APPENDIX A: GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT (Form CO-7) AND STANDARD INSTRUCTIONS TO BIDDERS (Form CO-7a)

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

To view/download the latest version of the Form CO-7 (aka, Form "DGS-30-054"), visit the website listed above and enter "DGS-30-054" in the search box on the Forms Center.

To view/download the latest version of the Form CO-7a (aka, Form "DGS-30-055"), visit the website listed above and enter "DGS-30-055" in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX B: GENERAL CONDITIONS OF THE DESIGN BUILD CONTRACT (Form CO-7DB)

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

To view/download the latest version of the Form CO-7DB (aka, Form "DGS-30-056"), visit the website listed above and enter "DGS-30-056" in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX C: LISTING OF FORMS AND FORMATS ON THE DGS FORMS CENTER

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

For a listing of current DGS forms applicable to the design and construction process, download Form DGS-30-000 (Capital Outlay Management Forms Available for Download from the DGS Forms Center).

A copy of Form DGS-30-000 is also posted and available for download from the Bureau of Capital Outlay Management website (http://bcom.dgs.virginia.gov).

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APPENDIX D: BASIS OF DESIGN NARRATIVE AND SYSTEMS CHECKLIST

1. INTRODUCTION

The basis of design is a narrative description of the project and should be a bound presentation of facts sufficiently complete in accordance with the following format to expedite BCOM review of the Schematic and the Preliminary submittals. The Schematic Basis of Design narrative presents the basic information, criteria, logic, evaluations and considerations developed in each category to prepare the Schematic submittal. The Preliminary Basis of Design narrative expands upon the Schematic submittal to reflect the further analyses, evaluations and selections/decisions made to arrive at the Preliminary level of design.

Design computations, sizing of members or conductors, details of connections, etc., are not required to be submitted with the Schematic Basis of Design, but general computations supporting system selection, member depths, floor to floor heights, mechanical and electrical loads should have been made.

2. SCHEMATIC BASIS OF DESIGN INFORMATION

The Schematic submittal shall include a Basis of Design Narrative which as a minimum provides the following information in narrative or tabular format:

- Type of occupancy/VUSBC Use Group
- Estimated occupancy capacity and method or factor used for estimate
- Functions to be housed in the building
- Proposed building location on the site
- Exterior Circulation (i.e., how this project may interface with other area facilities)
- Areas and/or capacity required for various activities proposed for building
- Type of Construction proposed: i.e., fire resistive, protected or unprotected noncombustible, etc. and VUSBC Type #
- Outline description of basic materials
- Future construction or expansion to be accommodated, if any
- Style and character of building desired
- Structural Design Live Loads, Wind Loads, and Seismic Criteria used
- Type of foundation system selected
- Description of the types of HVAC systems being evaluated, estimated heating and cooling loads, fuels evaluated and fuel selected to be used
- Total square foot area per floor and per building
- Number of beds, seats or parking spaces, where applicable
- Total estimated construction cost based on the schematic documents
- Total proposed project budget

3. PRELIMINARY BASIS OF DESIGN INFORMATION

The following format is for a new building type construction project but is applicable to renovation and addition projects by addressing those portions relevant to that particular project. When a project consists primarily of mechanical, electrical, structural, or another discipline, the basis of design shall provide more detailed information for the major discipline. The narrative shall address or list the factors indicated for each section. Data may be presented in tabular form where appropriate.

Architectural:

(a) Describe functions to be housed in the building and the applicable VUSBC Use Group Classification(s). Include copy of the minimum space/area requirements and adjacency criteria used to develop the design.

(b) Provide analysis of Virginia Uniform Statewide Building Code (VUSBC) and referenced standards (and NFiPA 101, Life Safety Code, if applicable) requirements of all occupancies involved. Determine occupancy classifications and compute occupant load, number of units of exit and other requirements. Describe unusual or critical code requirements and indicate how such requirement will be met.

(c) State the VUSBC Type of Construction selected with reference to the degree of fire resistance. Describe construction systems/materials proposed to achieve the construction type/fire resistance rating.

(d) Computation of gross floor area in accordance with Section 701A guidance and of Building Efficiency factor/ratio. Gross floor areas should be indicated on the drawings.

(e) Provide preliminary floor plans, elevations, building cross section and other drawings as required by Chapter **8** of the **Manual.** Floor plans should indicate the location of all built-in equipment and fire walls.

(f) Statement as to the types of thermal insulation to be provided, where required, and the value of the "U" factors for the various portions of the structure, i.e., roof, walls, floors, etc. Also describe all architectural energy conserving features to be incorporated.

(g) Provide a narrative description of the preliminary color design concept addressing architectural finishes and colors. Describe materials for all major items of construction and all interior and exterior finishes. The description of finishes (colors, textures, and patterns) shall be accomplished by the use of a finish schedule. The finish schedule (on the included drawings) shall identify spaces and interior building material finishes.

(h) Provide furniture and equipment footprint drawings in preliminaries reflecting the Agency's updated equipment list which show the end result of the architect's space planning effort. The furniture footprint demonstrates the designer's plan for the various functions that are housed in the facility. The designer shall use standard furniture sizes to demonstrate adequacy of space and to communicate utility and service requirements to

engineering disciplines. (Although required for space, utility and service requirement development, these drawings are not included in the final construction bid package.)

(i) A description of items not considered to be a permanent part of the structure, such as work benches, shelving, bins and removable partitions. (Show also on furniture footprint drawings.)

(j) Analyze the design for compliance with acoustical requirements. List areas of high noise and vibration and acoustic design principles applied. Is an acoustical consultant or specialist required for the project?

(k) Design features to make facilities accessible to and usable by the physically handicapped and conform to the requirements of Section 700C of the Manual. If not incorporated, appropriate reasons/justification shall be given.

(l) Equipment rooms of ample size shall be provided with consideration being given to adequate allowances for access, maintenance, repair and easy removal of units. Room dimensions shall not restrict equipment items to the products of any single manufacturer. The A/E should assure that equipment of more than one manufacturer can be accommodated in the space allocated. This policy will not be interpreted as sanctioning an increase in equipment space to accommodate some particular manufacturer's product when such would result in structural costs being greater than the probable resultant saving in equipment costs.

(m) Describe special construction features incorporated into the facility such as barred windows, special wall/roof construction, etc.

(n) The Art and Architectural Review Board (AARB) has been established to ensure architectural compatibility is maintained at each location. Presentation(s) of the design shall be presented to the AARB for comment and recommendation for approval after submitted to BCOM for review and comment at the Schematic and Preliminary submittals.

Structural:

(a) Description of foundation conditions, type of foundation to be used, method by which the allowable bearing values are to be determined, and maximum allowable bearing capacity for the foundations. Geotechnical information including field boring notes and foundation design recommendations shall be submitted with the preliminaries.

(b) Statement of the type of construction adopted and reason therefore, with capacity, dimensions, or other size criteria. List of materials selected with design strengths and ASTM, **AISC,** ACI, etc. standards to be specified.

(c) Special features to be included in the structure which are not evident from the drawings.

(d) Description of the structural floor and roof systems proposed, with length, spacing and size of principal members (for beam and girder, etc.).

(e) Description of the Lateral Force Resisting System proposed with appropriate materials and dimensions.

(f) Statement of live loading to be used, to include floor loads, wind, snow, earthquake, etc., with data to justify.

(g) Statement of any special considerations that affect the design, (e.g., special corrosion resistance requirements, detention facilities, cranes, etc.).

(h) The usual accepted means of structural system selection is economy. Demonstrate this with cost comparisons of various appropriate framing systems such as:

(1)"Typical bay" member sizing and cost comparisons of alternate structural systems;

(2) Horizontal force resisting system for wind and earthquake;

(3) Consideration of unusual geometry (long span, high bay, deep cuts, etc.);

(4) Consideration of heavy equipment supports.

Plumbing:

(a) Describe system to be utilized on each part of the project.

(b) Determination/calculation of number of each type of fixture based on VUSBC occupancy load. Indicate types and quality standards in narrative and on preliminary drawings.

(c) Estimated number of fixture units and water demand in gpm for all plumbing fixtures.

(d) Estimated maximum and minimum water pressure at each building and indicate if booster pumping will be required.

(e) Type, size and design temperature of domestic water heater and distribution system. Also, a statement as to whether heat recovery is contemplated for domestic water heating.

(f) Design temperature of domestic hot water distribution system and extent of recirculation system within building.

(g) Indicate materials to be used for each piping system.

(h) Address any special needs such as sumps, interceptors, pumps, pipe guides, lift pumps for sewerage, etc., and indicate tentative sizes, capacities and quality standards to be specified.

Heating, Ventilating and Air Conditioning:

(a) Design Conditions

(1) Describe and/or list the indoor and outdoor design conditions to be used in the design of systems for this project. Refer to criteria in Chapter 7.

(2) Energy sources for heating and cooling systems shall be determined from an analysis of the efficiency of use and economy of those available for each project. Parameters for analysis should be obtained from the Division of Engineering and Buildings. The analysis shall be presented for review with preliminary submittal and shall be summarized on an Energy Analysis Summary sheet.

(b) Heating

(1) Describe the source of heat energy which will be used, such as extension of central high pressure steam with meter, hot water with meter, or independent heating equipment with type of fuel to be utilized. Also explain why this source was selected in lieu of other available sources. Where there is a possibility of more than one type being economical a computerized analysis should be included to justify the selection.

(2) Briefly describe and/or show on the drawings the type and routing of the system proposed to convey the heat source, if applicable; (for example, 100 psig low level, above ground steam and condensate lines on concrete support, interconnecting to the existing system at manhole no. 150 and traveling due north into the mechanical equipment room.) State if condensate return system is to be utilized. If condensate is to be wasted, heat reclaim shall be studied. If wasted, it should be cooled to 140°F maximum, then re-turned to the sanitary sewer system (unless specifically instructed otherwise). Indicate the maximum hourly production of condensate.

(3) Describe and/or provide schematics of the type of heating medium and system to be used within the buildings. Also include reasons for selection of this system over others available.

(4) Describe the HVAC Control System. A specific type of control system will be specified, i.e., pneumatic, electric or electronic.

(c) Ventilation

(1) Indicate the quantity of outside air per person in all areas, the type of filtration, and whether **OSHA** requirements are applicable.

(2) State if smoke removal/control systems are to be employed.

(3) Describe the operation of the system in summer and winter modes.

(d) Air Conditioning

(1) Provide a complete description and/or schematics of the air conditioning system proposed including an explanation of why this system is preferred over others. Also indicate locations of major components of the system. For larger systems which qualify under Energy Conservation, a computerized comparison between at least two systems is required.

(2) Define areas to be air conditioned.

(3) Identify special humidification or de-humidification requirements, as well as special filtration requirements.

(4) Describe any special architectural features being incorporated to reduce cooling loads. Also, any features being incorporated in the mechanical system which would reduce energy consumption should be separately discussed.

(e) Combination Systems

(1) For systems in which the heating, ventilating and/or air conditioning are combined, repetition may be eliminated by consolidating the aforementioned requested information. Describe changeover procedures and requirements.

(f) Energy Conservation

(1) Computer energy analysis (block load type) for buildings larger than 8,000 square feet requiring heating and cooling and larger than 20,000 square feet requiring heating only shall be used to study energy conservation features. Concurrence of systems to be studied should be obtained prior to conducting study. If a valid computer analysis was prepared during the Budget Study Preparation for the project, this may suffice. When computer analyses are performed, the total annual energy consumption estimate should be clearly stated.

(g) Briefly describe the controls for each system and indicate intended sequence of operation.

(h) Briefly describe testing and balancing requirements to be required.

(i) When the Owner has an Energy Management System, the preliminary submittal shall be prepared to conform to the requirements and procedures in Chapter 7.

Environmental Pollution Control:

Identify expected environmental pollution and the proposed method of control. A detailed description will be necessary for those facilities directly related to controlling air and water pollution such as sewage treatment plants, industrial treatment facilities, incinerators, smoke

elimination facilities, and other similar projects. When subsurface tile filtration is being considered for sewage disposal, a soil percolation test will be required for each such disposal system. List all environmental control permits and notifications required.

Asbestos, Lead-Based Paint and Hazardous Material:

The A/E shall include **a** statement in the Basis of Design addressing asbestos, lead based paint, and other hazardous material (including leakage from underground storage tanks) presence or potential presence on the project. Indicate if Agency has secured an asbestos, lead based paint, or hazardous material investigation of the project area for renovation projects. Indicate how the presence of these materials will affect this project, (i.e., removed by separate project, removal included in this project, left in place and encapsulated, etc.) If work is by separate contract, indicate if phasing of work or a delay of this project is anticipated.

Special Mechanical Systems:

Provide a description of any special mechanical systems such as compressed air, hydraulic, nitrogen, etc., including an explanation of the medium source.

Central Heating Plants and Heating Plant Additions:

(a) Prepare an energy analysis as required by Chapter 7, Section 715L and submit Energy Analysis Summary. Describe criteria and assumptions in narrative. Describe purpose and justification of systems proposed.

(b) Describe environmental constraints such as applicable regulations, liquid wastes, gaseous emissions, treatments required, etc.

(c) Describe new boilers including rating, flow, temperature, pressure and type.

(d) Describe control systems.

(e) Describe any new auxiliaries to be added and what source of power will be used for their operation.

Refrigeration (Cold Storage):

(a) Identify areas to be refrigerated, indicating their usage and temperatures to be maintained.

(b) Describe type of refrigeration equipment and systems.

Thermal Storage:

(a) Describe the type (static or dynamic) of storage being considered.

(b) Provide preliminary cooling profile.

(c) Provide preliminary equipment and tank sizes.

(d) State how the A/E proposes to conform to State Procurement requirements when specifying thermal storage system and components.

Fire Protection Systems:

(a) Describe type(s) of automatic sprinkler and gaseous extinguishing systems to be utilized and note locations to be protected.

(b) Describe fire detection and alarm systems including location of detectors, manual stations, audible devices, control panels, etc.

(c) On the drawings indicate location of water supply pipe location and main entrance to buildings. Also indicate location of gaseous extinguishing system equipment and supplies and location of fire department connection and post indicator valve.

(d) Provide the following information about sprinkler systems:

(1) Hazard classification of occupancy and applicable Code reference.

(2) Water supply available at point of connection (static pres-sure and residual pressure at design flow). This data must be based upon flow tests at or near the point of connection and must appear in the Basis of Design. Indicate on drawings the location of flow test.

(3) Describe fire pump operating parameters.

(4) Approximate water demand for sprinkler system.

(5) Statement of adequacy/inadequacy of water supply and planned upgrades by local jurisdiction, if any.

Electrical:

(a) Provide the following about interior distribution systems:

(1) Electrical characteristics (phase, voltage, and number of conductors in main distribution circuits).

(2) Breakdown in tabular form of the *estimated* connected load to show:

a. Lighting load and convenience outlet load separately.

b. Power load for building equipment such as heating, air conditioning, etc.

c. Loads for special operating equipment such as compressors, generators, pumps, and for power receptacles being provided to energize special equipment. Apply an appropriate demand factor to each to compute total demand load.

(3) Type of wiring system, such as rigid conduit, electrical metallic tubing, non-metallic sheathed cable, etc., and where proposed to use. **(Present criteria prohibits embedding aluminum conduit in concrete. Present products should be reviewed to make sure that conduit, pipe, bars, anchors or other aluminum parts are not embedded in concrete.)**

(4) Type of conductors, such as rubber insulated, thermoplastic insulated, polyvinyl chloride jacket, etc., and where pro-posed to use.

(5) **A** statement describing proposed pertinent standards of design, such as voltage drop (include calculations), lighting intensities (include calculations), and type of lighting fixtures, and a statement regarding the use of selective switching or other energy conserving features.

(6) **A** determination of short-circuit duty required for all service entrance protective devices and switchgear (usually available from power company). Include cost premiums in cost estimate.

(7) Type and arrangement of Cable Television Systems (CATV), Closed Circuit Television Systems (CCTV), Nurse Call, inter-com, sound, signal, and fire alarm systems. Identify number and location of telecommunication outlets (telephone, computer, word processing, etc.). Obtain information from the using activity.

Space required for telecommunication equipment, point of connection to telephone utility, size of incoming duct/conduit and size of equipment mounting backboard to be provided.

Statement relative to interface provision for multi-use systems (i.e., intercom, telephone, etc.). A/E must provide all facility support for proposed telephone equipment installations, i.e., conduit, duct, and backboard. Design and procurement of telephone system to be accomplished by the Owner.

(8) Indicate interior lighting on lighting plans.

(b) Outside distribution systems:

(1) Contact the Utility Companies for location and characteristics of nearest service facility capable of meeting project supply requirement and cost-of-service information for economic analysis.

(2) Statement relative to the adequacy of the primary supply at the point of take-off. If primary source is inadequate, state measures proposed to correct the deficiency.

(3) Electrical characteristics of power supply to site including circuit interrupting requirements and voltage regulation.

(4) Estimate of total connected load and resulting kilowatt demand load by applying proper demand and diversity factors, if a group of loads is involved.

(5) Basis for selection of primary and/or secondary distribution voltage.

(6) Type of conductors, such as copper or aluminum, and where proposed to use.

(7) **A** statement describing pertinent standards for design, such as voltage drop, physical characteristic of overhead or underground circuits, type of lighting units and lighting intensities.

(8) Type and adequacy of signal and fire alarm systems, including a statement as to spare capacity on fire alarm circuit. **The importance of early resolution of the fire protection requirements cannot be overemphasized.**

(9) Type, adequacy and routing of supporting structure(s) for telecommunication cable.

Electronic Systems:

(a) System engineering concepts. Describe the proposed type of system, its functions and the interrelationships if the system is a multi-use system (i.e., security, etc.; See items (m) and (n) below).

(b) Indicate circuit requirements.

(c) Indicate equipment selection in such categories as: Owner furnished equipment; standards manufacturers or commercially available items; and special equipment.

(d) Describe site or location considerations.

(e) Describe bonding and grounding requirements.

(f) Describe communication and control cables and radio links.

(g) Identify test equipment, repair shop, and spare parts storage requirements.

(h) Describe equipment, instrumentation, arrangement, and space requirements. indicating requirements for racks, consoles, and individual mountings. Provide the most economical design in first cost, operation and maintenance costs, and operating conditions conforming to best engineering concepts.

(i) Identify wiring and cabling requirements plus terminations.

(j) Identify power and lighting requirements, including emergency or standby requirements.

(k) Describe air conditioning, including humidity and dust-control requirements.

(l) Identify interference and clearance requirements.

(m) State security requirements for Security/Entry Control System.

