy of any review comments to the SCO for review, consensus and project files.
- E. For all State buildings, the Designer shall comply with the NC Energy Code and State Construction Office's procedures for Implementation of Life-Cycle Cost Analysis for State Buildings. Compliance may be demonstrated by using the appropriate forms from the ASHRAE/IESNA Standard 90.1 User's Manual or other methods approved by the State Construction Office. **Refer to Section 307H, for additional requirements for Sustainable, Energy Efficient Buildings (GS 143-135.35 - .40).**
- NOTE:** The Life Cycle Cost Analysis shall be sealed, signed and dated by the designer. Use only the methods and forms provided in the guidelines.
- F. IT IS EXPECTED THAT THE DESIGNER WILL HAVE DONE A THOROUGH JOB CHECK AND DESIGN TEAM COORDINATION PRIOR TO EACH SUBMITTAL. IT IS NOT THE ROLE OF SCO TO RESOLVE SIMPLE ERRORS AND OMISSIONS IN THE DESIGNER'S WORK.
- G. The Designer should secure from the Owner and the State Construction Office written approval of the design development submittal before proceeding into construction documents. This is

important to the Designer should design changes be made later in the process. If the submittal does not sufficiently outline the basic elements of the project, it will be returned for further development.

H. Sustainable, Energy Efficient Buildings (GS 143-135.35 - .40)

1. Final submittal of Energy Model should be submitted at this phase, and should include a model of a baseline ASHRAE 90.1 building, along with lists of options and costs for up to two (2) alternate building models that result in a 20% (major renovations) or 30% (new construction) more efficient building than baseline model.
2. Designers shall submit the following data, along with the forms provided in this section, to the State Construction Office at the end of the Design Development Phase.
 - a) Revised energy simulation model developed in the SD phase, refining the proposed energy conservation options. Compare via software the proposed options with the base building that meets ASHRAE 90.1 2004 baseline and NC Building Code.
 - b) The incremental cost increases, if any, for each energy conservation strategy based on the difference of the cost of constructing the energy conservation option versus the cost of constructing the base ASHRAE 90.1-2004 building.
 - c) Updated LCCA comparing the energy conservation options for up to two composite buildings to the ASHRAE 90.1-2004 compliant base building.
 - d) Selection of the resultant the Energy Conservation Measures to be implemented and summarize the final building construction.
 - e) Water reduction calculation for both indoor and outdoor water use relative to baseline. Refer to the "Water Conservation" available in the drop down menu under "Guidelines" on the State Construction website.
3. The Commissioning Authority shall review the DD design package against the modeling assumptions and shall make recommendations for incorporation into the project by the design team. Refer to "Building Commissioning" in the drop down menu under "Guidelines" on the State Construction website. (Sustainable, Energy Efficient Buildings Advanced Planning Flowchart, GS 143-135.35 - .40)

NOTE: The Design Development stage is a "hold point" for further approval until all outstanding comments and issues have been complied with or resolved before there is approval to begin Construction Document production. DD Submittals will not be approved when regulatory review comments are extensive, the cost estimate is not within design contract budget, the soils investigation and/or the LCCA are not provided for the project. "Not Approved" projects must be re-submitted or otherwise resolved with the State Construction Office.