(1) Identify separately from the other project elements the requirements for Intrusion Detection Systems (IDS). Any of the following items and their interconnecting circuits may be considered part of an IDS:

Annunciation Panels and Cabinets
Visual and Audible Annunciators
Magnetic Switches
Proximity Sensors
Volumetric Sensors
Wire Grids
Vibration Detectors
Power Supplies Integral to Items on this List
Closed Circuit Television Cameras and Monitors, and
Video Recorders used for Intrusion Detection Purposes
Access Control Systems

(2) IDS installation can be divided into three general functional categories:

(a) Sensitive compartmented information facilities.
(b) Conventional arms, ammunition, and explosives storage sites (AA & E).
(c) All other (including but not limited to communication facilities, special training facilities, special operational facilities, intelligence facilities, etc.).

Describe access control equipment (versus IDS) when required and outline locations, function, and area of control.

Energy Monitoring and Control System (ECMS):

(a) Indicate if any EMCS will be utilized.

(b) Indicate if the EMCS will be stand alone or tied into central system.

(c) Indicate if a sole source is required for tie in.

(d) Describe the EMCS proposed to be used.

Site and Landscaping:

(a) Describe site and facility location and give reasons for selection and orientation.

(b) List and/or describe utilities available at the site.

(c) Describe existing vegatation, bodies of water, topography, and soil conditions.

(d) Describe existing site improvements to remain, to be altered, and to be demolished.

(e) Describe existing pedestrian and vehicular access, roads, sidewalks, and parking to include accessibility for the disabled.

(f) Describe proposed site improvements.

(g) Describe proposed contours, bodies of water, and landscaping improvements.

Water Supply:

(a) Describe the existing system including, but not limited to, the type, capacity, condition, present water use, and unsatisfactory elements.

(b) State type of construction proposed, materials for water mains, type of well, etc.

(c) State design factors with present and projected design population loads for sewage treatment plants. Coordination with appropriate state/local regulatory agencies is required.

(d) State materials to be used for sewer systems and sewage treatment plants.

(e) Identify standards (federal, state, local) governing the design.

(f) Describe the impact of steam condensate and cooling water discharges on existing sewer lines and sewage treatment plants and the estimated cost of distribution and treatment of this additional loading.

Sewers and Sewage Disposal Systems:

(a) Describe the existing system indicating particularly the type, capacity, condition, present flow and unsatisfactory elements.

(b) State degree of treatment necessary by effluent requirements and units needed to treat.(c) State design factors with present and projected design population loads for sewage treatment plants. Coordination with appropriate state/local regulatory agencies is required.

(d) State materials to be used for sewer systems and sewage treatment plants.

(e) Identify standards (federal, state, local) governing the design.

(f) Describe the impact of steam condensate and cooling water discharges on existing sewer lines and sewage treatment plants and the estimated cost of distribution and treatment of this additional loading.

Roads, Driveways, Parking Areas and Walks:

(a) State general soil conditions, with a brief outline of soil exploration and testing performed. Indicate CBR valve and pavement recommendations. (Show typical paving section on the drawings.)

(b) Describe the type and volume of traffic, controlling wheel loads and types or classes of roads under consideration. Justify any deviation from criteria thickness for these classes.

Dust and Erosion Control:

Dust and erosion control will be considered an integral part of all design and construction projects. Such controls will be generally limited to areas actually scarred or denuded in the process of constructing a project. Dust and erosion control will not be confused with landscaping. Preliminary submittal will contain the necessary design data, and costs for dust and erosion control measures where applicable. The Basis of Design will include a narrative regarding the type of treatment selected, affected areas, and reasons for selection of type and determination of areas.

Fencing: State type, heights, and justification for fencing.

Stormwater Management:

Describe the measures to be taken and/or features/structures required to comply with Stormwater Management Regulations.

Building Systems and Equipment Checklist

The Building Systems & Equipment Checklist form is available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

On the Forms Center, search for Form "DGS-30-232" to download the current copy of this form. The form is available in Adobe pdf format. (The data may be typed in the form or printed and completed manually.)

APPENDIX E: COST ESTIMATE REQUIREMENTS AND FORMAT

1. GENERAL

All estimates shall be prepared in the **systems format** and shall be summarized on a **Building Cost Summary** form. The Building Cost Summary form (Form Number DGS-30-224) is available as an Excel spreadsheet template which may be downloaded from the DGS Forms Center (http://forms.dgs.state.va.us). **A printed copy of the Building Cost Summary form and the associated supporting estimate backup shall be provided with each submission. Unless waived by the Director of the Bureau of Capital Outlay Management, the Agency shall require their design and cost consultants to submit an electronic copy of each completed Building Cost Summary form**. The electronic copy of the form (i.e., spreadsheet) may be submitted to BCOM either on diskette, or as an e-mail attachment.

The estimate backup material for each submittal shall be consistent with the level of design required for that submittal. Accurate quantity take-off, inclusion of all appropriate standard systems, and accurate unit prices for the project's location are fundamental to the development of a good cost estimate. Properly prepared cost estimates provide a check of the plans and specifications for constructability, coordination, conflicts, discrepancies, and omissions. They are used to establish/ verify budgets, to develop historical data for future estimates, and for verification of the Contractor's initial Schedule of Values (CO-12).

The estimate at each submittal is expected to reflect the A/E's or Agency's Independent Estimator's best information and experience. Pricing must reflect all requirements of the contract plans and specifications. Estimate backup may be prepared manually or by utilizing computerized estimating programs, however, the estimate must be summarized using the Building Cost Summary spreadsheet. A detailed breakdown of the components of each system or assembly shall be calculated, quantified and costed. The total system cost, a system quantity, a unit cost for the system, and a unit cost per square foot of gross building area shall be calculated for each system and summarized on the Building Cost Summary spreadsheet.

Separate estimates will be prepared for each new non-identical building, structure, or addition costing over $50,000 contract cost. Costs of alteration work to existing buildings will not be included with the building addition costs. When one construction contract contains more than one type of work (i.e., new construction, repair, equipment installation, etc.), the estimate shall be structured such that each type of work is identified separately. In addition to an overall or master summary sheet, each type of work requires a separate summary sheet. Costs from these separate summary sheets must be directly transferable to the master summary sheet. Refer to the notes on page 1 of the Building Cost Summary form.

When the estimates exceed the approved or proposed construction budgets, the agency, in consultation with their design and cost consultants, shall describe how they will address this issue.

2. SCHEMATIC DESIGN/PROJECT CRITERIA PHASE ESTIMATE

The Schematic Design Construction Cost Estimate shall be developed in the "systems" format. Each system shall include a description or listing of the components or items included in that unit cost. To the extent possible, major systems or commodities should be quantified. Where quantification is not practical, the key assumptions made while developing the estimate must be described.

3. PRELIMINARY PHASE ESTIMATE

The Preliminary Estimate shall be based on a materials take-off from the preliminary documents. The estimate for this submittal shall reflect cost based on reasonably accurate take-off of material/systems consistent with the level of design. For those elements of the project where the status of design does not permit a reasonably accurate take-off of quantities or firm pricing of individual items of work, system unit prices may be used. Lump sum costs are not acceptable. Use of empirical costs shall be minimized. **The Preliminary Building Cost Summary backup shall use the systems format.** If the difference between the **A/E cost estimate** and the **Independent cost estimate** is **10% or greater**, the Agency shall provide a **reconciliation** of the two consultant's estimates.

4. FINAL/WORKING DRAWINGS PHASE ESTIMATE

The A/E shall provide a final estimate based on the working drawings and specifications and shall be prepared using the systems format. A full and accurate description of each system shall be provided in the estimate. Quotations shall be obtained for all items of substantial quantity or cost. Documentation must be provided for all major items of equipment included in the project. "Estimated prices" are considered to be quotations that are reasonable expectations of the price a Contractor will be expected to pay. Estimates that do not conform to these formats and information requirements will be returned for revision. **Separate estimates must be prepared for each additive bid item** included in the documents and shall be in the proper format.

5. SUMMARY OF ESTIMATE SUBMISSION REQUIREMENTS

Design Phase	A/E Estimate	Owner's Independent Estimate
Schematic Phase	Required*	Optional (at owner's discretion)
Preliminary Phase	Required*	Required*
Working Drawing Phase	Required*	Optional (at owner's discretion)

* - Required are the following:

- a hard copy of the Building Cost Summary sheet(s) and supporting estimate backup must be submitted to BCOM
- an electronic version of the completed Building Cost Summary worksheet(s) must be submitted to BCOM (the Excel spreadsheet template, "Form DGS-30-224" is available for download from the DGS Forms Center)

COST ESTIMATING STANDARD SYSTEMS DESCRIPTIONS

Building Systems Descriptions

Includes cost of construction of all work inside the line 5 feet from the building. Cost each system separately. Same systems were indicated for entry on Summary Sheet.

System	System Unit	Unit/Measure
Foundation	Ground Floor	Sq. Ft.

Includes excavation and backfill for foundation and basement construction, pile caps, footings, grade beams, piers, foundation walls, basement walls, fill under floor slabs and all required construction to the first floor elevation, excluding all structural floor slabs, ground slabs, basement structural framing, piling, structural fill, and soil treatment. Special foundations such as compacted structural fill, piling, caissons, and other work required to prepare the site for the building construction should be included in the **SITEWORK & UTILITIES** portion of the estimate under "Special Building Foundations" category

Slab-on-Grade Slab on Grade Sq. Ft.
Includes all ground slabs and vapor barrier, waterproofing, wire mesh, capillary fill and soil treatment. Includes ground slab, reinforcing steel, waterproofing and soil treatment for structural slab placed on fill where fill is used as form. Borrow fill under slab is included in Earthwork system.

Structural Frame Gross Building Area Sq. Ft.
Includes structural frame consisting of skeleton frame of building, i.e., columns, girders, cantilevered members extending beyond exterior walls, and fireproofing. Excludes framing in direct support of floor or roof construction.

Supported Floor Supported Floor Sq. Ft.
Includes construction of structurally integrated or independently supported floors, i.e., steel decking, joists, beams, slabs, precast concrete decking with topping steel reinforcing and other related items to provide a complete structural floor. Excludes applied finishes which are part of "Interior Finishes."

Roof Structure Roof Area Sq. Ft.
Includes construction of structurally integrated or independently supported roofs, i.e., precast concrete roof slabs, concrete topping, steel decking, joists, beams. Roofing system excluded.

Roofing Roof Area Sq. Ft.
Includes roof curbing, roof insulation, roofing, gravel stops, gutters, and downspouts, flashing, skylights, roof-access hatches, and other related roofing items.

Stairs Number of Risers Each
Includes interior and exterior building stairs, landings, platforms, and railings.

Elevators Number of Stops Each
Passenger or freight elevators including conveyor cab, doors, controls and rails.

Exterior Walls Exterior Wall Area Sq. Ft.
Includes bearing or non bearing walls from inside rough wall to outside finish walls, parapet walls, damp proofing, flashing, insulation, waterproofing, balcony walls and handrails. Includes exterior finishes, caulking and painting.

Interior Walls Interior Wall Area (1 side) Sq. Ft.
Includes partitions, bearing or non bearing walls, extending from floor-to-floor or floor-to-ceiling excluding finishes. Includes masonry walls, steel or wood stud framing, blocking, acoustic material (insulation), bracing, and anchorage, **but excludes** painting, gypsum board or other applied finish.

Interior Finishes Gross Building Area Sq. Ft.
Includes finishes applied to floors, walls, ceilings, stairs and ramps such as wall covering, resilient flooring tile, terrazzo, wood, carpeting, acoustical tile, plaster, paint, gypsum board, suspended ceiling systems, caulking, and all related trim work.

Doors & Hardware Surface Area one Side Sq. Ft.
Includes all exterior and interior doors, frames, hardware, caulking and painting.

Windows Glazed Walls Surface Area One-Side Sq. Ft.
Includes windows, glazed wall systems, glazing, caulking, and painting.

Specialities Gross Bldg. Area Sq. Ft.
Includes chalk and tack boards, signs and plaques, flag poles, access flooring, telephone enclosures, ladders, storage shelving, toilet and bath accessories, fireplaces, compartments and cubicles, movable partitions, identifying devices, protective covers, postal specialities, scales, exterior sun control devices and wardrobe specialities, excluding special mechanical or electrical equipment.

Plumbing-Domestic Number of Fixtures Each
Includes water supply and treatment, wastewater disposal and treatment, plumbing equipment, fixtures and trim, and insulation, i.e., hot and cold water pipes, waste, soil and vent pipes, water heaters, water coolers, floor drains, and roof drains. Fixture count shall include 1 fixture for each bathtub, shower, drinking fountain, water heater, water cooler, lavatory sink, slop sink, wash fountain urinal, water closet and roof drain. Also, 1/2 fixture shall be included for each rough-in without a fixture (i.e., ice maker rough-in), floor drain and wall hydrant.

Heating, Ventilation, and Air Conditioning Capacity MBTU or Tons

Includes heating, ventilating and air conditioning systems, i.e., heat generating equipment, refrigeration, air distribution, piping, controls and instrumentation, and insulation.

Fire Protection Gross Area Protected Sq. Ft.

Includes sprinkler pipe, fittings, valves, pumping equipment, tanks, sprinkler heads and controls. Also include carbon dioxide and other fire protection systems.

Power Connected Load KW

Includes all interior distribution for power and special electrical systems, i.e., switchboards, transformers, motor controls, distribution switches, motor starters, feeders, branch-circuit wiring and devices, panels and lightning protection. Exclude all interior distribution for lighting fixtures and emergency lighting, i.e., light fixtures, branch circuit wiring and devices for lighting.

Lighting Gross Bldg. Area Sq. Ft.

Includes all interior lighting fixtures, exit and emergency lighting, branch circuit wiring, conduit, and devices for light fixtures only.

Special Electrical Gross Bldg. Area Sq. Ft.

Includes all special electrical systems such as Telephone, CATV, Direct Current, Uninterruptable Power Supply (UPS), Emergency Generators, Data Communications, Fire Alarm, Security Detection and EMCS.

Built-In-Equipment Bldg. Gross Area Sq. Ft.

Includes contractor furnished and installed specialty equipment such as casework, shelving, exhaust hoods, coolers, freezers, kitchen equipment, and stage apparatus for hospitals, clinics, food services, chapels, theaters, rifle ranges, laboratories, libraries, etc.

Other Special Systems Gross Bldg. Area Sq. Ft.

Includes systems such as Vacuum, Oxygen, Compressed Air, Vehicle Exhaust, Dust Collection, Bridge Cranes, Vehicle Lifts, Hoists, Monorails, Conveyors, etc. Cost each system individually in estimate and enter sum total on Summary Sheet.

Interior Demolition Gross Building Area Sq. Ft.

Includes all interior building demolition connected with new construction or alternatives. Also includes any work on, or in, the exterior wall. Does not include complete building demolition.

HAZMAT Abatement Total Cost Lump Sum

Includes costs for abatement of asbestos, lead based paint, and other hazardous materials in existing areas of buildings, as well as costs for sealing off areas, lead based paint removal, asbestos removal or encapsulation, monitoring, testing, disposal, change areas, protective clothing, respirators, and other related costs.

SITEWORK, UTILITIES & IMPROVEMENT DESCRIPTIONS

Exterior Electrical Distribution Length of Run Lin. Ft.

Includes overhead power distribution, i.e., poles, crossarms, insulators, guying, terminations, lightning protection, wire and cable, and underground distribution, i.e., excavation and backfill, concrete encased duct bank, direct burial duct, manholes, handholes, cable, terminations, stress cones, and grounding. Also includes costs of transformers and substations for Agency-owned systems. Add in this total the costs of exterior Fire Alarm, EMCS, security and similar distribution lines.

Area Lighting Number of Fixtures Each

Includes poles, fixtures, excavation and backfill, concrete work, wire, duct and conduit.

Exterior Mechanical Distribution Length of Run Lin. Ft.

Includes overhead and underground mechanical distribution system such as steam, hot water, condensate, chilled water, natural gas, compressed air systems and piping, insulation, valves, trenches, excavation, backfill, manholes, supports, anchors, etc., as required to provide the systems outside the building 5' line.

Water Distribution Length of Run Lin. Ft.

Includes complete potable water distribution system, i.e., utility service connections, fire hydrants, excavation and backfill, pipe, valves and fittings outside building 5' line. Also includes pump station and booster pump if required.

Sanitary Sewers Length of Run Lin. Ft.

Includes complete sanitary sewer system, i.e., utility service connections, excavation and backfill, sheeting and shoring, dewatering, pipe and fitting, manholes, cleanouts, septic disposal and process and acid waste system outside the five-foot line. Also includes pump/lift station if required.

Stormwater System Length of Run Lin. Ft.

Includes utility service connections, excavation and backfill, sheeting and shoring, dewatering, pipe and fittings, manholes, catch basins, curb inlets, dry wells, ditches and culverts, retention ponds, detention ponds, underground detention structures, and headwalls. Also includes culverts, drainage facing materials, erosion control material and devices and slope protection from storm water runoff.

Paved Roads Paved Area Sq. Yd.

Includes paving, tack and seal coats, curbs, curbs and gutters, subgrade preparation, fine grading, compaction, sub-base course, base course, wearing course, finish course, rails and barriers, reinforcing, expansion/ control joints, wheel stops and pavement markings.

Paved Parking Paved Area Sq. Yd.
Includes paving, tack and seal coats, curbs, curbs and gutters, subgrade preparation, fine grading, compaction, sub-base course, base course, wearing course, finish course, rails and barriers, reinforcing, expansion/ control joints, wheel stops, and pavement markings.

Earthwork Volume (Cut + Fill) Cu. Yd.
Includes site grading, site excavation, soil stabilization, soil treatment, and site clearing. Also includes removal and disposal of unsuitable material; obtaining, placing, rolling, compaction, and proof rolling new/borrow material.

Landscaping Area Planted Sq. Yd.
Includes trees, shrubs, ground covers, and planters. Also includes fine grading and leveling, fertilizer and limestone application, spreading and leveling topsoil, seeding, mulching and sodding.

Site Improvements Area Developed Sq. Yd.
Includes retaining walls, terrace and perimeter walls, signs, site furnishings, fountains, pools and watercourse, flagpoles and other miscellaneous related items. Also includes recreational areas/playing fields, recreational equipment, walks, ramps, steps, restrooms and similar improvements.

Supporting Structures Lump Sum Each
Includes treatment facilities, equipment buildings, pollution abatement structures, oil water separators, electro-static precipitators, wash platforms, guardhouses and similar structures. (Sum supporting structures with Site Improvements and enter as Site Improvements and Cost Summary sheet.)

Fencing Length of Fence Lin. Ft.
Includes footings, posts, fencing materials, alarms, gates and turnstiles for perimeter fencing. Includes station perimeter and individual facility.

Special Building Foundations Length E- 3E- 2Lin. Ft.
Includes driven piling of wood, steel or concrete; caissons; pressure injected footings; cast-in-place piling; special or dynamic compaction; and other special building foundation systems required.

Demolition-Site Lump Sum Each
Includes removal, hauling and disposal of utilities, buildings, roads, paving, slabs, foundations, structures and related existing site features.

Building Cost Summary Sheet

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

To view/download the latest version of the Building Cost Summary Sheet (Form "DGS-30-224"), visit the website listed above and enter "DGS-30-2244" in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX F: CHECKLIST FOR OPENING BIDS

The Agency shall assure that the person receiving bids, called the Bid Officer, is thoroughly trained / knowledgeable in the proper procedure for receiving and documenting bids.

PROCEDURES FOR RECEIVING BIDS

(1) On the morning bids are due, check the time on the clock, the date/time stamp, and the FAX machine in the bid receipt area to assure the times are coordinated and correct. Assure that the clock visible to bidders in the bid receipt area shows the correct time.

(2) When bids or modifications are delivered to the bid receiving office, the bids shall be date stamped and the time noted or stamped on the envelope showing the time of receipt.

(3) The bid receipt deadline must strictly comply with the specific time called for in the Invitation for Bids. It is suggested that the Bid Officer give a warning that the Bid Receipt Deadline is near such as **"The time is.now 1:55 pm and all bids must be received by 2:00 pm."**

The Bid Officer shall be responsible for deciding when the Bid Receipt Deadline has arrived and shall announce **"The 2 PM Deadline has arrived. All bids and bid modifications in our possession at this time are deemed to be timely. No further bids or bid modifications will be accepted."**

(4) When multiple bids are delivered just prior to the bid receipt deadline, the Bid Officer shall accept the bids up to the deadline without taking time to note the time on each bid. After announcing that the deadline has arrived, the Bid Officer or assistant should note on those bids which were timely but not stamped that the bids were received prior to the 2:00 pm deadline.

(5) If a bidder wishes to change the amount of his bid, such change must be received by telegram, Facsimile, letter or written on the outside of the bid envelope before the time set for receipt of bids. Methods for modifying the bid are further described in the Instructions to Bidders, CO-7a.

(6) The bids, including any modifications, shall be kept in a locked security container by the Bid Opening Designee.

PROCEDURES FOR OPENING BIDS

(1) Once the Agency Bid Opening Designee determines that the bid opening hour has arrived, a **statement should be made as to the number of bids received.** It is prudent to inquire whether any bidder has any question about the pending opening. After receiving either a negative reply or after answering questions, proceed to open the bids in alphabetical order. **Do not open work papers!**

(2) Paragraph 4 of the Instructions to Bidders requires the Contractor to place its Contractor License Class and License Number on the envelope and on the bid documents. Para. 4(c) of the CO-7a gives instructions for action if not shown.

(3) Prior to revealing any of the information in the bid, the Bid Opening Designee must verify that
- the Bid Bond or Certified Check in the amount of 5% is attached where required and
- that the Form of Proposal is signed by the bidder and
- Bidder information complies with Item 4(b) and (c) of the Instructions to Bidders.

Only then shall the other bid information be revealed. If the Bid Bond or Certified Check is not included or if the Bid is not signed, the bid shall not be read or considered.

(4) If a modification to the bid has been received, check it to assure that it has been signed by one of the persons listed on the Bid Form as authorized to make such modifications. If If the modification was not inside the envelope or written on the outside of the envelope, check the time received to assure that it was before the deadline.

(5) After Opening the Bid envelope and checking for the information above, state the following items and record on the bid tabulation form:

a. Bidder/Contractor's Name
b. Virginia Registration No.
c. Work papers were ____ were not ___ submitted.
d. Receipt of Addenda 1 thru ___ are acknowledged.
e. Bid Bond or Certified Check is _____ is not _____ included.
f. Bid Form is signed.

THEN

g- **Read Bid Information**

- Any proper Bid Modification received,
- Part A. Building Base Bid Amount,
- Part B - Sitework Base Bid Amount,
- any other Parts of the Base Bid,
- the TOTAL BASE BID AMOUNT, and
- then any Additive Bid Item Amounts in order.
- (days for completion if Bidder was allow to state such on the Bid Form)

h. Any **qualification** to the requested information on the Bid Form shall be noted as the bid is read.

AFTER BID OPENING IS COMPLETE.

a. Keep all bids, work papers, etc. until **2 hours** after bid opening to allow the Bidders to state he made a mistake. **Do not open Work Papers unless low bidder claims an error!**

b. After two hours, return all Bid Bonds, checks, etc., to all but 3-lowest bidders. Work papers can be returned to all.

c. Keep bids and bid bonds or checks from 3-lowest bidders until Contract is signed.

d. Contact Department of Professional and Occupational Regulation, Contractor's Section, and verify Contractor Class and Registration No. of the 3 lowest bidders (and listed subcontractors, if any).

e. Prepare an official tabulation of bids indicating:

- Name and Project Code of project as on the specifications
- Time and date of bid receipt and opening
- Exact Name, address, telephone & FAX numbers of Bidders
- Bidder's Virginia Registration Number (or non-requirement statement).
- All amounts bid for Base Bid(s), Parts, the Total Base Bid Amount, any Bid Modification and Additive Bid Items.
- Completion time stated, if Bidder was given the option.
- Acknowledgement of receipt of all addenda and number of addenda issued.
- Whether or not sealed work papers were submitted.
- Name of Agency Bid Opening Designee.

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APPENDIX G: ROOF INSPECTION FORMS AND PROCEDURES

1. The Roof Inspector

The minimum qualifications below serve as criteria for Owners who must select an outside, full-time roofing inspector:

A. The Inspector should have **a** thorough knowledge of roofing details, flashing, and systems employing single-ply, built-up, metal, shingle, slate, or other membranes as the main weatherproof barrier.

B. The Inspector should have attended at least three formal schools/ seminars (for example: AIA, BURSI, RCI, CSI, NRCA or RIEI seminars) providing no less than a total of four (4) continuing education units, have a registered roof observer registration from RCI (or a Quality Assurance Observer Certificate from RIEI for the roof system to be observed) or have equivalent training as approved by BCOM.

C. He should be thoroughly familiar with the latest edition of the NRCA Roofing and Waterproofing Manual.

D. The Inspector should have a minimum of five years of full-time, practical roofing experience or approved equivalent experience.

E. He should identify, in writing, at least three projects where he has been the full-time roofing inspector. He should provide names, addresses, and telephone numbers of roof owners and Architects/ Engineers for the roof projects.

F. He should be trained and competent in the services he is providing.

G. Roof Inspector's Scope of Work:

(1) The Inspector shall monitor the work continuously during installation of the roof.

(2) He shall monitor the work for compliance with the contract documents and the State's Roofing Policy of Chapter 7 of the **Manual.**

(3) He shall immediately report any deviations from the contract documents, the State's Policy, or good roofing practice to the Architect and Owner. **A** written report shall follow an oral report.

(4) The Inspector may recommend suspension of work or rejection of non-complying work to the A/E and Owner.

(5) He shall not:

(a) Allow roofing materials to be installed until the manufacturer's certification that the roofing materials comply with specified ASTM or other approved standards are received. He shall notify the Owner so that appropriate action can be taken.

(b) Authorize deviations from the contract documents.
(c) Enter the area of responsibility of the Contractor's superintendent.
(d) Issue orders on any aspect of construction means, methods, techniques, sequences, procedures, or safety in connection with the work.

(6) The Inspector shall keep a daily log (refer to the form at end of this appendix.) for each project and shall give a copy of the log to the roofing contractor. The Inspector shall record all pertinent information such as weather, daily progress, workmen on the job, material storage, deck condition, bitumen temperature, installation procedures, quality of workmanship, job-related visitors, and so forth.

2. The Roof Consultant

The Consultant should have the following qualifications:

A. Roof consulting and testing services should be the Consultant's full-time occupation.

B. He should have a minimum of five years of field experience in providing the service.

C. He should have completed at least three service contracts in the recent past. Work for each of the completed contracts should be roughly equivalent in size and complexity to the proposed work.

D. He should be required to submit three complete surveys of roofs that were repaired, recovered, or replaced; names, addresses and telephone numbers of roof owners; and Architects or Engineers responsible for preparing the drawings and specifications.

E. He should have attended at least three formal roofing schools/ seminars (RIEI, BURSI, RCI, NRCA, AIA, CSI Seminars, for example). The seminars should be the type that gives CEU (Continuing Education Unit) credits. **A minimum total of four (4) CEU credits should have been received.**

F. He should be trained, experienced and competent in performing required services.

G. If testing is required, he shall be appropriately trained, certified, licensed in the testing procedures (infrared, nuclear, electrical capacitance surveys; core sampling; ASTM procedures; gravimetric analysis; and so forth) required for the service.

H. He should submit resumes of his firm and all employees participating in the service.

I. His resume should describe other related services and contributions, such as writing, lecturing, and serving as an expert witness that he has provided. He should list any professional qualifications or licenses.

J. The resume form must be submitted with the roof Consultant's response to the Owner's request for proposal. It will be used with other requested items to evaluate the applicant.

3. Non-Destructive (NDE) Roofing Surveys

A non-destructive (NDE) Survey uses infrared or nuclear and electric capacitance moisture detection equipment to locate unacceptable moisture within a roofing system. An infrared or nuclear survey may be used alone; electric capacitance is acceptable only if it is used with infrared or nuclear surveys.

An NDE survey is mandatory before a newly constructed roof may be accepted. Depending on the size and condition of an existing roof, a survey may or may not be required before an Agency may repair or replace the roof. The following outlines requirements for NDE surveys:

A. Equipment, subject to the Owner's approval, shall be equal to the following:

(1) Infrared: AGA 720 system or Inframetrics 520 system
(2) Nuclear: Seaman Troxler 3216 Roof Reader, Nuclear Model R-50 or later model
(3) Electrical Capacitance: **As** approved by the Owner

B. Surveys

(1) Infrared: Provide a complete survey of the roof or roofs. Outline all anomalies with spray paint. Provide a thermogram showing the outlines and daylight photographs of all anomalies. If video thermogram imaging is used, provide the Owner with the video tape of the survey. Roof markings, thermogram, and photographs shall be numbered so that features can be readily identified and coordinated.

Walkover surveys shall be performed in a pattern of 20'-0" maximum (20 foot maximum distance between walk paths), however the distance between walk paths shall not exceed the sensitivity of the instrument being used. Instrument sensitivity shall permit recognition of areas of wet insulation as small as 6 inches on a side. Surveys, inspection procedures, reports, etc. shall be conducted in accordance with the requirements and procedures in ASTM C1153, "Standard Practice for the Location of Wet Insulation in Roofing Systems Using Infrared Imaging", except as otherwise noted in this Appendix.

(2) Nuclear: Provide a grid, comprising 5'-0"on-a-side grid unit, to completely cover the roof or roofs. **Mark** each grid intersection with spray paint. Take readings at the inter-sections and record them on a roof plan. Provide daylight photographs of anomalies.

C. Core Samples

Since NDE surveys are not able to measure moisture in roofs directly - nuclear equipment responds to hydrogen emissions, infrared to heat changes - core samples to measure actual moisture content must be taken from surveyed roofs and correlated with NDE readings. The samples shall be taken as follows:

(1) One is required on roofs showing no anomalies. Additional cores are not required if the Consultant can show that moisture is not causing detected anomalies. The Consultant shall identify such anomalies and explain their cause in a written report to the Owner.

(2) On all other roofs a minimum of one dry and one wet core shall be taken from each roof surveyed.

(3) As many cores as needed should be taken to establish moisture counts and changes, but no more than five cores shall be taken from any roof.

D. Gravimetric Analysis

As soon as possible after samples are taken, cores should be sealed in air tight containers and taken to a laboratory for analysis.

(1) Analyze samples gravimetrically to determine percent of moisture in any required core sample taken from new roofs and, unless waived for justifiable reasons, from existing roofs.

(2) Identify all materials - surfacing, membrane (and number of plies), insulation, vapor barriers, adhesives, etc. - in the cores.

E. Moisture Conditions

The Surveyor shall correlate survey reading results with actual moisture conditions determined by core samples gravimetrically analyzed. The correlation shall be shown or tabulated on the drawings.

F. Report

The Consultant shall submit a written report explaining what the problems are, what to do about them, and what the costs are. Specifically, the report shall:

(1) Identify and describe all anomalies.

(2) Identify and describe any visual survey defects that may be harmful to the roof.

(3) Give the causes for each anomaly and defect.

(4) Recommend alternate courses of corrective action for defects and anomalies harmful to the roof.

(5) Provide the cost for correcting the defects and anomalies.

4. Drawings

The consultant hired to survey roofs shall provide plans complying with the following:

A. General Requirements are:

(1) Print size, preferably, should be 24" X 36"; but in no case larger than 36" X 46".

(2) Minimum drawing scale is 1/8" = 1'-0" for roofs or portions of roofs surveyed.

(3) Provide one reproducible print (Mylar, etc.) and two non-reproducible prints, as **a** minimum, for each sheet of drawings.

(4) A legend defining all symbols and explaining abbreviations.

B. Drawings shall show the following as a minimum:

(1) All roofs surveyed

(2) State identification, title, and date

(3) An orientation north arrow and drawing scale

(4) The area of each roof and approximate overall dimensions

(5) All existing features, equipment, and roof penetrations of whatever nature (such as vents, stacks, drains, hatches, skylights, screens, railings, mechanical equipment, etc.) shall be accurately indicated, identified, and drawn to scale.

(6) All roof slopes and valleys noted with drainage arrows. If there is no slope, state that the roof is dead level.

(7) Where flashing is carried to a vertical surface, identify the surface (roof vent, masonry parapet, etc.) and give its height from roof level.

(8) For a visual survey, show and explain all roofing defects and anomalies. Show interior damage (to the roof system) by dotted line.

(9) For an infrared survey, accurately delineate moisture anom-alies with contour lines; for a nuclear survey, show all grid point readings and define areas having unacceptable moisture by contour lines. Show where core samples were taken. Correlate nuclear grid point readings and infrared contour changes to percent of moisture. Dimension areas recommended for removal and locate them with respect to fixed identifi-able features (such as parapets).

(10) Provide at least one detail section (3/4" = 1' - 0" minimum) showing roof construction where core samples were taken; more if there are differences in construction from core to core. Identify surfacing material, membrane product, insulation type and thickness, vapor barrier if used, and deck construction.

ROOFING FORMS

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

For a listing of current DGS forms applicable to the design and construction process, download Form DGS-30-000 (Capital Outlay Management Forms Available for Download from the DGS Forms Center).

The following roofing forms are available for download from the Forms Center:

Form Number	**Description**	**File Type**
DGS-30-328	Roofing - Installation History	Word
DGS-30-332	Roofing - Built-up Roofing Data	Word
DGS-30-336	Roofing - Metal Roofing Data	Word
DGS-30-340	Roofing - Shingle Roofing Data	Word
DGS-30-344	Roofing - Single Ply Roofing Data	Word
DGS-30-348	Roofing - Inspection Checklist	Word
DGS-30-352	Roofing - Daily Inspection Log	Word
DGS-30-356	Roofing - Consultant/Inspector Resume	Word

To view/download the latest version of a form, visit the website listed above and enter the Form Number (e.g., "DGS-30-328") in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX H: GUIDELINES FOR NON-CAPITAL OUTLAY BUILDING PROJECTS

GENERAL

In general, the procedures for **non-capital outlay projects** are the same as those for Capital Outlay Projects **with the exception of the requirement to submit Forms CO-2, CO-4, CO-5 and CO-6** to BCOM/DEB for approval. All building construction, additions and renovations must have a Building Permit as described in the Building Permit Policy included in Appendix P. Some work may be permitted by the agency under the Annual Permit Program for those agencies which have received such a permit. The plans and specifications for all other building construction and additions and those renovations which affect the Use Group Classification, the type of construction, means of egress, or other "life safety" features must be submitted to the Building Official for review along with a Form CO-17A, Application for a Building Permit. The Technical requirements and the procedures for procurement of construction (both Capital Outlay and Non-Capital Outlay) are covered by the **Commonwealth of Virginia Construction and Professional Services Manual for Architects & Engineers** and the **companion Commonwealth of Virginia Construction and Professional Services Manual for State Agencies**.

ARCHITECT/ENGINEER

- The A/E is responsible for having copies of the **Commonwealth of Virginia Construction and Professional Services Manual for Architects & Engineers (the A/E Manual**), the VUSBC, and the referenced codes and standards.

- Procedures for solicitation, selecting and contracting with the A/E described in Chapters 3, 4, 5, and 6 of the **Manual** should be followed by the Agency.

- Form CO-3, CO-3.1 or CO-3.2 should be used for the contract along with a Memorandum of Understanding (MOU) defining the A/E's specific scope of work, schedule, etc.

CODES AND STANDARDS

- Technical standards in Chapter 7 of the **Manual** are applicable to the design of all state projects.

- The VUSBC applies to the project.

- Accessibility Standards cited in Chapter 7, Section 700.C, also apply to state projects.

- The standards and guidance in Chapter 8 of the **Manual** should be followed in the preparation of the plans and specifications; especially Section 802 -Drawing Standards, Section 803 - Specification Standards, and the Sections describing the content of drawings.

- The **GENERAL CONDITIONS OF CONSTRUCTION CONTRACT, Form CO-7** and the **INSTRUCTIONS TO BIDDERS, Form CO-7a**, shall be used for building projects, whether new, renovations or additions.

- For consistency in working with "Building Contractors" on state building projects, the following CO Forms shall be used for execution of the construction contract:

CO-9	Contract Between Owner and Contractor
CO-9.1	Notice of Award
CO-9.2	Notice to Proceed
CO-10	Commonwealth of Virginia Standard Performance Bond
CO-10.1	Commonwealth of Virginia Standard Labor and Material Payment Bond
CO-11	Contract Change Order
CO-12	Schedule of Values and Certificate for Payment
CO-13	Affidavit of Payment of Claims
CO-13.1a	Certificate of Substantial Completion by Architect/Engineer
CO-13.2a	Certificate of Substantial Completion by Contractor

PROCEDURES PRIOR TO BEGINNING CONSTRUCTION

- Once plans and specifications have been completed, the Agency shall obtain a Building Permit from the Building Official (thru BCOM) or from the Agency Designee for those projects /work which can be performed under the Annual Permit where applicable.

- For those projects which must be submitted to the Building Official for review, submit the following to BCOM: electronic copy of Form CO-17a, BUILDING PERMIT APPLICATION; five (5) sets of Project Plans and Specifications. (It is suggested that this submittal be made to BCOM prior to bidding so that any deficiencies noted can be corrected prior to receipt of bids.)