SECTION 308 CONSTRUCTION DOCUMENT PHASE

308.1 GENERAL

- A. Provide a written response to Design Development review comments with this submittal. An e-copy of DD review letter can be provided to facilitate response letter.
- B. Based upon the approved design development submittal, the Designer shall prepare construction drawings and specifications setting forth all the work in detail and prescribing work to be done, including materials; workmanship; finishes; mechanical and electrical systems; special equipment; site work; utility connections and services. Bidding information; proposal, contract and bond forms; General and Supplementary General Conditions of the Contract; and any and all other information and documents required for receiving competitive bids on the project shall be provided and completed. Copies of construction documents shall be simultaneously furnished for review to the Owner, the SCO and regulatory agencies having jurisdiction. The Owner shall forward a copy of his review comments and/or approval to the SCO for review and consensus.
- C. The Designer and his consultants shall retain design calculations for all systems, including structural, special foundations, mechanical and electrical designs and keep same in reproducible form for submittal to SCO, if requested.
- D. Form formats and documents required for CD documents are available on the SCO website. As noted below some are simply inserted into the manual and others require editing and modification for use on specific projects. MSForms requiring editing will generally include directions and indications as to what needs to be modified or addressed.
- E. There is no Approved or Not Approved status provided at the conclusion of the Construction Document review. Written review comments from all applicable disciplines are provided to the Designer and Owner for revisions, additions, deletions, etc. Electronic copies in MSWord can be provided for convenience in providing responses. See Section 311 - Final Submittal for SCO verification and review of Designer responses.
- F. See Chapter 200 for the number of copies to be submitted by regulatory review agencies and the Owner. SCO will typically require only one set of complete documents. On large projects where drawings and specifications must be printed in 2 or more large volumes, 2 complete sets may reduce time in review.
- G. Sustainable, Energy Efficient Buildings GS 143-135.35 - .40
 1. The design team shall incorporate the energy conservation options into the project. The energy model submittal from the design development phase shall be re-submitted with the documentation for this phase. If alterations have occurred due to site or building changes, the model shall be updated and indicated to contain altered information.
 2. The LCCA shall be refined and updated and submitted in accordance with the requirements of the Life Cycle Cost Manual.
 3. Designers shall refine, update and submit the water reduction calculation for both indoor and outdoor water use.

4. Commissioning Authority shall review the construction document package against the modeling assumptions and shall make recommendations for incorporation into the project by the design team. Refer to “Building Commissioning” in the drop down menu on the State Construction website under “Guidelines”.

308.2 COST ESTIMATE & BUDGET CONTROL

The Designer shall provide a construction cost estimate using quantity take-offs of major sections within Master Format divisions. Overhead, profit, taxes, insurance, bonds, contractor’s contingency, etc., shall be included. Estimates shall be escalated to the midpoint of construction time. Estimates must be prepared for all bid items, including alternates. A summary tabulation shall be furnished showing the current design contract total budget and line items for reserves, owner contingency, and design fee. The remaining funds are available for construction bids and award. Owner contingency cannot be used to award a construction contract. The Designer is responsible for bringing the project within the Construction Funds Available as set forth in the design contract. It is essential that accurate and proper construction estimates be developed by the Designer at this stage to avoid delays and added cost to the state in the event bids exceed project funds available

Budget control: Should the Designer’s estimate be over the Construction Funds Available, SCO suggests the base bid scope be established at 90% of the Construction Funds Available with add alternates to 110% of those funds to permit flexibility and/or ability to award a contract(s) without negotiating down, which is not advantageous to the Owner. An estimate considerably over the funds available obviously cannot be approved for bids unless scope is reduced and/or Owner provides evidence that funds can and will be added to the project for award of contract. An amendment to the contract will be necessary to reflect any new funding or added scope.

If the low bid(s) are over the construction funds available for the project and additional funds are not available, then the owner is advised not to negotiate if the overrun is more than 15% of the Construction Funds Available. Again this is based on the opinion that it is better value to reduce scope and re-bid than to negotiate more than 15%.

IT IS EXPECTED THAT THE DESIGNER WILL HAVE DONE A THOROUGH JOB CHECK AND COORDINATION OF DOCUMENTS PRIOR TO EACH SUBMITTAL. IT IS NOT THE ROLE OF THE SCO TO RESOLVE SIMPLE ERRORS AND OMISSIONS IN THE DESIGNER’S WORK.

308.3 BID ALTERNATES

Bid Alternates are line item components of the project that are set aside on the Proposal Form for separate bids or pricing to give the Owner some control and flexibility over how his budgeted funds can best be used to adjust scope or meet budget limits.

Note: SCO policy is to only **USE** ADD alternates and **NOT** DELETE Alternates to control project costs. The construction industry consensus is that deleting work, “value engineering”, on a bid project returns only a portion of the true value of the alternate scope, sometimes as little as one-half the value. In some cases an option of Add/Delete selection by bidder can be used if the bid could go either way.

- A. Budget control can best be achieved by using ADD alternates as described in 308.2. Reducing the estimated “Base Bid “ scope to be under the budget, then using bid alternates up to 10% or less over the budget.. The Owner/Designer shall make reasonable value judgments in determining alternate scope of work. Consideration should also be given to prioritizing the

alternates.