- If the project is for renovation of existing facilities, also send one copy of the Project Plans and Specifications to the Regional Fire Marshal's office for review and comment.

- BCOM will review plans and specifications for compliance with the applicable Building Code, Standards, and Technical Requirements of the Manual. Assuming conformance with these requirements, a signed/approved building permit along with any comments and/or stipulations will be sent to the agency. If significant deficiencies are found or if the plans and specifications (or sketches and scope of work) are deemed insufficient to require code conforming work, a Permit will be denied and a resubmittal of corrected documents will be required.

- Agency shall send one copy of final plans and specifications and any addenda to the Regional Fire Marshal's office.

- Agency shall send copies of documents for approval to other review agencies such as Division of Soil & Water Conservation, State Water Control Board, etc., if required by the scope of the project.

PROCEDURES PRIOR TO OCCUPANCY

- Agency's Project Representative shall assure that all inspections and tests are performed to assure that the work performed conforms to the requirements of the applicable codes and standards and that the building is safe and ready for occupancy.

- Have Contractor complete Form CO-13.2 or 13.2a.

- Have Architect (or Agency Project Manager/Inspector) complete a Form CO-13.1 or 13.1a, a Form CO-13.3a, Application for Certificate of Occupancy, and a Form CO-13.3b, Checklist for Beneficial Occupancy.

- If new building, addition to or renovations of existing building, have Regional Fire Marshal inspect and provide report recommending acceptance for occupancy.

- On new buildings, on building additions, or on renovations that involve a change in Use Group Classification, the Agency submit above documents to BCOM. BCOM will review and prepare CO-13.3, Certificate of Occupancy, for signature and send signed Certificate to Agency.

APPENDIX I: PARAMETERS FOR LIFE CYCLE COST AND ENERGY ANALYSES

Parameters for Calculation of Life Cycle Costs and Energy Analyses

I. General Instructions For All Life Cycle Cost Analyses:

a. Costs are to be computed over a 30 year period, except as noted in Paragraph II below.

b. Costs for each alternative must be shown on the Life Cycle Cost Worksheet or an exact facsimile. Specific instructions for completing the worksheet are provided in Paragraph III below.

c. Include appropriate backup to support the summary figures shown on the worksheet. (i.e., indicate how the various costs were calculated and note the basis or source of the cost data.)

II. Additional Instructions For Calculating Life Cycle Costs For Energy Analyses:

a. Use the following periods for energy-related life cycle cost studies:

1) Building Envelop Studies:	30 years
2) Central Heating/Cooling Plants:	30 years
3) Building HVAC Systems:	20 years
4) Fuel Selection Studies	20 years

b. Average service lives of mechanical equipment shall be based upon the Average Service Life shown in the ASHRAE Applications Handbook.

c. Indoor and outdoor design conditions shall be as stated in the Manual or other criteria as approved by BCOM.

d. The type of system and the energy source shall be clearly noted on the Life Cycle Cost Worksheet.

e. The supporting backup shall clearly show the various fuel/energy rates (i.e., $s/gallon, $s/kwh, etc.) and the data source for each.

III. Specific Instructions For Completing Worksheets

a. Use a new Worksheet for each alternative.

b. Complete all general information at the top of the Worksheet.

c. Fill in Columns "a" thru "f" for each year. Use escalated costs. On the Worksheet, specify the annual escalation rate used for each cost category. In the supporting documentation, identify the source/basis for the chosen escalation rates.

d. Sum Columns "a" thru "e" for each year; subtract Salvage Value (Column "f") and place results in Column "g".

e. Multiply the Column " g " figures by the corresponding discount factor in Column "h" and place results in Column "i".

f. Sum Column "i" and place results in the box at the bottom of the Worksheet.

Building Life Cycle Cost Summary Worksheet

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

To view/download the latest version of the Building Life Cycle Cost Summary (aka, Form "DGS-30-228"), visit the website listed above and enter "DGS-30-054" in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX J: MISCELLANEOUS POLICIES AND MEMORANDA IMPACTING DESIGN AND CONSTRUCTION

COMMONWEALTH of VIRGINIA

Office of the Governor

George Allen
Governor

EXECUTIVE MEMORANDUM 2-97

FLOODPLAIN MANAGEMENT PROGRAM FOR STATE AGENCIES

Purpose

The purpose of this executive memorandum is to provide floodplain management policies and requirements to ensure the Commonwealth avoids unnecessary disaster cost and risk to human health, safety, and welfare; to emphasize the responsibility of all state agencies to promote flood hazard mitigation; and to assign responsibility for leadership and coordination to the Department of Conservation and Recreation, under the direction of the Secretary of Natural Resources.

National Flood Insurance Program: Policy and Requirements

The continued availability of flood insurance and many types of floodplain disaster assistance, development loans, and other financial resources are dependent on state and local participation in the National Flood Insurance Program (e.g. National Flood Insurance Act and regulations, Stafford Disaster Assistance Act). Lack of State compliance with the National Flood Insurance Program will result in State suspension from the program and increased disaster costs for the Commonwealth. The guidelines of the National Flood Insurance Program are not overly burdensome and provide common sense guidelines for avoiding risks in flood hazard areas.

1. The Department of Conservation and Recreation (DCR) shall be the coordinating agency for floodplain management and the National Flood Insurance Program. The Chief of the Floodplain Programs Section shall serve as the State Coordinator for the National Flood Insurance Program.

2. Pursuant to Section 10.1-603, *Code of Virginia*, and in accordance with 44 CFR Section 60.12 of the National Flood Insurance Program Regulations for Floodplain Management and Flood Hazard Identification, all construction or land disturbing activities initiated by an agency of the Commonwealth, or by its contractor, in floodplains shall comply with the locally adopted floodplain management ordinance.

   As a matter of policy, new state-owned buildings shall not be constructed within a 100-year floodplain unless a variance is granted by the Director, Division of Engineering and Buildings, in his capacity as Building Official for state-owned buildings pursuant to Section 36-98.1 of the *Code of Virginia*. A variance will be considered if the following conditions are met:

   a. Reasonable or economically justified alternatives do not exist.
   b. The lowest floor for the proposed construction is elevated or flood proofed two feet above the base flood elevation.
   c. Reasonable access during flood events is demonstrated. Water dependent uses, such as water treatment facilities, boat houses, fish hatcheries, and other similar uses, are a reasonable use and are exempt from floodplain prohibitions. The use, however, must comply with appropriate codes, ordinances, and regulations, and be flood proofed to the maximum extent practicable in conformance to Section 3107, Virginia Uniform Statewide Building Code.

The Building Official for state-owned buildings will provide written rulings on variance requests after consultation with the State Coordinator for the National Flood Insurance Program. Appeals to rulings may be made to the State Building Code Technical Review Board (Department of Housing and Community Development).

3. In the event a locality is not participating in the National Flood Insurance Program, State agencies shall comply with the standards of the Program when undertaking land disturbing or construction activity. These projects shall be submitted to the Building Official for state-owned buildings for review.

Floodplain Management Coordination: Policy and Requirements

The Department of Conservation and Recreation is the lead coordinating agency for floodplain management policy and programs of the Commonwealth. Floodplain management is an issue that impacts numerous agencies with land management, public works, construction and reconstruction, or related regulatory oversight. To assure coordination and efficiency in state agencies:

1. The Department of Conservation and Recreation is to Chair the Virginia Interagency Task Force on Floodplain Management. Within thirty days of the effective date of this executive memorandum, DCR will provide to the Governor's Office for review, approval, and implementation an outline of the structure of this task force. The task force will be a forum to develop interagency recommendations and products to promote the mitigation of public and private flood damages in the Commonwealth.

2. State agencies participating in flood protection projects with a federal interest shall be coordinated with the DCR Floodplain Programs Section. DCR shall serve as the technical advisor of the Commonwealth on viability of proposed alternatives.

3. Federal disaster assistance for flood damaged public buildings in the floodplain is calculated based on the assumption that the Commonwealth has flood insurance to the value of the building or limits of the program. The total amount of cost shared federal disaster assistance for an individual structure in the floodplain can be reduced by the amount of insurance available. Annually, the Department of General Services (DGS) shall review changes in the limits for the National Flood Insurance Program, which shall be provided to DGS by DCR, and determine if the Commonwealth's insurance program provides adequate protection. DGS shall provide DCR with a written summary of their findings.

Applicability and Effective Date

This Executive Memorandum rescinds Policy Memorandum 3-78: Floodplain Management Program for State Agencies, issued by Governor John N. Dalton.

This Executive Memorandum applies to all executive branch state agencies and institutions and shall be effective July 1, 1997, and shall remain in full force and effect until superseded or rescinded by further executive action.

Governor

COMMONWEALTH of VIRGINIA

Department of Historic Resources

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

H. Alexander Wise, Jr
Director

Tel: (804) 367-2323
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Memorandum

April 2, 1998

Historic Properties and the USBC

Questions have been raised regarding the application of the Virginia Uniform Statewide Building Code (USBC) to historic buildings particularly as it relates to accessibility. This guidance is intended to help clarify the application of the USBC to historic buildings.

Section 3406.0 of the BOCA National Building Code, which is incorporated as part of the USBC, allows special provisions for historic buildings and reads:

> The provisions of this code relating to the construction, repair, alteration, addition, restoration and movement of structures shall not be mandatory for existing buildings or structures identified and classified by the federal, state or local government authority as historic buildings, when such buildings are judged by the code official as safe and in the interest of the public health, safety, and welfare regarding any proposed construction, alteration, repair, addition and relocation.

Simply stated, when a property is listed on or eligible for the Virginia Landmarks Register or is designated a contributing building to a state, county, or city district, the building need not strictly comply with the USBC. The local code official determines the extent of the exemption from USBC requirements.

Because most historic buildings are not exempt from providing accessibility under the Americans with Disabilities Act (ADA) requirements, the ADA should be followed in planning alterations to historic buildings. The ADA offers alternative requirements for properties that cannot be made accessible without "threatening or destroying the historic significance of the property" (4.1.7 of ADAAG). Owners of such properties should contact the Department of Historic Resources (the State Historic Preservation Office) to determine if the special accessibility provisions for historic properties apply. When special provisions are warranted, this office will document justification for the allowance.

Questions pertaining to these issues should be directed to William Mills Crosby of the Department of Historic Resources or the local city, county or town USBC code official. Staff of the Division of Building and Fire Regulation at the Department of Housing and Community development are also available for technical assistance.

H. Alexander Wise, Jr., Director
Department of Historic Resources

Warren C. Smith, Director
Department of Housing and Community Development

Petersburg Office
10 Courthouse Avenue
Petersburg, VA 23803
Tel: (804) 863-1620
Fax: (804) 863-1627

Portsmouth Office
612 Court Street, 3rd Floor
Portsmouth, VA 23704
Tel: (804) 396-6707
Fax: (804) 396-6712

Roanoke Office
1030 Penmar Avenue, SE
Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7588

Winchester Office
107 N. Kent Street, Suite 203
Winchester, VA 22601
Tel: (540) 722-3427
Fax: (540) 722-7535

APPENDIX K: CONSTRUCTION CHANGE ORDER PROCEDURE GUIDELINES

OVERVIEW

The Agency should require that the Contractor and A/E use the following procedures in the development of change orders to any construction project which uses the Commonwealth of Virginia General Conditions of the Construction Contract. The procedures are based on requirements of the Commonwealth of Virginia Construction and Professional Services Manual and Section 38 of the General Conditions.

Construction change orders may be necessary during the course of construction to deal with unforeseen construction conditions, user directed changes, or for other reasons. All changes involving a modification to contract cost or time for completion must be documented with a Contract Change Order (D.G.S. Form CO-11). Procedures outlined herein will generally begin once a change in the work is identified by the Owner, A/E, or Contractor.

PROCEDURE

In order to ensure compliance with Paragraph 38 of the General Conditions, the following Change Order procedures are recommended:

1. A. Where the Owner desires to modify the requirements of the Contract Documents to add, to delete from, or to alter the sequence or timing of the Work, the Owner will have the A/E prepare a Request for Proposal (RFP) to the Contractor describing the requested change and asking that the Contractor submit a price proposal for accomplishing said change in the Work.

   B . Where the A/E determines that a change to the Contract Documents is necessary or desired, the A/E will obtain approval from the Owner to prepare an RFP to the Contractor describing the requested change and asking that the Contractor submit a price proposal for accomplishing said change in the Work.

   C. Where the Contractor desires to make a substitution and/or where the Contractor desires to delete a requirement for Work described in the Contract Documents, or where the Contractor determines that the direction provided by the Owner or the A/E constitutes a change in the Work required by the Contract Documents, the Contractor shall prepare a price proposal for same and request that the Owner issue a Change Order.

   D. Where unit prices for Work were requested in the Bid Form and included in the Contract [reference General Conditions Section 38(a)(2)], the Contractor and the A/E will agree upon the actual quantity of the Work performed and multiply by the unit price included in the contract to determine the value of such Work accepted. If the value of

such Work is more than or less than the value for such Work included in the Contract Price, a Change Order will be prepared by the A/E to increase/decrease the Contract Price to reflect the Work performed and accepted.

E. Where Work or changes in the Work are to be performed under the procedures described in General Conditions Section 38(a)(3), the A/E shall prepare a Change Order describing the Work to be performed and directing the Contractor to keep an accounting of all labor, material and associated costs of performing the Work. The Change Order shall cite General Conditions Section 38(a)(3) as the basis for determining the cost of such Work and shall identify any specific requirements or formats not specified in Section 38(a)(3) which the Contractor will be required to use. One or more subsequent Change Orders will be issued to adjust the Contract Price and/or Time and each shall cite or reference the initial Change Order authorizing such Work to be done using this method for determining price and time compensation.

2. The Contractor will send his pricing proposal for the Change Order to the A/E and Owner. To facilitate analysis by the Owner and A/E, this estimate shall be prepared using the following forms:

GC-1, General Contractor s Estimate for Change Order

SC-1, Subcontractor s Estimate for Change Order

SS-1, Sub-Subcontractor s Estimate for Change Order

The general contractor and each affected subcontractor and sub-subcontractor must sign these forms.

3. When a mutually agreed price has been determined, the A/E shall make his written recommendation to the Owner for acceptance by signing the bottom of Form GC-1. A statement as to how any differences were reconciled shall be provided by to the owner by the A/E unless the Owner was an active participant in the price negotiations.

4. If the Change Order proposal is acceptable, the Owner shall have a Change Order prepared.

5. The A/E shall prepare the Change Order form (Form CO-11) and the Change Order Justification (CO-11a) accompanied by a fall description of the change, including drawings if applicable, and copies of the estimate sheets used to reach the mutually agreeable price. The A/E will forward Form CO-11 to the Contractor for signature.

6. The Contractor will forward the signed Form CO 11 to the Owner. All backup material must be provided with each copy of the change order.

<u>IMPORTANT</u>: NO CHANGE ORDER WILL BE APPROVED IF THE LABOR, MATERIAL, AND EQUIPMENT ARE NOT ITEMIZED ON THE BREAKDOWN SHEETS (GC 1, SC 1, and SS 1).

7. Change Order approval authorities are described in Chapter 10 of the Construction and Professional Services Manual and Section 38 of the General Conditions.

8. No work on any change order shall be accomplished without the approval of the Owner and, if applicable, the Director, Department of General Services. Any work accomplished prior to the receipt of the fully executed change order is done at the Contractor s risk and will be removed at Contractor expense should the change order not be approved. No payment for work covered by a change order shall be invoiced or paid until the fully executed change order has been received.

9. The Owner will distribute approved Change Orders to the A/E and Contractor.

CONSTRUCTION CHANGE ORDER FORMS

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

The following Construction Change Order forms are available for download from the Forms Center:

Form Number	Description	File Type
DGS-30-092	CO-11, Change Order (Construction)	Excel
DGS-30-096	CO-11a, Change Order Justification (incl'd w/ CO-11)	Excel
DGS-30-200	GC-1, Change Order Estimate (General Contractor's)	Excel
DGS-30-204	SC-1, Change Order Estimate (Subcontractor's)	Excel
DGS-30-208	SS-1, Change Order Estimate (Sub-subcontractor's)	Excel

To view/download the latest version of these forms, visit the website listed above and enter the Form Number in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

CONSTRUCTION & PROFESSIONAL SERVICES MANUAL – 2004

APPENDIX L: MEMORANDUM OF UNDERSTANDING (DGS and DHCD)

Reserved.

Being revised.

APPENDIX M: STRUCTURAL AND SPECIAL INSPECTIONS

The 2000 VUSBC Article 1, Section 113.2, "Special Inspections," requires special inspections to be performed on a project and cites VUSBC Section 1704, requirements for Special Inspections. These inspections have been, heretofore, provided on state projects by a combination of the Owner's Project Inspection, the A/E and the Owner's independent testing lab. CPSM Section 815 describes the procedures assuring that the structural, special and other associated inspections are provided for the project. The concept of the process is that:

- the A/E will determine in the design the materials, strengths, configurations, quality and standards applicable to the work and describe that information to the Contractor in drawings and specifications;

- the A/E will specify the submittals (i.e., shop drawings, manufacturer's data, and certificates of conformance), required from the Contractor and review the submittals;

- the A/E and the Agency shall review the list of Special Inspections for the applicable code (1996 or 2000), make appropriate notations on the list and forward the marked-up list with the completed Statement of Structural & Special Inspections, Form CO-6a, to BCOM for review and approval.

- the Contractor shall review the submittals from its subcontractors, suppliers, fabricators and vendors to assure conformance with the contract documents and assure that materials, sizes, and configurations proposed are compatible with other trades and the space provided;

- the fabricator, supplier, vendor or production plant shall secure and/or have ongoing the required testing and quality control/assurances program to meet the requirements specified and shall submit certificates of conformance to the applicable standards of practice and quality assurance;

- the A/E will perform on-site observations of erections, placements, and installations to ascertain the intent of the contract documents and shop drawings are met;

- the Owner's Project Inspector/Clerk of the Works will observe day-to-day operations and report deviations/discrepancies in the materials and/or work versus contract documents and approved submittals;

- the Owner's test lab will for the indicated items make on-site inspections, measurements, tests and sample collections, make applicable laboratory tests and submit copies of the reports to the Owner, the Contractor, the A/E and the Project Inspector; the Contractor will have other tests made as specified and as necessary to assure conformance with the applicable regulations and standards of practice and workmanship.

- the A/E's Structural Engineer, the Agency's Project Inspector and the Agency's Project Manager or responsible person shall complete the Final Report of Structutural & Special Inspections, Form CO-13.1b, and submit to BCOM as soon as completed but prior to the substantial completion inspection report.

- The four page lists of special inspections related to either the 1996 VUSBC or the 2000 VUSBC are available on our website at http://bcom.dgs.virginia.gov and may be used as a guide for the A/E in preparing the documents and in assuring that the inspections are made to obtain substantial completion and a Certificate of Occupancy.

STRUCTURAL & SPECIAL INSPECTION FORMS

Standard DGS forms and formats are available for download from the DGS Forms Center (http://forms.dgs.state.va.us).

The following Structural and Special Inspection forms are available for download from the Forms Center:

Form Number	Description	File Type
DGS-30-048	CO-6a, Structural & Special Inspections, Statement of	Word
DGS-30-052 (1996)	CO-6b, Structural & Special Inspections, Listing of Required	Excel
DGS-30-052 (2000)	CO-6b, Structural & Special Inspections, Listing of Required	Excel
DGS-30-053	CO-6c, Contractor's Statement of Responsibility for Quality Assurance	Word
DGS-30-120	CO-13.1b, Final Report of Structural & Special Inspections	Word
DGS-30-124	CO-13.1b-twr, Final Report of Structural & Special Inspections for a Communication Tower	Word

To view/download the latest version of these forms, visit the website listed above and enter the Form Number in the search box on the Forms Center.

Additional instructions for viewing and downloading forms are available in the Help Guide on the DGS Forms Center.

APPENDIX N: PROJECT INSPECTION

DUTIES OF THE PROJECT INSPECTOR / CLERK OF THE WORKS

The Project Inspector shall meet the CPSM Chapter 7, Section 701.13 criteria and must have the following minimum qualifications to perform the duties listed below:

- have education, trade related training, and experience in a design or construction related field;

- have the ability to read and understand the requirements of building Plans & Specifications;

- have some knowledge of construction means, methods and procedures;

- be knowledgeable of and have reasonably convenient access to the codes and standards referenced in the Contract Documents which stipulate the requirements for installation and workmanship on the trades involved in the Work. (e.g. ACI, SMACNA, NFiPA, NEC, BOCA, ASHRAE, etc.)

- have an understanding of the General Conditions of the Construction Contract;

- have the ability to read and understand a construction bar chart schedule; and

- have the ability to communicate effectively orally and in writing.

The following is a detailed listing of the duties, services, functions and responsibilities of the Project Inspector for Capital Outlay Projects. This listing supplements and expands upon the duties, functions and responsibilities generally described in Chapter 10 of the **Manual** and in Section 16 of the **General Conditions of the Construction Contract**. The Project Inspector is an employee of the Owner and is responsible to the Owner for performing the duties, observations, and services described. This in no way relieves the Architect/Engineer from providing and being responsible for his contractual obligations as described in the Manual, the A/E contract, and the **General Conditions of the Construction Contract**. Administrative duties may be assigned to / performed by a Clerk of the Works in support of the Project Inspector

The Project Inspector shall perform the following services unless modified by the contract for services:

- Monitor and inspect all construction materials, equipment, and supplies for compliance with the contract documents, shop drawings, and submittals.

- Inspect installation and workmanship for compliance with the approved plans, specifications, shop drawings and referenced standards. (e.g. ACI, SMACNA, NFiPA, NEC, BOCA, ASHRAE, etc.) Verify compliance prior to cover or close-in of work.

- Monitor quality and coordination of trade contractors' Work at all times. Recommend to the Owner ways to alleviate identified problems. Identify all work not done in accord with the Contract Documents and report it to the Owner and A/E.

- Immediately report all discrepancies in the Contractor's work to the Architect/Engineer and the Owner. Also report any discrepancies noted in plans and specifications to the Architect/Engineer (A/E) for clarification or resolution. The Project Inspector shall not interpret or change approved plans and specifications.

- Keep a record or records, including a daily log of construction activity, roofing, tests, inspections, reports, photographs, and annotated drawings, in order to show the progress of and changes in the project during its construction. Keep records of the designer's and designer's representatives' site visits. Maintain these records. (See Formats on the DGS Forms Website at http://forms.dgs.state.va.us)

- Provide full-time inspection of the roof during its application. The Inspector shall not permit the Contractor to install roofing materials without first having obtained from the A/E a copy of the manufacturer's certification confirming that roofing materials deliveredÿfor use on the project meet specified ASTM standards. During 'Roofing Operations,' the inspector shall maintain a daily written roofing report covering such items as: weather conditions, deck conditions, materials stored, and installation procedures including, bitumen temperature at kettle and point of application, etc. A copy of the daily report shall be given to the Contractor.

- Notify the A/E and Owner if work begins before required shop drawings, product submittals, or samples have been approved by the A/E. Receive and log samples required to be furnished at the site; notify the A/E when they are ready for examination; record the A/E's approval or other action; and maintain custody of approved samples.

- Report to the A/E and the Owner when in his judgment the Work being performed does not conform to the requirements of the Contract Documents or safety requirements are not being followed and, if appropriate, recommend suspension of the Work.

- Notify the Owner any safety violations, OSHA visits, accident reports, and corrective actions observed. Such reports do not relieve the General Contractor of responsibility for safety under terms of the Contract for construction.

- Observe tests required by the Contract Documents. Record and report, to the A/E and Owner, the Contractor's test procedures and, where applicable, results of the tests.

- Observe and report on all tests performed by the Contractor and note results in daily reports.

- Report presence of and activities performed by Owner's Testing & Inspection agents.

- Verify invoices for on-site tests/site visits of independent testing entities, which are to be paid by the Owner.

- Submit to the Owner and the A/E a weekly report in an approved format summarizing the significant activities and occurrences at the project site. Include copies of the Daily Reports with the report. (See Formats in Appendix N of the Manual.)

- The Inspector shall record, maintain, and submit with the Weekly Report a running record of outstanding, unresolved issues. The record shall include the issue, date of occurrence, and date of resolution. After an item is reported to be corrected, it shall be deleted from the list in the weekly report.

- The Inspector shall report, in writing, to the Owner and A/E any notifications from the Contractor of dates and times that services will be disrupted.

- The Inspector shall participate in progress and monthly pay meetings with the owner's representative, Architect, Contractor, and other designated representatives, to review the current status of Work and any action needed to keep the project within budget and on schedule. The Owner may assign the Inspector other duties related to these scheduled meetings.

- The Inspector shall record, maintain, and submit with the weekly report a running record of outstanding discrepancies / deficiencies noted by the Inspector. The record shall include the item, the date observed, and the date corrected. After an item is reported to be corrected, it shall be deleted from the list in the weekly report.

- The Inspector shall maintain, on site, a complete set of minutes of meetings as a "Running Record" of evolution of problems and solutions during progress of the work.

- The Inspector shall maintain current copies of the following at the jobsite:
    a. current set of Contract Documents (addenda, contracts, drawings, specifications, change orders, proposed change orders, request for clarification, construction change authorizations, A/E's supplemental instructions, etc.
    b. all correspondence and reports of site conferences
    c. shop drawings
    d. samples and product data
    e. Owner's purchases, including material and equipment
    f. supplementary drawings
    g. color boards, schedules and samples
    h. names and addresses of Contractors, Sub-contractors, and Principal Material Suppliers
    i. Contractor's Applications For Payment
    j. running list of discrepancies/deficiencies and dates
    k. running list of Unresolved Issues
    l. A/E punch lists with date of issue indicated on each
    m. any other documents and revisions resulting from issues concerning the Contract or Work
    n. maintenance and operating manuals and instructions when received from Contractor

- The Inspector shall review and provide a recommendation to the Owner on the acceptability of all proposals submitted by the Contractor for changes initiated by the Owner or Architect, and the acceptability of all claims for change orders initiated by the Contractor.

- The Inspector shall confirm to the Owner that changes required by approved change orders are incorporated in the work at a time deemed appropriate by the Contractor, and are reflected in the Contractor's progress schedule.

- The inspector shall keep a record of all Proposal Requests from the Architect, change order proposals from the General Contractor, and executed change orders from the Architect. He shall file copies with the Owner monthly.
- Throughout construction, the Inspector shall review the Contractor's detailed schedule and advise the owner on the Contractor's progress and all other construction scheduling issues. He shall monitor the schedule, notify the owner of any slippage in critical path time, make recommendations on accepting the Contractor's proposed schedule recovery plan, and maintain an annotated copy of the schedule that reflects actual progress of the work.

- The Inspector shall maintain, at the site, a copy of the project schedule with notations, highlighting, etc., that show work to date and any changes made in the CPM schedule. Where a schedule shows early/late start and finish dates for various activities, the Project Inspector shall note actual dates of each occurrence on a copy of the CPM listing. The Inspector shall make recommendations to the Owner as appropriate concerning the Contractor's conformance to the schedule and/or recovery plans.

- When the Contractor is directed to make changes based on unit costs, the Inspector shall verify accuracy of quantities of material and labor (or other units of measure) attributable to change orders. The Inspector shall verify that all change orders are complete.

- The Inspector shall observe the Contractor's Record Drawings at intervals appropriate to the state of construction and shall notify the Architect of any apparent failure by the Contractor to maintain up-to-date records.

- The Inspector shall review each certificate and application for payment. He shall advise the Architect and Owner whether they accurately represent progress of the work and values of each line item in the Schedule of Values. He shall verify that stated quantities of stored materials are accurate. Based on such review and verification, he shall make recommendations to the Owner and Architect to approve or to revise the Certificate and application for payment.

- The Owner may assign the Project Inspector other duties related to the project.

The Project Inspector has no authority to and shall not:

1. Authorize deviations from the Contract Documents;

2. Enter into areas of responsibility of the Contractor's superintendent;

3. Issue directions regarding construction means, methods, techniques, sequences or procedures, or safety precautions and programs in connection with the Work;

4. Authorize or suggest that the Owner occupy the project in whole or in part;

5. Issue a certificate for payment.

Supervisor: The Inspector shall report to the Owner's Project Manager.

CHECKLIST OF PROJECT INSPECTOR / CLERK OF THE WORKS DUTIES

1. REPORTS/RECORDS (See Sample Formats for Reports)

___ Photographs (progress and non-conforming work).

___ Daily reports (prepare and maintain standard form).

___ Weekly reports (prepare and maintain summary of daily report).

___ Monthly reports (prepare and maintain summary of weekly report).

___ Record drawings (review periodically).

___ Notify A/E and Owner of Contractor's failure to keep up-to-date changes.

___ Notice of defective or non-conforming work with resolution space at bottom of form (to GC, A/E, Owner).

___ Safety notification (to GC, A/E, Owner).

___ Understands and maintains clarification requests.

2. MEETINGS (ATTEND, REVIEW MINUTES AND MAINTAIN COPIES)

___ Preconstruction meeting.

___ Monthly pay request.

___ Interim A/E inspection.

___ Pre-roofing conference.

___ Substantial Completion Inspection.

___ Final Inspection.

___ Coordination meetings.

___ Records Owner's minutes of meetings when A/E is absent.

3. SUBMITTALS (RECEIVE, USE, KEEP TRACK OF)

___ Shop drawings/Samples.

___ Response to notice of Non-conforming work.

___ Responses to Contractor's requests for clarification.

___ A/E field orders.

___ Request for proposals.

___ Change order.

___ Names, addresses, and Telephone Numbers of Contractor(s), subcontractors materialmen, Owner, superintendent, Architect/Engineer, consultants, special inspectors.

___ Special inspection reports.

___ Project inspector reports.

___ Minutes of meetings.

___ Operation and maintenance manuals, and instructions.

___ Any other documents and revisions resulting from issues concerning work.

4. INSPECTIONS/QUALITY CONTROL

___ Inspects all work and materials for conformance to Contract Documents, shop drawings, change orders.

___ Coordinates special inspections.

___ Judges clean-up effectiveness. If ineffective,notifies A/E and Owner of problems.

___ Verifies approved erosion & sediment control plan is on site and is being followed daily. Notifies A/E and Owner of deficiencies.

___ Verifies Contractor's disposal site has been approved.

___ Verifies that off site storage for Contractor materials is approved.

___ Verifies Contractor records proper disposal of hazardous material.

5. SCHEDULING/PAYMENTS

___ Assists A/E to verify accuracy of CO-12 quantities.

___ Compares work progress to scheduling.

___ Notifies A/E and Owner of Contractor's failure to comply with schedule.

___ Verifies Contractor time and materials for change orders and unit prices.

___ Advises Owner and A/E if separate Contracts are being executed.

6. PROJECT CLOSE OUT

___ Verifies readiness for substantial completion inspection.

___ Verifies readiness for final inspection.

___ Turns over complete and organized submittals, reports, records to Owner.

___ Provides list of unresolved issues.

___ Reports status of separate contracts at substantial completion inspection.

___ Coordinates Contractor's training of Owner's forces.

___ Receives and keeps track of punch list.

APPENDIX O: RESERVED

APPENDIX P: BUILDING PERMIT POLICY

BUILDING PERMIT POLICY for CONSTRUCTION STATE OWNED BUILDINGS & STRUCTURES

A Building Permit issued by the State Building Official is required for work in accord with VUSBC Section 111.0, *Application for Permit.* An Annual Permit issued by the Agency is required for work in accord with VUSBC Section 112.1.3, *Annual Permits.* No Permit is required for work in accord with VUSBC Section 111.1, *When required - Exceptions.*

General Requirements

- Applicable Codes: Virginia Uniform Statewide Building Code, 2000 edition and the Uniform Federal Accessibility Standards, April 1, 1988.
- The requirement for a Building Permit is determined by the type or character of the work. The **type of funding** (general, non-general, gift) **or program area** (capital, maintenance reserve, operating) in which the work is authorized **have no bearing on the requirement for a Building Permit**.
- *Construction documents* for work performed under the Annual Permit, are a State *Building Official* requirement, but are not required to be submitted for State *Building Official* review.
- The Agency shall submit to the State *Building Official* by July 31 of each year an Annual Permit Activity Report as of June 30 of work initiated under the Annual Permit. A report of audit conducted by the State *Building Official* or State Auditor during the Annual Permit period may be submitted for the Annual Permit Activity Report.
- HVAC, Electrical, Plumbing, Gas Piping, Fire Sprinkler, Fire Suppression, and Fire Alarm work shall be performed by, or under the supervision of, tradesmen certified by the Department of Professional and Occupational Regulation.
- The Regional Fire Marshals Office shall be notified prior to performing **building demolition**, and alterations to and relocation of Fire Sprinkler, Fire Suppression, or Fire Alarm systems by submitting a copy of the Project Permit.
- *Construction documents* for Annual Permit work, Fire Prevention Code inspection reports by the Regional Fire Marshal's Office, Property Maintenance Code inspection reports by the agency, Periodic ASME A17.1 required elevator test and inspection reports by an ASME QEI-1 certified elevator inspector, and Substantial Completion inspection reports by the agency of Division of Engineering and Buildings inspection **shall be on file** at the Physical Plant office of the agency for inspection by the State *Building Official* or Regional Fire Marshals Office.
- Code Clarifications and Technical Design Standards shall apply as indicated by Chapter 7 of the Construction and Professional Services Manual, July 1, 2004.

BUILDING PERMIT (Issued by DEB)

Character of work

Capital Projects including *structures* and site improvements

Projects involving the construction of new structures that are *occupiable*

Projects involving the site work, utility work, and foundations for Industrialized Buildings

Projects involving changing the use of a building either within the same *Use Group* or to a different *Use Group*

Projects involving removal or cutting a structural beam or bearing support

Projects involving the addition, removal, alteration, or relocation of all, or a part of, a *Means of Egress, Exit,* or *Fire Rated Assembly*

Projects requiring *Special Inspections*

Projects involving addition, removal, replacement, alteration, or relocation of *Elevators and Conveying Systems*

Projects involving the addition of or removal of an HVAC, Electrical, Plumbing, Gas Piping, Fire Sprinkler, Fire Suppression, and/or Fire Alarm System

Projects involving the following:

Mechanical – alteration or relocation of the quantity or source of ventilation, exhaust, or combustion air; alteration or relocation of boilers, water heaters, pressure vessels, or refrigeration equipment; change in refrigerant classification for replacement in kind of refrigeration equipment

Electrical – alteration or relocation of circuits greater than 1 phase, 240 volt, 50 amp or 1 phase, 277 volt, 30 amp

Plumbing – alteration or relocation of plumbing fixtures, water supply, water distribution, sanitary waste, special waste, or storm drainage

Gas Piping – alteration or relocation of fuel gas or fuel oil piping systems

Fire Sprinkler – alteration or relocation water supply or equipment other than sprinkler heads; relocation of more than 25% of sprinkler heads per story

Fire Suppression - alteration or relocation of suppression agent or equipment other than heads; relocation of more than 25% of heads per story

Fire Alarm – alteration of system logic; alteration or relocation of equipment other than alarm devices; relocation of more than 25% of alarm devices per story

Utility structures including communication towers, water tanks, and water and wastewater treatment

Roof replacement projects where the work is the replacement of more than 25 percent of an existing roof covering

Temporary structures

Demolition of structures (CO-17 Demolition Permit w/attachments required)

Requirements: *Construction documents* prepared under the supervision of, signed and sealed by a registered Architect or Engineer and submitted for review to the State Building Official.

ANNUAL PERMIT

Character of work

Projects limited to the addition, removal, alteration, or relocation of any wall or partition **that is not a part of a *Means of Egress, Exit,* or *Fire Rated Assembly***

Site improvements limited to parking lots and roads, fences, and other sitework regulated by the VUSBC

Projects limited to alteration or relocation of Mechanical, Electrical, Plumbing, Gas Piping, Fire Sprinkler, Fire Suppression, Fire Alarm not indicated above as requiring a permit to be issued by DEB

Requirements: *Construction documents* prepared under the supervision of and signed by a registered Architect or Engineer. **Regional Fire Marshal's Office acceptance of installed *Means of Egress, Exit, Fire Rated Assembly, or Fire Protection Systems*.**

Character of Work

Asbestos abatement (abatement documents shall be prepared and signed by a licensed asbestos designer)

Roof replacement projects where the work is limited to the replacement of less than 25 percent of an existing roof covering.

Replacement in kind of steep-slope (4:12 or greater) asphalt shingle roofing.

Requirements: *Construction documents* describing the work.

Character of Work

***Hot Work* including cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch applied roof system or any other similar work.**

Requirements: Agency shall implement safety measures in accord with the International Fire Code to prevent fire and fire spread.

NO PERMIT

Character of work

Ordinary Repairs and maintenance which are not regulated by the VUSBC

Replacement in kind of materials and equipment with that of similar characteristics in the same location

Periodic elevator tests and inspections by an ASME QEI-1 certified elevator inspector

Italicized words are as defined by the VUSBC

APPENDIX Q: QUALITY ASSURANCE CHECKLISTS

DESIGN COORDINATION

- The Working Drawing documents submitted shall represent a reasonable and cost effective architectural and engineering solution for the scope of work and construction budget constraints in the A/E contract. All work must conform to current criteria, guides, Codes and Standards established by the Division of Engineering and Buildings, and shall conform to good architectural and engineering practices. Workmanship shall be neat with all lines and lettering of uniform weight and clarity for complete legibility and satisfactory reproduction.