- B. Owner Preferred Alternates were established by [GS133-3](#) in 2002. The Owner may bid an alternate for a preferred “brand” of product under the conditions and procedures described in the statute. [Procedures](#) are also available at SCO website under [Guidelines](#).
- C. An alternate may be used to upgrade materials or add additional features to the project should budget permit. Any materials specified within the alternate must meet competitive bidding requirements of GS133-3.

NOTE: Review Chapter 400 on Bidding and Contracting and determine method proposed for the project. The Construction Document submittal shall be properly prepared to reflect the method selected.

308.4 PROJECT MANUAL

The project manual shall be complete and contain all the project's forms and documents required: advertisements, instruction to bidders, general conditions and supplementary general conditions, general requirements, technical specifications, bid forms, other attachments or appendices required, bond forms and construction contract forms and agency approval pages. The format shall be 8-1/2 x 11 securely left side bound in the following order:

(See **Chapter 400 Forms and Documents – Bidding and Contracting.**)

Forms in *Italics* require editing for the project prior to submittal for CD review.

A. Single volume projects:

2. Manual Cover or Title Sheet. **SCO Project ID number.** (Professional Seals affixed)
3. *Newspaper advertisement* - formatted and edited for the project
4. *Notice to Bidders* - formatted and edited for the project, (On small projects-avoid use as newspaper ad - \$\$\$)
5. *Table of Contents*
6. Instructions to Bidders and General Conditions
7. *Supplementary General Conditions* - formatted and edited for the project.
8. Guidelines for MBE Participation in State Construction Contracts
9. *Special Conditions or Division 1 Requirements* - if any, by agency/institution
10. *Subsurface investigation report* - also hazmat surveys, etc.
11. *Statement of Special Inspections* - (If required by SCO in DD Phase review or earlier.)
12. *Statement of Contractor's Responsibility* (If required by wind and/or seismic conditions.)
13. **Technical Specifications – (CSI Master Format Divisions – 1995 or 2004)**
14. *Form of Proposal* - formatted and edited for the project
15. MBE Contractor List and Affidavits A thru D
16. Form of Bid Bond
17. Form of Construction Contract

18. Form of Performance Bond
 19. Form of Payment Bond
 20. Sheet for attaching Power of Attorney
 21. Sheet for attaching Insurance Certificates
 22. Form of Approval of the Attorney General and the Office of State Budget and Management
- B. **Multi-volume project** manuals are acceptable and should be used on large projects. The Bid Forms and Contractual documents may be included in the front of the first volume or as a separate volume.

308.5 INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS OF THE CONTRACT - FORM OC-15

This document is to be used on State capital construction projects and Community College projects that are reviewed and approved and inspected by the State Construction Office. It is not to be modified in any manner except by a Supplementary General Conditions. The General Conditions for Construction Manager at Risk is specifically for use in those projects.

308.6 SUPPLEMENTARY GENERAL CONDITIONS

- A. A Supplementary General Conditions shall be prepared by the Designer, and shall include, but not be limited to, the following Articles where it is stated in the General Conditions -----
“as required by the Supplementary General Conditions”
1. Art. 1: Specific definitions for this project. (Ex - Owner may be a “Community College”).
 2. Art. 14e: If a surveyor is required for bench marks, elevations, layout, utilities, etc.
 3. Art. 14f: Designation of the project expediter for separate prime/dual contract projects.
 4. Art. 14g: Type of project construction schedule to be required. Specify details in Div.1.
 5. Art. 23: The Designer, in consultation with the Owner, shall establish a time of completion in calendar days and liquidated damages in dollars per day. Liquidated damages are required and shall be reasonable and estimated in advance to cover any loss or damages to the Owner should there be delay of completion or occupancy of the project. Time of Completion shall be in calendar days from the Notice to Proceed to Final Completion. Do not use dates for completion.
 6. Art. 40: Project specific clarification of the parties responsible for temporary facilities and utilities during construction. (Some state facilities own their utility systems.)
 7. Special requirements of participating federal agencies, if required.
 8. Owner changes made to specific conditions of the contract.
 9. Additional editing of the General Conditions beyond this scope is strongly discouraged. Excessive editing creates legal/contractual conflicts and situations that may make legal defense of the contract documents problematic and costly.
 10. **NOTE:** Owners may include a “standard” Project Requirements in Division 1– General Requirements for technical and procedural issues specific to their facility such as parking

rules, security, work periods, fencing, safety, etc. These are not conditions of the contract but are technical and procedural requirements.