- **All elements of submittals shall be checked by the A/E and such check should be made by persons other than those preparing the materials and by professional personnel trained in that specific discipline. Submittals will be reviewed by the various disciplines in BCOM for compliance with requirements and standard criteria. Errors and deficiencies shall be corrected by the A/E at no additional cost to the Agency.**

- The A/E shall be responsible for the professional and technical accuracy and coordination of all designs, drawings, specifications and cost estimates of all disciplines and other work or materials furnished. This includes overlaying the plans either manually or by CADD to coordinate the locations of work in the various disciplines. Intersections of components of various disciplines shall be checked for conflicts and to assure that adequate space exists for the material to be installed where shown on the documents.

- The A/E shall perform a quality assurance review for both the technical accuracy and discipline coordination. Such items as section, detail, and note references to other sheets, major dimensions, and equipment locations shall be checked. Verify that all equipment is correctly identified the same way on all sheets and in the specifications.

- Sections, details, and dimensions must be in sufficient quantity, clarity and detail to allow the bidder to understand what is expected, to make takeoffs of material types and quantities, and, once hired to prepare shop drawings and execute the construction. This particularly applies to stairs, special connections for framing, typical details of system interfaces, flashings for roofs and walls, and similar building features.

- Required information may be shown on plans, details, sections, notes and/or schedules as may be appropriate.

- The A/E shall determine that all work as indicated on the drawings is fully and consistently specified.

QUALITY ASSURANCE

- The following material/checklists in this chapter provide guidance to assist the A/E in reviewing the documents and represent the information the Commonwealth expects to be shown on the drawings to clearly identify the Work to be performed. The specification section numbers reflect those often used and are intended to show the types of information that should be included in the Quality Assurance check regardless of actual specification section numbering used by the A/E or where (which discipline's drawings) the information occurs on the drawings.

- Information may be shown or noted on plans, elevations, sections, details, schedules, tables, or notes as applicable to the particular item and the project scope of work. In general, where more than one type, size, thickness, class, strength, or characteristic is specified, the location and limits for each should be indicated on the drawings.

BIDDING NOTICES AND FORMS

Notice of Invitation to Bid (Advertisement)

- Project name and location shown
- Brief general description of project shown
- Specific location where Bids will be received (street address, building room number and any other special information)
- Time and date for receiving bids
- Date, Time and Location of Prebid conference
- Is attendance at Pre-Bid Conference mandatory? (Should not be mandatory unless there is specific justification.)
- Where can documents be obtained?
- How much is the deposit (and shipping charge, if any) for the bid documents?

Bid Form

- Does basic wording and format conform to standard bid form?
- Has Part A been properly edited for piles, caissons, and rock material?
- Has paragraph following Part B been included and properly edited?
- Have quantities been shown for Parts C, D, and E?
- Has Rock Excavation ben adequately addressed? Quantity shown?
- Have Additive Bid Items been clearly defined on the Bid Form?
- Have Additive Bid Items been clearly described/shown on the drawings?
- Has the Contract award statement from the Standard Bid Form been copied verbatim to the project Bid Form?
- Are there any subcontracts which have been procured separately which will be included in this contract?
- Has wording from Standard Bid Form been used to include this work?
- Has A/E filled in the number of calendar days or the required substantial completion date in the space provided for use by ALL bidders?
- Has the climatological data source to be used been indicated?

Supplemental General Conditions

- Are Supplemental General Conditions required?
- Have Supplemental General Conditions been approved by the DEB Director?
- Does wording of Supplemental General Conditions conform to Sample Format?

Have the following forms been included?

- Notice of Invitation to Bid
- Instructions to Bidders (G.S. Form E&B CO-7A)
- Prebid Question Form
- Bid Form
- The current Commonwealth of Virginia General Conditions of the Contract for Construction Projects (G.S. Form E&B CO-7)
- Supplemental General Conditions, if applicable
- Form of Agreement (G.S. Form E&B CO-9)
- Workers Compensation Insurance Certificate (G.S. Form E&B CO-9a)
- Standard Performance Bond (G.S. Form E&B CO-10)
- Standard Labor and Material Payment Bond (G.S. Form E&B CO-10.1)
- Change Order blank (G.S. Form E&B CO-11)
- Schedule of Values Format (G.S. Form E&B CO-12)
- Affidavit of Payment of Claims (G.S. Form E&B CO-13)
- Certificate of Completion by Architect/Engineer (G.S. Form E&B CO-13.1) and Certificate of Partial or Substantial Completion by Architect/Engineer (G.S. Form E&B CO-13.1a).
- Final Report of Structural & Special Inspections (G.S. Form E&B CO-13.1b)
- Certificate of Completion by Contractor (G.S. Form E&B CO-13.2) and Certificate of Partial or Substantial Completion by Contractor (G.S. Form E&B CO-13.2a).
- List of Drawings
- Submittal Register Format
- Structural and Special Inspections List

DIVISION 0 AND DIVISION 1

- Do Special Conditions conflict with the General Conditions?
- Have special conditions or requirements affecting the Contractor's Work been described in the Special Conditions?
- Is a list of Drawings included?
- Do submittal requirements conflict with Section 24 of the General Conditions?
- Have requirements for Temporary Facilities been specified?
- Are there any special construction phasing requirements or sequencing of Work?
  Have these been specified?
- Are there any special limits on Contractor access to the Work or Site?
  Have these been specified?
- Are there any special limits on Contractor hours of work?
- Are there any special requirements for giving notices to the Owner?

DIVISION 2

Section 02050 - Demolition and Removal
Show the following information on the project drawings:

- Plan of structures to be demolished
- Elevation of structures to be demolished
- Limits of demolition
- Depth of demolition and detail for termination of foundations / walls
- Locations of any monitoring stations required for vibration, wellpoints, etc
- Asbestos locations and/or statements
- Lead-based paint locations and/or statement

Section 02110 - Clearing and Grubbing
Show the following information on the project drawings:

- Limits of clearing
- Property Lines
- Trees and shrubs to remain in area to be cleared and detail of protection required
- Trees to be removed in areas which are not to be cleared
- Identify area to be totally cleared and grubbed.

Section 02200 - Earthwork (For structures and pavements; includes clearing and grubbing, excavation, fill/backfill, compaction and grading) Show the following information on the project drawings:

- Location and record of soil boring, water level observations, and test pits.
- Soil classification(s) per ASTM D 2487 and properties.
- Hydrological data including 100 year Floodplain (where available).
- Surface elevations, existing and new.
- Location of underground obstructions and existing utilities.
- Sources of borrow material and soil classification(s) of borrow, if located on state property
- Limits of areas to be cleared of trees, shrubs, and brush.
- Disposal areas for brush and wasted soil, if available on state property.
- Description/details of any special subgrade requirements or use of synthetic fiber filter fabric.
- Details of special construction such as under railroad or highway right-of-way.
- Areas to receive topsoil and to be seeded or sodded identified.
- Erosion/sediment control measures and storm water management facilities
- Typical cross sections of embankments or roadway construction indicating depths and extents of special compaction.

- Details of subsurface drain construction (include foundation drains and drains behind retaining walls).
- Have specifications been tailored for this project?
- Has "**suitable soils**" listing been tailored to suit this project?
- Have procedures for filling, backfilling and compaction been specified?
- Have specifications identified the tests to be performed on the fill/backfill and the standards to be met to assure proper compaction?

Section 02220 - General Excavation, Backfilling and Compaction
Show the following information on the project drawings:

- Surface elevations (contours, spot elevations or both), existing and new;
- Location of underground obstructions and existing utilities;
- Location of borings and test pits and logs of soil borings and test pits. Include ground water observations and topsoil thickness encountered in boring, soil classifications.
- Location of borrow and disposal area if located on state property;
- Clearing stripping and grubbing limits, if different from clearing limits;
- Areas to be seeded or sodded identified;
- Hydrological data including 100 year Floodplain, where available;
- Shoring and sheeting (if required) and design requirements/criteria to be used by Contractor's shoring and sheeting designer
- Pipe trench excavation details.
- Erosion/sediment control measures and storm water management facilities

Section 02225 - Excavation, Backfill and Compaction for Utilities
Show the following information on the project drawings:

- Location and logs of soil borings, water level observations, and test pits.
- Hydrological data including 100 year Flood Plain (where available).
- Surface elevations, existing and new.
- Location of underground obstructions and existing utilities.
- Sources of borrow material if on state property or at a prearranged source.
- Limits of areas to be cleared of trees, shrubs, and brush.
- Disposal areas for brush and wasted soil if on state property.
- Location and length of continuous concrete cradles, arches, or sleeves. Details/table of width and depth of trenches and pits for each type of pipe or appurtenance. Details of bedding for each type of pipe in varying earth and rock conditions; backfill details.
- Typical detail of method of stabilizing weak foundation material.
- Details of special construction such as under railroad and highways right-of-way requirements for jacking and boring.

- Details of sewage absorption trenches, absorption pits, and subsurface drains.
- Identify, detail, or note areas to receive topsoil and to be seeded or sodded and thickness of topsoil to be placed.
- Details of pavement repair.

Section 02270 - Erosion and Sediment Control/Stormwater Management
Show the following information on the project drawings:

- Temporary control devices required during construction
- Permanent control devices to regulate rate of runoff water and to control future erosion
- If disturbed area is greater than 10,000 sf, plans must be submitted by Agency to the Division of Soil & Water Conservation for approval
- If disturbed area is greater than 1 acre, plans must be submitted by Agency to the Division of Stormwater Management for approval
- Stabilization methods for soil stockpiles
- Temporary and Permanent erosion control and stabilization methods for borrow/waste areas

Section 02361 - Round Timber Piles
Show the following information on the project drawings:

- Plan layout (Singles and clusters, show cluster layout)
- Batter pile angle.
- Design loads
- Location of test pile, unless option to allow direction by the engineer is selected.
- Tip elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. (The entire soils report must also be included in an appendix to the specifications.)
- Staging area, if other than within the limits of work shown on the site plan.
- Sections, Details, Dimensions and Reinforcement of Pile Caps

Section 02363 - Concrete Filled Steel Casing Piles
Show the following information on the project drawings:

- Plan layout (Singles and clusters, show cluster layout)
- Batter pile angle.
- Design load capacity
- Location of test pile, unless option to allow direction by the engineer is selected.

- Tip/Base elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. The entire soils report must also be included in an appendix to the specifications.
- Staging area, if other than within the limits of work shown on the site plan.
- Size of Casing
- Concrete strength and Details of reinforcing.
- Sections, Details, Dimensions and Reinforcement of Pile Caps

Section 02365 - Pressure-Injected Footings or Piles
Show the following information on the project drawings:

- Plan layout (Singles and clusters, show cluster layout)
- Batter pile angle.
- Design load capacity
- Location of test pile, unless option to allow direction by the engineer is selected.
- Bottom elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. The entire soils report must also be included in an appendix to the specifications.
- Staging area, if other than within the limits of work shown on the site plan.
- Size of shaft
- Concrete strength and Details of reinforcing.
- Sections, Details, Dimensions and Reinforcement of Pile Caps

Section 02366 - Steel Sheet Piles
Show the following information on the project drawings:

- Plan layout
- Batter pile angle.
- Tip elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. The entire soils report must also be included in an appendix to the specifications.
- Staging area, if other than within the limits of work shown on the site plan.
- Grade of steel.
- Pile shape and weight.

Section 02367 - Precast/Prestressed Concrete Piles
Show the following information on the project drawings:

- Plan layout (Singles and clusters, show cluster layout)
- Batter pile angle.
- Design pile load capacity
- Location of test pile, unless option to allow direction by the engineer is selected.
- Tip elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. The entire soils report must also be included in an appendix to the specifications.
- Size and shape and Unit stresses for prestressing strands or wire.
- Detail of splices
- Detail of reinforcing and tendons
- Sections, Details, Dimensions and Reinforcement of Pile Caps

Section 02368 - Rolled Steel Section Piles
Show the following information on the project drawings:

- Plan layout (Singles and clusters, show cluster layout)
- Batter pile angle.
- Design pile load capacity
- Location of test pile, unless option to allow direction by the engineer is selected.
- Tip elevation (Estimated elevations/depths for bidding).
- Cutoff elevation (Top elevation)
- Subsurface soil data logs shall be shown on the drawings. The entire soils report must also be included in an appendix to the specifications.
- Staging area, if other than within the limits of work shown on the site plan.
- Sections, Details, Dimensions and Reinforcement of Pile Caps

Section 02371 - Drilled Foundation Caissons (Piers)
Show the following information on the project drawings:

- Subsurface soil data and logs.
- Top and estimated bottom elevation of each caisson.
- Size (diameter in inches), bearing capacity, and total number of each size of caissons.
- Dimensions of the bell, if required.
- Dimensions of the casing.

- Reinforcing steel details, if required.
- Location of caissons to be penetration tested, if required.
- Location of caisson to be proof tested, if required.
- Locations, size, bell dimensions, and installation sequence of load testing caisson, if required.
- Pilot hole size and depth into rock, if required

Section 02500 - Pavement and Associated Work
Show the following information on the project drawings:

- Typical section of each type or thickness of pavement showing dimensions and geometry, slopes, etc.
- Dimensions defining the limits and shape of the paved areas
- Details with dimensions of curbs, curb & gutter, raised islands, medians, curb cuts, ramps, and drainage structures
- Layout of parking spaces, pavement markings, traffic control signage, and painted indicators including handicapped parking spaces meeting UFAS requirements
- Existing and new grading contours or spot elevations
- New contours and spot elevations of paved areas showing drainage swales, slopes and directions of drainage flow
- Drainage structures including manholes, drop inlets, piping, culverts, sizes of piping/culverts and lighting standard locations.

Section 02660 - Exterior Water Distribution System
Show the following information on the project drawings:

- Plan and location of all new pipelines, including size and type of pipe.
- Show or specify maximum working pressure of the system.
- Location, size, and type of service of existing connecting, intersecting, and adjacent pipelines and other utilities.
- Paved areas and railroads which pass over new pipelines.
- Profile, where necessary to show existing parallel or crossing underground piping, conduits, clearances or unusual conditions.
- Note class or thickness of pipe, including material identification if more than one class or thickness is used. Show limits for each where class or thickness will be different for different sections of pipeline.
- Bedding conditions.
- Detail and Location of critical flanged joints, joints made with sleeve-type mechanical

couplings, grooved and shouldered type joints, and insulating joints.
- Location of valves, hydrants (showing which are traffic type hydrants), and indicator posts; and details concerning valves, where necessary).
- Show or specify size and shape of hydrant operating nut and cap nuts if nonstandard nuts are required; dimensions of threads (major diameter, minor diameter, pitch diameter, thread form, and number of threads per inch) on hydrant hose and pumper connections if nonstandard threads are required.
- Connection of service line to water main, if different from that specified.
- Location or size of thrust blocks, including type; or location of and details of metal harness, when necessary (metal harness, when necessary, must be shown for PVC plastic water main pipe).
- Details for fire hydrant installation.

Section 02690 - Site Steam or Hot Water Distribution System

The project drawings should show the following information:

- Plan and location of all new pipelines, including size of pipe.
- Show or specify maximum working pressure of the system.
- Location, size, and type of service of existing connecting, intersecting, and adjacent pipelines and other utilities.
- Paved areas and/or railroads which pass under or over new pipelines.
- Profile, to show elevations, manholes, laterals, crossing utilities, and unusual conditions.
- Note class or thickness of pipe, including material identification if more than one class or thickness is used. Show limits for each where class or thickness will be different for different sections of pipeline (unless clearly described in specs).
- Locations, types and typical and/or special details of above grade and in tunnel pipe supports and pipe guides.
- Locations of expansion loops or expansion joints.
- Locations and details of anchors
- Locations and typical and special details of pipe tunnels and trenches.
- Points of connection.
- Location and details of concrete thrust blocks.
- Location and details of manholes.
- Location and size of main and branch line valves
- Location and size of vents and drains.
- Location and detail of drip legs, trap stations, trap schedule, and method of condensate recovery.
- Diagrams of electronic circuitry for controls and instrumentation shown.

Section 02720 - Storm Drainage System
Show the following information on the project drawings:

- Plan and location of all new pipelines, including type of service and size of pipe.
- Location, size, and type of service of existing connecting, intersecting, or adjacent pipelines and other utilities.
- Paved areas and railroads which pass over new pipelines.
- Profile, where necessary to show existing parallel or crossing underground piping, conduits, clearances or unusual conditions.
- Invert elevations at beginning and end of pipelines and at manholes or similar structures.
- Note class or strength of pipe and limits for each where class or strength will be different for different sections of pipeline. Indicate shape requirements if different shapes available.
- Design details for all stormwater system structures including manholes, catch basins, curb inlets, and head walls.
- Storm drainage lines and culverts required to be watertight.
- Bedding details and location of cradle(s), when cradle is required.
- Location, size, elevation and details, if necessary, for stormwater retention basin or structure.

Section 02730 - Exterior Sanitary Sewer System
Show the following information on the project drawings:

- Plan and location of new pipelines, including type of service and size of pipe
- Location, size, and type of service of existing connecting, intersecting, or adjacent pipelines and other utilities
- Paved areas and railroads which pass over new pipelines
- Profile, where necessary to show existing parallel or crossing underground piping, conduits, clearances or unusual conditions.
- Invert elevations at beginning and end of pipelines and at manholes or similar structures
- Note class or strength of pipe and limits for each where class or strength will be different for different sections of pipeline
- Design details for pertinent manholes, septic tank(s), and sewage absorption trench including Health Department Requirements
- Bedding conditions, where different from those specified in the appropriate specification and location of cradle(s), when cradle is required, if not covered
- Sections and details of Pump Stations.
- Location and size of thrust blocks on pressure lines
- Location of flanged joints on pressure sewers if only used on part of line.
- Location of mechanical joints on ductile-iron piping (if used on only part of the system).
- Location, size, and type of service of existing connecting, intersecting, and adjacent pipelines and other utilities.

Section 02831 - Fence, Chain Link
Show the following information on the project drawings:

- Fence alignment.
- Posts: Minimum height to accommodate fabric and clearance, post size for line posts, corner posts, pull posts and gate posts.
- Post Setting Dimensions: Not less than indicated in chain link manufacturer's installation standards. Assure that embedment length in concrete slabs and walls will be at least 12 inches. Show typical details for each condition to be encountered.
- Chain-Link Fabric: Show height and size or gage on detail or section.
- As required: Top rail, bottom rail, top and bottom reinforcing wires, and where a higher degree of security is required other than provided by fabric, include barbed wire on supporting arms. Note method of supporting arm attachment to post tops - bolts, screws, tamper-proof fasteners or welding.
- Sleeve-Type Expansion Couplings: Specify/note as maximum of 21 feet on centers, if used.
- Gates: Location, size, and type. Include framing members size, weight, bracing, locking hasps, hinges, center pins, etc.
- Where special fencing requirements exist, such as wolf-proofing, antiburrowing provisions, crossing drainage ditches, provisions for electrical installations, or special security installations, specifications should be modified and appropriate details included on the drawings. Modifications and details should afford security equal to that of the fence.
- Where special entrance security requirements exist such as electronic locks, motor operated gates, closed circuit video; add details and modify the specification accordingly.
- Other information necessary to indicate layout and general configuration of the fence.

Section 02930 - Turf
Show the following information on the project drawings:

- Clearly indicate all areas to be turfed and if more than one type of turf is specified, delineate areas for each type.
- All turf specifications shall be written to reflect the environmental conditions peculiar to the project area.

Section 02950 - Landscaping, Trees and Shrubs
Show the following information on the project drawings:

- Description, number and size of trees and plants
- Layout/location of various trees and plants including groupings.

- Details of planting requirements including depth and diameter of excavations, mulching, protection, and supports
- Layouts and controls for irrigation systems if included in project
- Are tree and plants located away from existing and new underground utility lines, site improvements and surface drainage patterns?

DIVISION 3

Section 03300 - Cast-in-Place Concrete

The documents shall provide sufficient details with data on the various configurations or conditions of the concrete and reinforcing steel to facilitate bidding and shop drawing preparation. Details shall include, but not be limited to, rebar size, location and spacing, location and lengths of splices, and required embedment lengths and cover. Typical details with tabular information are acceptable with special sections and details shown as needed. Clearly indicate that the design of formwork and shoring required for construction are the responsibility of the contractor. The documents may require that the design of the formwork and shoring be performed by a licensed professional engineer and that the design responsibility shall rest with the contractor and his engineer.

Show the following information on the project drawings:

- Loading assumptions.
- Material strengths used in design, fc.
- Yield strength of reinforcement required.
- Details of reinforcement bars, showing number, sizes, bends, laps and stopping points of bars; location and details of stirrups; and mechanical connections to reinforcement bars.
- Show wire size and weight or wire size and spacing of wire fabric reinforcement and locations where used;
- Details of concrete sections, showing dimensions, reinforcement cover, and required camber.
- Expansion, contraction and construction joint locations with dimensions and details.
- Details and locations of critical construction joints, including waterstop locations and splices, keys and dowels when required.
- Locations where structural lightweight concrete or lightweight insulation or fill concrete will be used.
- Show locations and details for depressed structural slabs where required for static-disseminating and spark-resistant tile, terrazzo or other floor finishes in order to provide finished surfaces at the same elevations.
- When exposed concrete surfaces are specified, the locations in the finished structure shall be indicated. If other than cast finish is required, the type and location shall be indicated.

Section 03366 - Cast-in-Place Post-Tensioned Concrete

The documents may require that the post-tensioning system be engineered by the contractor. Clearly indicate all design, loading and performance criteria as well as all pertinent design assumptions. Require contractor to provide calculations and shop drawings for the post-tensioning system sealed by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Section 03410 - Precast Concrete (Non-Prestressed)

The documents may require the contractor to provide these components as an engineered system. Clearly indicate the layout and configuration of the units as well as the complete performance requirements. The contractor shall be required to provide calculations and shop drawings of the units sealed by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Show the following information on the project drawings:

- Live and dead (and lateral) loads for design (Note whether the topping is included in the specified dead load).
- Details and locations for fitting, bearing, and connections.
- Location of expansion and control joints.
- Style and area of steel fabric reinforcement in areas where required. Kind and size of reinforcing bars and spacing.
- Strength and type of concrete.
- Detail of placement of sealant or fillers in joints.
- Fire rating.
- Lightweight concrete unit weight.
- Special requirements for concrete cover over reinforcing.
- Areas where toppings are required, indicate areas where the full thickness of the topping is not present.

Section 03412 - Precast, Prestressed Concrete

The documents may require the contractor to provide these components as an engineered system. Clearly indicate the layout and configuration of the units as well as the complete performance requirements. Require contractor to provide calculations and shop drawings of the units sealed by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Show the following information on the project drawings:

- Live and dead (and lateral) loads for design and whether topping is included in the dead load.
- Details and locations for fitting, bearing, and connection of units.
- Location of expansion and control joints.
- Camber.
- Style and area of steel fabric reinforcement in areas where required. Kind and size of reinforcing bars and spacing.
- Strength and type of concrete.
- Detail of placement of sealant or fillers in joints.
- Fire rating.
- Lightweight concrete unit weight.
- Tendon types, physical properties, and allowable design stresses.
- Special requirements for concrete cover over tendons and other reinforcing.
- Areas where toppings are required, indicate areas where the full thickness of the topping is not present.

DIVISION 4

Section 04200 - Unit Masonry (Brick and/or CMU)
Show the following information on the project drawings:

- Locations and dimensions of each kind of masonry work.
- Masonry compressive strength fm, Type, and Fire rating, if required
- Mortar types and where used
- Vertical reinforcing bar size and spacing where required
- Horizontal reinforcing and spacing
- Control joint locations
- Expansion joint locations
- Bond pattern if other than running bond.
- Through-wall flashing and weep details.
- Control joint and expansion joint details.
- Special brick shapes if required.
- Bond beam locations, sizes, and reinforcing
- Lintel locations
- Lintel schedule with sizes, shapes, components, reinforcing, etc.
- Details of anchorage of masonry to supporting structure
- Details of Bearings on masonry and of anchorages to masonry

DIVISION 5

Section 05120 - Structural Steel

The documents shall provide complete details of the configuration of the structural steel and of any non-standard connections. The detailing of standard connections shown in AISC's Manuals of Steel Construction, Allowable Stress Design and Load and Resistance Factor Design may be left to the contractor. If this is done, the documents must clearly indicate all design loads and other criteria required for the development of connection details. The A/E shall review the shop drawings and verify design adequacy of fabricator detailed connections. The contractor shall not be required to provide a licensed professional engineer for the design of these connections.

Show the following information on the project drawings:

- Yield strength of steel used in design;
- The extent and location of structural steel;
- Designations of steel members;
- Centerline dimensional locations of framing members;
- Top of steel elevations above or below a reference elevation.
- Connection details of typical connections
- Details of special and moment resisting connections
- Beam or girder camber, if required
- Shoring information and typical details, if shoring required during construction
- Locations where galvanized steel will be used;
- Size and shape of crane rails;
- Types of connections (welded and bolted), including adjustable runway support connections if overhead, top running cranes are provided;
- Locations where high-strength bolts and slip critical connections are required and the loads and stresses required if design is provided by Contractor;
- The location of welds requiring nondestructive testing, along with type of testing required;
- Lateral bracing members / framing
- For composite beams show shear stud number, size and spacing required

Section 05210 - Steel Joists and Joist Girders

Standard open web steel joists and joist girders shall be indicated by size, type and spacing on the drawings. **For non-standard loading conditions,** the documents may require that the components be provided by the contractor as an engineered system. In this case, **clearly indicate all loading and design criteria**. The contractor shall be required to provide calculations and shop

drawings for these components prepared by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Show the following information on the project drawings:

- Joist series, size and spacing, point loads (if any), and slope
- Joist girder depth, kip load on each panel point, span, and slope.
- Design loads, including uplift and lateral forces in addition to gravity (dead and live) loads.
- Method of anchoring joists to supports
- Stiffeners at point / concentrated loads
- Framing between joists at openings through supported roof or floor
- Framing at equipment being supported by joists/joist girders
- Spacing and type of bridging and bracing.
- Accessory details as applicable
- Bearing details on masonry

Section 05310 - Steel Decks

Indicate which roof areas on the structure are considered by the structural engineer as functioning as diaphragms for the lateral force resisting system. Composite decks and diaphragm acting decks, including connections, should be designed by the structural engineer according to the Steel Deck Institute and details shown on the drawings. Drawings must show wind uplift loads for roof joist design in addition to the items listed below.

In addition to the above, show the following information on the project drawings:

- Structural properties (height, sheet thickness, section moduli, moment of inertia).
- Openings in floor and roof deck and typical detail of framing at opening
- Location, spacing, and size of hanger clips or loops for critical locations.
- Closure plates, where required.
- Location of cellular decking and whether it is to be used as electrical raceway.
- Weld or fastener spacing and size of same
- Whether construction is based on shored construction.
- End and side lap details

Section 05400 - Cold-Formed Metal Framing

Show the following information on the project drawings:

- The extent and location of all cold formed metal framing
- Indicate gage, size, section modulus, and other structural properties required.
- Connections and other installation details.
- Indicate concentrated loads, e.g., pipe supports, that may overstress a flange or connection.
- Slip connection requirements at underside of roof members

Section 05500 - Metal Fabrications

Show the following information on the project drawings:

- Location and configuration of all metalwork.
- All sizes and dimensions.
- Special fastenings, attachments or anchoring.
- Location and size of expansion shields larger than 3/8 inch in diameter.
- Location and identification of products to be galvanized.
- Location and special details of expansion joint covers.
- Connection details (other than manufacturer's standard) of grating.
- Locate and detail removable sections of handrails.
- Location and support detail of ladders.
- Location and details of all structural steel door frames.
- Sections, dimensions, sizes and details of all metal stairs.

DIVISION 6

Section 06100 - Rough Carpentry

Show the following information on the project drawings:

- Location and magnitude of concentrated loads
- Grade and stress rating of structural lumber
- Sizes and spacing of all wood framing members including trusses
- Location, size, type, and thickness of all materials
- Size and spacing of special fasteners

- Details of connections
- Size and spacing of anchor bolts
- Details of all connections and anchorage where special conditions exist such as high wind, hurricane, and earthquake areas
- Locations where treated lumber is required including type of treatment - preservative or fire retardant treatment
- Details of depressed floors to receive ceramic tile

Section 06180 - Prefabricated Wood Components

The documents may require that prefabricated wood components such as glue laminated structural members and trusses, metal plate fabricated wood trusses, and similar shop fabricated wood structural systems be provided by the contractor as engineered systems. All design and performance criteria must be indicated in the documents. The contractor shall be required to provide calculations and shop drawings for these systems prepared by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Section 06200 - Finish Carpentry

Show the following information on the project drawings:

- Location, size, type, and thickness of materials;
- Size and spacing of special fasteners or attachments;
- Special details, sections and requirements of millwork;
- Type and/or pattern of prefinished material;
- Profile and size of trim;
- Color and/or pattern of prefinished material
- Profile and size of trim
- Location and species of any wood that is to be stain, natural, or transparent finish

DIVISION 7

Section 07220 - Roof Insulation

Show the following information on the project drawings:

- The extent and locations of the work to be accomplished.
- Dimensions when space limitations or construction features govern thickness of insulation materials.
- Details at cants, edge strips, and nailers.

- Location and spacing of wood nailers.
- Location, type and spacing of special anchorages to substrate
- Extent of tapered insulation and slope

Section 07240 - Exterior Insulation and Finish System
Show the following information on the project drawings:

- Locations of EIFS.
- Thermal resistance value (R-Value) for each location if various R-values are used.
- If several levels of Impact Resistance are specified, indicate locations where each level is required.
- Joint layout on elevations.
- Details at edges and at joints and of special profiles

Section 07250 - Spray-Applied Fireproofing
Show the following information on the project drawings:
- Location of all sprayed fire protection.
- Thickness of sprayed on fire protection and rating required
- Drawings should also show fire protection other than sprayed-on for the following items:
  (a) Concrete fire protection of steel bearing members in elevator hoistways.
  (b) Plaster fire protection of structural steel and underside of steel decks in machine rooms.
  (c) Equivalent masonry, concrete or plaster fire protection on outside surfaces of exterior structural peripheral members.
- Bearing for members in certain areas may not require fire protection. Locations and members should be specifically identified on the drawings.

Section 07410 - Preformed Metal Roofing and/or Siding
Show the following information on the project drawings:
- Roof slope.
- Location, sizes, and details of flashing, closure strips, and accessories.
- Depth, thickness/gage, and configuration of roof and wall panels.
- Spacing of girts and purlins.
- Design loads for sizing girts and purlins.
- Method of attachment to supports

Section 07414 - Preformed Steel Standing-Seam Roofing

Show the following information on the project drawings:

- Roof slope
- Supporting structural framework.
- Intermediate support and attachment details, when applicable.
- Attachment clip spacing.
- Flashing support and fastening spacing.
- Roof venting. (Detail to preventing infiltration of wind-driven rain.)
- Sealant and closure locations.
- Locations for dissimilar metal protection.
- Details of all accessories such as ladders, walkways, antenna mounts, guy wire fastening, ventilation equipment, and lightning rods.
- Details of flashing at all roof penetrations. On roof plan add note to offset penetrations such that center of penetrations coincide with mid-point of panel seams.
- Detail how expansion of roofing will be accounted for
- Locations where panels will be anchored / attached / restrained

Section 07511 - Aggregate-Surfaced Bituminous Built-Up Roofing

Show the following design, details and information on the roof drawings:

- Roof-penetrating components such as roof drains and vents shall not be located within 18 inches of each other, of the toe of cant strip, or at juncture of roof with wall or other vertical surfaces.
- Roof drains with approved clamping rings and removable large dome strainers are used.
- Equipment mounted on curbs or structural supports are of sufficient height to accommodate roof flashings and installation of roofing under equipment.
- Structural supports are circular (pipe columns) to greatest extent practicable to permit use of circular collars with flashing flanges and umbrella flashing with clamping rings. Avoid use of pitch pockets, if possible.
- Curbs shall not restrict drainage of water from roof.
- Expansion joints in roofing shall be provided at each expansion joint in the structure.
- Details of expansion joints in roofing placed on curbs 8 inches high, minimum, above the membrane. Expansion joints shall not restrict drainage of water from roof.

- Indicate pressure treated wood cants at base of curbs for structural support.
- Area dividers in the roofing shall be provided:
  (1) where the roof deck changes direction and where substrate materials change;
  (2) uniformly spaced not over 200 feet apart on section of roof that exceeds 200 feet in length or width;
  (3) at each intersection where L- or T-shaped roof deck changes direction; and
  (4) where there is a difference in elevation between adjoining decks.
- Area dividers shall be located at high points, where practicable, shall not prevent drainage of water from the roof, and shall be placed on curbs above the water line.
- Flashing details provided at points where items will mount on or penetrate roofing membrane and at points requiring a typical flashing. Use isometric drawings as required to clearly indicate intersections of different types of flashings.
- Slope of substrate/roofing with directional arrows and live load limits.
- When backnailing of felts is required on a non-nailable deck, provide treated wood nailers, as a minimum, as follows:
  (1) Spaced no more than 21 feet apart (clear dimension), same thickness as insulation, and at right angles to roof slope on decks with roof insulation;
  (2) Spaced no more than 21 feet apart, embedded flush with deck top surface, and parallel to roof slope on decks without roof insulation; and
  (3) At right angle to roof slope of barrel roofs and spaced and installed as for decks with or without insulation, as applicable.
- Extent, location, and configuration of roof planks and walkways shown.
- Are treated wood nailers compatible with roofing material specified?

Section 07530 - Elastomeric Sheet Roofing System (EPDM)

Show the following information on the project drawings:

- Flashing and counterflashing at perimeter of roofing, pipe, conduit and other roof penetrations, and curbs. (Do not use sealant filled pitch pans for flashing roofing penetrations unless there is no alternative.)
- Expansion joints in the roofing at each expansion joint in the structure, placed on curbs above the waterline, and not restricting drainage of water from the roof.

- Roof drains not placed within 18 inches of other penetrations, expansion joints, or walls.

- Roof-mounted equipment on curbs or structural supports of sufficient height to accommodate roof flashings and installation of roofing under the equipment. Curbs shall not restrict drainage of water from the roof.

- Roof walkways for traffic areas and access to mechanical equipment. Provide openings in walkways to permit drainage of water from the roof.

- Slope of substrate/roofing with directional arrows.

- Live load limits of roof construction to caution against overload during stockpiling roofing materials.

Section 07600 - Flashing and Sheet Metal
Show the following information on the project drawings:

- Base, counter open valley, and eave flashing
- Roof drain flashing
- Expansion joints - (The contract drawings should contain details of building expansion joints at walls, ceiling, floors, roof, and parapets. Include exterior and interior details. Provide isometric detailing for expansion joints intersections.)
- Sheet metal roofing - show extent, slope, method of attachment and provisions for thermal movement of roofing
- Downspout locations, gauge, size, and method of attachment
- Gutter size, gauge, locations, and method of attachment

DIVISION 8

Include a complete door schedule. The door schedule should assign a separate number for each opening and should indicate:

- the door type and style,
- material,
- design (whether flush panel, full flush, paneled, glazed, or louvered)
- size and thickness,
- glazed or unglazed,
- fire rating class for fire doors,
- hardware set number, (may be here or in specifications)
- threshold material, if any, and
- material for frames, mullions, and transom bars.

It is recommended that standard door-type nomenclature, SDI 106, be used to indicate designs (e.g., F, L, G, GL, etc., in lieu of A, B, C, etc.).

Section 08110 - Steel Doors and Frames
Show the following information on the project drawings:

- Sizes of door openings, direction of swings, and travels of doors.
- The side of wall or partition where door is to be located.
- Details of nonstructural mullions, mullion covers, and removable mullions.
- Type and thickness of glazing required; whether or not insulating glass units are required.
- Method, type, number and spacing of anchors required for anchoring door frames to adjoining construction.
- The type of doors and frames required for various openings, and optional types of materials and construction, if any.
- Indicate locations which require Safety Glass (on plan or in schedule)
- Indicate the free area for louvers in doors.
- Indicate whether fire doors are required on one or both sides of the fire wall.