308.7 SPECIAL CONDITIONS/REQUIREMENTS

- A. Supplementary General Conditions should be reserved specifically for additions or revisions to the standard State General Conditions (OC-15) latest revision. Owner provided “standard” Supplementary General Conditions or Special Conditions are not acceptable unless prior review and approval have been obtained from SCO. ([GS116-31.11\(b\)](#))
- B. Special Requirements: Should an agency or institution have specific contractual conditions on all their projects (i.e. universities, hospitals, corrections facilities, zoo, parks, etc.) such as work times, access, security, parking, conduct, etc. that would be typical and necessary requirements, then those institutions should provide or assist the Designer in preparation of “Special Requirements” that could be used on any project on their facility to address specific needs. A “Special Requirements should stand-alone and not be repetitious or in conflict with the State General Conditions or its Supplementary General Conditions.

308.8 DIVISION 1 – GENERAL REQUIREMENTS

- A. Temporary Utilities: Many state institutions have their own utility systems. Clarify with the Owner whether any Owner utilities may be used and how. Include any charges to be assessed. Who provides should also be addressed in the Supplementary General Conditions, Art. 40
- B. Alternates: List and describe Alternates to be used. Limit the use of alternates and “Owner-preferred” alternates. An excessive number of alternates can discourage bidders as costly to estimate and can over complicate design and construction with errors. Keep the alternates simple and clearly identified in scope and details.
If the “base bid” is set at 90% of the project construction funds with add alternates adding up to 110% of funds available, then award of contract may be expedited without time lost on negotiations or “value engineering”.
- C. Cash allowances are not used in public work, as there is no “competitive bidding” process as required by statute. Estimated quantity allowances are acceptable with a unit price solicitation on the Proposal Form to adjust the allowance up or down after the actual quantity has been established and verified. Base bid quantities should be carefully estimated to ensure project contingency is not critically depleted.

Exception: Brick products may be purchased using a set dollar allowance per 1000 brick provided in the bid documents. All other costs for labor and materials for masonry shall be included in the base bid.
- D. Unit Prices: Unit prices are not considered in determining the low bidder and may be negotiated with the low bidder if prices are out of line compared to other bids. The Designer shall estimate and provide a “quantity allowance” in the bid documents for the bidder to include in the base bid. The bid Proposal Form shall request a single unit price from the bidder that will be used to adjust the actual quantity or scope *up or down*.
- E. Owner supplied items or work should be fully identified and explained to eliminate duplication and confusion during bidding.

SECTION 309 TECHNICAL SPECIFICATIONS – MasterFormat 2004 or MasterFormat 1995

- A. **Divisions:** The new CSI MasterFormat, as well as the older MasterFormat, will be acceptable as construction industry standards and should be used for uniformity and consistency in all state projects. Note: The older version will not be supported by the Construction Specifications Institute (CSI) after 2006.
- B. **Format** for all specifications shall be in narrative or "imperative" form. So-called "streamlined" "short form" or "outline" specifications will not be acceptable for CD submittal. Statements shall be complete and concise, in simple language known to the construction trades. Specification content shall relate only to the specific project requirements. The division of responsibility between prime contracts (such as between food service equipment and plumbing or electrical and mechanical) shall be carefully coordinated and noted. The specifications shall be customized and tailored to the project.
- C. Specifications shall be created via electronic word processor. Copies shall be legible and securely bound. Review sets shall be complete with all forms and specifications required in Chapter 400 and edited for the project.
- D. Neither Federal Specifications (FS) nor Military Specification (MS) are to be used or referenced. SCO and many contractors do not have or maintain those specifications. Reference standards such as UL, FM, NFPA, etc. are appropriate.
- E. Instructions to Bidders and General Conditions (OC-15) is available in electronic form only (Acrobat) from SCO website and may only be modified by the SGC.

SECTION 310 DRAWING SET**310.1 SIZE**

- A. Drawing set sizes shall be 24" x 36", 30" x 42" or 36" x 48" unless otherwise approved by the State Construction Office. Do not mix drawing sizes within the same project documents.
- B. Drawing set shall be securely edge bound. For convenience or ease of handling, on large projects drawing sets may be submitted as multiple volumes, preferably by GPME discipline.
- C. Reduced drawings and electronic media are not suitable for review. (Submittals with a very large number of drawing sheets may include an additional half-size set as a useful cross-reference set for reviewers.)
- D. Complete sets must be provided with each submittal/re-submittal. No single sheets or partial sets are acceptable. If review comments are minor or limited, corrected sheets may be submitted for review compliance verification and a complete bid set provided later when the project is issued for bids.
- E. **NOTE:** All lettering fonts, notes, schedules and room names should be a minimum 1/8". A project's Record Drawings are presently archived by microfilming in black & white and must be legible on a microfilm reader and for reduction when needed. Specifications and files are archived by boxing and storage. See Chapter 600 for Record Drawings and Final Report.

310.2 ORIENTATION AND PRESENTATION:

- A. All site plans and building plans should have the same orientation on all drawings and all disciplines. Various plan orientations by different disciplines can cause errors and confusion by reviewers and bidders.
- B. Column lines and designations should be included on all plan sheets, elevations and wall sections for orientation and reference between disciplines.
- C. All site plans and building plans should indicate true north and plan north. A survey benchmark shall be provided on the drawings locating the building (X&Y) as well as elevation.

310.3 COVER SHEET AND TITLES

- A. Cover sheet and all drawings shall have project name, agency/institution, Designer and consultants and the **SCO Project ID number**.
- B. NCSBC Code Summary sheet shall follow the Cover sheet. This form is required by the State Building Code Volume I-A - Appendix B to identify all code decisions and information for the project. An [electronic template](#) is available from the Department of Insurance.

SECTION 311 FINAL SUBMITTAL (100% COMPLETE AND READY TO BID)

Final Submittal is not intended to be another project review. Final submittal is to review and verify the Designer's written responses to the Construction Document review comments from the SCO and verify that revisions required have been made to the Project documents. Evidence shall also be provided of approval from other review agencies having jurisdiction. Where the Construction Documents were submitted incomplete, the final review comments or Designer responses may generate additional questions or comments at Final. IF a Final submittal check shows non-compliance with previous CD review comments or has generated more comments, then a Not Approved for Bid is given and a re-submittal may be necessary.

An e-copy of the CD review letter in MSWord can be e-mailed to the Designer to facilitate a response letter, if the Designer's e-mail address is provided to SCO. Final project approval letters from the Owner and all regulatory agencies having jurisdiction must be on file with the SCO before a bid date may be established. ([GS143-31.1](#))

NOTE: Final submittal may also be accomplished in a "sit-down" checkout process at the SCO in Raleigh. IF submittal is complete, all comments satisfactorily addressed, and other regulatory approvals are provided, the project may receive approval to bid that day.

NOTE: An SCO Final Review letter that is marked:

*"Approved for Bids **SUBJECT TO** approval of involved regulatory agencies. Coordinate a bid date with this office when all approvals have been obtained. According to our records approvals have not been received from:"*

means exactly what it says. SCO may be generally satisfied with the project documents but has not received comments or concurrence from Dol for code, Owner for budget or funding or other regulatory approvals that are necessary for approval to bid in compliance with GS143-31.1.

SECTION 312 SETTING OF BID DATES

Upon approval of all regulatory agencies, the Owner and Designer, in consultation with the State Construction Office, shall establish the date for receipt of bids. When the bid date is established please send via e-mail a copy of the completed [Notice to Bidders](#) to SCO for posting on the State IPS website for public advertisements. A review of statutory authority and procedures described previously may be helpful at this point.

The State Construction Office authority is to review and approve to bid, all State buildings or buildings built on State land and community college projects over \$300,000.

The Department of Insurance, under GS58-31-40(b), must review and approve for construction all State buildings.