Section 08120 - Aluminum Doors and Frames
Show the following information on the project drawings:

- Size of door openings, thickness, swing and travel of doors and design; whether flush, paneled, glazed, or louvered; width of stiles and rails
- Elevations of each door and frame type, at 1/4-inch scale
- Details of head, jamb, sill, mullions, and transom sections; key sections to door frame elevations; type and spacing of anchors
- Type and thickness of glazing required and method of glazing
- Details of weatherstripping for exterior doors
- Amount of free area for louvers
- A separate number for each door opening on door schedule

Section 08210 - Wood Doors
Show the following information on the project drawings:

- Locations and travel of doors
- Sizes, types, and thicknesses,
- Glazing and louver requirements

- Designs
- Fire rating requirements
- Color or finish
- Door swing
- Sound transmission class

Section 08500 - Metal Windows
Show the following information on the project drawings:

- Type of material
- Sizes and types of windows;
- Metal and wood subframes, casings, or stools, if any;
- Hardware required.
- Sizes, location, and swing of ventilators; direction of slide for sliding ventilators;
- Location and details of fixed sash.
- Typical window sections and details.
- Show glass thickness. Show special glazing such as safety glass, if any.
- Method of anchoring windows to adjoining or adjacent construction; note size and types of clips, anchors, screws, or other fasteners in details.
- Details of nonstructural mullions and mullion covers; details of anchoring and reinforcing nonstructural mullions at windows to receive window cleaner anchors.
- Number of window cleaner anchors required and locations.
- Locations of windows requiring special operators, if any. Show method of operation and concealment of operators, cables and rods, as appropriate. Show wiring diagram for motor driven operators, if any.
- Locations of windows designated as forced entry resistant, if any.

- Locations of fire-rated windows, if required.

Section 08710 - Finish Hardware
Show the following information on the project drawings:

- Location, class, and hourly rating of fire doors;
- Location and installation details for blocking behind door stops (wall bumpers) mounted on wallboard partitions; and
- Hardware set numbers (HW-2, etc.) in the door schedule or list doors by number in each hardware set in the specifications.
- Are the following items included in the schedule - thresholds, automatic door bottoms, weatherstripping, acoustic seals, kick plates, panic hardware?

Section 08800 - Glazing
Show the following information on the project drawings:

- Locations of each type of glass, using the same terminology used in the specification.
- Thickness of glass, unless glass of each type is the same thickness.
- Frame and rabbet details, indicating method of glazing.

Section 08900 - Glazed Curtain Wall System
Show the following information on the project drawings:

- Large scale details showing the sizes and configuration of principal wall system framing members, panels, and other components as well as details of flashings, copings, weep, and drainage system.
- Methods of securing system framing to structures and details of fastenings, anchors, and auxiliary shapes.
- Details of expansion joints and each type of typical joint.
- Type and thickness of glass and details showing methods of glazing for all conditions.
- Details for installing each type of panel specified.
- Details of any required field applied thermal insulations, sound insulations, baffles, fillers, fire stops, or other seals at joints between curtain wall and edges of floor slabs.
- A schedule showing the various types and sizes of system units and of all window units.

DIVISION 9

Section 09310 - Ceramic Tile, Quarry Tile and Paver Tile
Show the following information on the project drawings:

- Rooms, areas, or spaces that are to be tiled such as floors, walls, wainscots (give heights), shower rooms and compartments; and, sink, vanity, or work table tops and splash backs, should be shown in the finish schedule.
- Bases, thresholds, and treatment at windows, doors and trimmed openings, including sills and vertical returns back to window or door frames, should be properly detailed.
- Spaces which require cleavage membrane or membrane waterproofing.
- Where a mortar bed is required, and where it is desired that surface of tiled floor be flush with adjacent floor, indicate depressed structural slab or sub-floor.
- A schedule showing tile types, sizes, patterns, trim, and built-in tile accessories required for each room or space. Identify type of trim shape by the designations of ANSI A137.1. Do not indicate sizes if specified in this section.
- Slope of floors to drain is 2% or less.
- Details and locations of expansion and control joints in tile walls or floors.
- Treatment at tile recesses for radiators, convectors, drinking fountains, lighting fixtures, and other recessed items.
- Locations where concrete walls or partitions, or masonry walls are to be furred to receive ceramic wall tile.

Section 09500 - Acoustical Treatment
Show the following ceiling information on the project drawings:

- Location of acoustical tile ceiling (ATC) systems. If more than one type of system is used, key each system to locations on the reflected ceiling plan or the Finish Schedule using symbols ATC-1, ATC-2, etc.

- Arrangement of panels, light fixtures, diffusers, other penetrations and exposed suspension grids when used are shown on the Reflected Ceiling Plan. Have these items been coordinated with Mechanical & Electrical?

- Maximum spacing of suspension members for concealed grid suspension systems.

- Location and material of fire stops above suspended ceilings.

- Location of systems required to have ceiling sound transmission class (STC), fire endurance ratings, or both.

- Details of special or patterned panels if necessary to describe adequately.

- Where acoustical ceilings are provided in conjunction with thermal insulation beneath vented attic spaces, under certain types of roof decks, careful attention should be given to furnishing adequate details on the contract drawings. Such features as support of insulation over flush-mounted light fixtures, conduit, acoustical units, and suspension system components and around heating, air conditioning, and other utilities shall be covered by the details. Appropriate specification shall be included in Section: Ceiling, Wall and Floor Insulation, to cover the installation of insulation over the suspension system, light fixtures and other ceiling penetrations.

Section 09660 - Resilient Tile Flooring

Show the following information on the project drawings:

- Type, location and layout pattern of floor tile.

- Type and location of base, stair treads, edge strips, and joints between resilient and other types of flooring.

- Manufacturer's name and number. Note on drawings or in specs: Colors listed are for color identification purposes only. Listing is not intended to limit selection of equivalent textures and colors from other manufacturers.

Section 09900 - Painting

Drawings shall include project documentation such as details, sections, elevations and/or schedules which indicate the type and extent of work. Specific quantities of work shall not be cited in the specification. Work shall be coordinated between the drawings and specifications and include the following:

- Reputtying and Reglazing

- Resealing of Existing Exterior Joints

- Removal of Existing Coatings

- Has potential for lead paint and/or asbestos been investigated and addressed on renovation projects?

- Has Finish Schedule been coordinated with this Specifications Section?

- Are types of paint compatible with materials being painted?

- Are number of coats of paint shown in schedule or specified?

- Do specifications establish the level of workmanship required for painting?

DIVISION 10

Section 10800 - Toilet and Bath Accessories
Show the following information on the toilet room plans and elevations:

- Mounting heights required above Finished Floor

- Locations of all fixtures, partitions and accessories including plan and elevation dimensions.

- Number of accessories required.

- Clearances as required to meet UFAS standards for handicapped accessibility

DIVISION 11

Section 11193 - Detention Hollow Metal Frames, Doors and Door Frames
Show the following information on the project drawings:

- Sizes of door or view window, speaking port, louver, view port and food pass, if any, openings, thicknesses of doors, swings, and travels of doors.

- Indicate detention hollow metal doors as Sec. Holl. Mtl. or SHM and show that the term means Detention Hollow Metal Doors and Frames, in a schedule of abbreviations.

- The size of wall or partition where door is to be located.

- Type and thickness of glazing required.

- Method, type, and spacing required for anchoring frames to adjoining construction.

- Include a complete door schedule. The door schedule should assign a separate number for each opening and should indicate the door type and style, material, design, size, thickness, hardware set number, threshold material, if any.

Section 11400 - Food Service Equipment
Show the following information on the project drawings:

- Equipment location, including all elements located in counters and dishwashing counters and at sinks.

- Size, material and details for custom-fabricated equipment.

- Floor, wall, and ceiling penetrations. Include mounting height and size of pass through window at soiled dish counter.

- Locations for raised bases, retainer curbs, or depressions.

- Locations for recessed, grated floor drains required for equipment.

- Locations for exhaust fan curbs, supply fan curbs, exhaust duct, supply duct, and ductwork material.

- Location for fire suppression system tanks and actuating stations.

- Locations and type of hoods, plumbing enclosure housing and control panel of automatic washdown system.

- Location and detail drawing of insulated floors, including under-floor perforated drains and vent pipes.

- Location of disposer control centers.

- Locations of disconnect switches.

- Location and detail drawings of electrical chases and raceways and plumbing chases. Assure that underfloor electrical chases are provided to and among cash registers.

- Location of remote compressors and refrigeration systems.

- Location of all utility connections to building water, sanitary, gas, electrical, sprinkler, fire alarm, oil, compressed air, steam, and other utility systems. Include convenience outlets at point of use of plug-in equipment.

- Detail drawings should be provided to show water metering devices located to provide one device to serve two kettles where practical.

- Details of the remote pressurized syrup containers and associated supply lines to drink dispenser(s).

Section 11601 - Laboratory Equipment and Fume Hoods
Show the following information on the project drawings:

- Location of equipment, by unit number.

- Location of utility connection.

- Relation to adjacent trades.

- Remotely located blower and ductwork, to create negative pressure at hood. Require appropriate weatherproof caution labels attached to outlet end of exhaust duct systems where warning of dangerous chemical fumes will be necessary for the protection of workmen in the vicinity.

- Optimum face velocity.

- Fans and ductwork needed to create negative pressure. Laboratory fume hoods are ventilated enclosures designed to provide a safe working area for laboratory activities involving hazardous materials, generated fumes, aerosols, gases, and particulate matter. To operate satisfactorily, air is removed from this enclosure at an optimum face velocity. Require velocities measurable at the maximum face area of the hood, with maximum allowances for hood, filter, and appurtenance static pressure losses within the specified limits.

DIVISION 13

Section 13121 - Pre-engineered Metal Buildings

The documents may require that pre-engineered metal structures be provided by the contractor as engineered systems. All design and performance criteria must be indicated in the documents. The supporting structure for the engineered system shall be detailed on the drawings with the assumed reactions from the engineered system indicated. The contractor shall be required to provide calculations and shop drawings for these systems prepared by a licensed professional engineer. The A/E shall review these submittals for conformance with the design requirements.

Show the following information on the project drawings:

- Floor and eave height dimensions required

- Clear spans, clear heights necessary

- Roof slope required (or minimum and maximum slope)

- Type of roof and wall coverings

- Approximate locations for downspouts, roof ventilators, louvers, and skylights

- Location and required R factor of insulation

- Depth of roof and wall coverings, if necessary

- Location of liner panels

- Minimum design roof dead, live, and snow loads.

- Basic wind speed in miles per hour.

- Collateral loads for special equipment or crane loads, special live loading

- Importance factor for wind and seismic computations.

- Foundation plan with dimensions and details and the allowable design bearing capacity of soil on which this design is based. Require Contractor to include in his price any modifications necessary for his building.

- Where applicable, state the allowable horizontal drift between the pre-engineered metal building and adjacent or adjoining construction.

DIVISION 14

Section 14200 - Elevators
Show the following information on the project drawings:

- Fire-rated hoistway, with vent at top where required by code.

- Waterproofed pit, with ladder, indirect drain or sump, light and (GFIC) outlet.

- Machine room, with ventilation to maintain temperature, light and outlet, and fire extinguisher. Do not run pipes, ducts, conduits, etc. through or over the machine room or locate other equipment in the machine room. For new machine rooms in existing buildings show how pipes, ducts, conduits, etc. are relocated.

- Hoist beam at top of shaft, removable if necessary for overhead clearance.

- Smoke detectors in each lobby and machine room to initiate firefighter's return.

- Heat detectors in shaft and machine room to activate elevator return and sprinkler time delay.

- Power feeders to machine room with disconnects for elevator machine and cab lighting, phone connection in machine room.

DIVISION 15

Section 15250 - Mechanical Insulation
Show the following information on the project drawings:

- Areas where pipe insulation differs from the Typical;

- Areas where ductwork is to be internally insulated;

- Areas where metal jackets are to be used on interior piping;

- Pumps to be insulated and encased in 20 gage boxes, if required;

- Heat exchanger temperatures.

Section 15320 - Fire Pumps
Show the following information on the project drawings:

- Configuration, slope to drain, and sizes for each piping system;

- Location and type of each pump, including associated equipment and appurtenances;

- Capacity of each item of equipment;

- Locations and details for special supports for piping; and

- For pipe larger than 12 inches, details of anchoring piping including pipe clamps and tie rods.

Section 15330 - Fire Extinguisher Sprinkler Systems
Show the following information on the project drawings: (See NFPA 13):

- Location and detail of each sprinkler system entrance to include
  supply riser,
  alarm valve,
  water motor alarm,
  fire department inlet connection,
  pressure or flow switch,
  fused disconnect switch,
  and associated electrical connections.

- Location where each sprinkler system begins including connection to water distribution system piping.

- Location of sprinkler system control valves, post indicator valves, wall indicator valves and inspector test stations.
- Area of sprinkler system coverage when system is protecting partial areas.

- Details of sprinkler piping anchors where required.

- On renovation projects, indicate existing sprinkler piping layout and sprinkler heads on project drawings only if existing sprinkler system is being modified and such layout is necessary for clarity or coordination with new work. Show new sprinkler system work.

- Show predominate hazard classification; identify any areas with a different classification

- Preaction valve detail for elevator shaft and machine room sprinklers

- Show information on water supply to include
  Water flow available in gpm
  Static Water Pressure in psi
  Residual Water Pressure in psi
  Hydrant locations

Section 15400 - Plumbing Systems
Show the following information on the project drawings:

- Configuration and sizes of piping systems

- Locations of hot water and cold water shut-off gate valves for each toilet room

- Dimensioned location and type or schedule # of each plumbing fixture with clearances as required to conform to UFAS accessibility requirements.

- Typical details for attaching wall-hung fixtures to walls

- Whether piping is run above or below ground, floors, and ceilings and whether concealed or exposed

- Capacity and operating characteristics of each item of equipment

- Locations and details for special supports for piping

- Locations, sizes, and types of cleanouts

- Locations, sizes, and typical details for extended rim floor drains

- Detail or sections through each type roof drain, floor sink, and grease interceptor or separator

- Roof drain / roof leader piping location and sizes

- Location of acid-resistant DWV piping, cleanouts, traps, drains and accessories
- Cleanouts in crawl spaces or exterior of buildings shall be not less than 3 feet from building wall

- Exterior buried piping shall not run parallel within 5 feet of exterior building wall

- Location and size of water hammer arresters

- Ranges and accuracies for gages and thermometers

- Capacity, size, bypass valves, and piping for water meters and detail of water meter box (Coordinated with serving utility entity)

- Locations and sizes of access panels for valves

- Details of pipe penetrations in outside walls

Section 15512 - Chilled, Condenser or Dual System Water Systems
Show the following information on the project drawings:

- Single line plan and necessary sections indicating location, sizes, and routing of associated piping. Piping larger than 4" diameter should be shown by double lines.

- Locations of anchors, expansion loops, and fittings

- Details of anchors and guides

- Flow diagrams for system(s).

- Appropriate schedules and details for equipment or components.

Section 15520 - Steam or Hot Water Distribution Systems (Interior)
The project drawings should show the following information:

- Plan and location of all new pipelines, including size of pipe.

- Maximum working pressure of the systems.

- Location, size, and type of service of existing connecting, intersecting, and adjacent pipelines and other utilities.

- Locate and detail the pipe entry through building wall or slab. Include detail of interface between the tunnel or box trench and the building.

- Isometrics to show elevations, manholes, laterals, crossing utilities, and unusual conditions.

- Locations, types and typical and/or special details of pipe supports and guides.

- Locations and isometric of expansion loops.

- Locations and details of anchors. Indicate pitch of pipe and direction.

- Points of connection.

- Location and size of main and branch line valves

- Location and size of vents and drains.

- Location and detail of drip legs, trap stations, trap schedule, and method of condensate recovery.

Section 15652 - Central Refrigeration Equipment for Air Conditioning
Show the following information on the project drawings:

- Indicate size and locations of cooling tower supports.

- Locations of water treatment tanks and control panels.

- Indicate size and routing of refrigerant safety relief discharge piping. Consult ANSI/ ASHRAE 15 Safety Code for Mechanical Refrigeration.

- Indicate a cooling tower basin heating system for cooling towers that will be required to operate when outside temperatures are below freezing and the heat generated through the refrigeration process (with head pressures maintained) will be insufficient to preclude freeze-ups. Either electric immersion heaters or steam or hot water coils may be used for supplemental heating.

- Indicate vibration isolation requirements

Section 15850 - Air Handling Equipment
Show the following information on the project drawings:

- Arrangement plan and details for air handling equipment and accessories.

- Equipment schedules with sound ratings (loudness level), electrical characteristics, capacities.

- Equipment pads, foundations, supports, and vibration isolators.

Section 15900 - Temperature Control Systems

Show the following information on the project drawings:

- Sequences of operations and system schematic. (Specification should contain a narrative description detailing how the controls are to operate.).

- Direct Digital Controller Architecture Schematic: Show general architecture of DDC system including controllers, communication LANs, workstation terminal, etc.

- Dampers: Show type of damper (opposed or parallel blade).

- Control Valves: Show control valve nominal size, flow capacities, type of fluid, inlet pressure, maximum and minimum pressure drop at design flow, and calculated Cv. (Select valves for smallest Cv within available pressure constraints, pipe velocities, economy of design, and noise criteria.)

- Indicate pressure and temperature indicator's scale ranges and location. Location of temperature wells and pressure taps.

- Smoke detectors and location of key-operated override switches, when required, along with the zoning arrangements for these systems.

- Indicate location of meters provided in this and other sections.

- Location of room sensors, pressure sensors and outdoor sensors.

- Input / Output summary as described in the Manual.

- Location and horsepower of air compressors and refrigerated air dryers when required.

- Elementary wiring diagrams.

- Location and types of automatic dampers, including smoke dampers, e.g., opposed or parallel blade.

- Mechanical Flow Drawing: Show relative position of all individual HVAC components, input sensors (temperature sensors, pressure sensors, equipment proofs, override buttons, etc.), output components (actuators, valves, dampers, etc.), and hardwired safeties (smoke detectors and freeze stats).

Section 15996 - Testing/Adjusting/Balancing: Heating, Ventilating and Cooling Systems
Show the following information on the project drawings:

- A unique number or mark for each piece of equipment or terminal.

- Air quantities at air terminals in cfm and direction of air flow (2-way, 4-way, etc.).

- Air quantities and temperatures in air handling unit schedules.

- Water quantities and temperatures in thermal energy transfer equipment schedules.
- Water quantities and heads in pump schedules.
- Water flow measurement fittings and balancing fittings.
- Ducts for special locations (wet, corrosive, etc.)

DIVISION 16

Section 16100 - Interior Wiring and Circuiting
Show the following information on the project drawings:

- Plans showing locations of all fixtures, receptacles, switches, and outlet sizes.
- Show Branch Circuiting with identification of circuits for all light fixtures and switches. Show wire size, type insulation, Alu or Cu wire, method of running circuit, and number of conductors including ground fault protection, as applicable.
- Provide Panelboard schedule for branch circuits.
- Show conduit sizes and runs.
- Show mounting height for outlets and switches on elevation or note on drawings.
- Have equipment rooms and electrical rooms been checked for adequate heat dissipation? (i.e. cooling or ventilation)
- Are wiring and equipment suitable for kitchens, mechanical rooms and other hot locations?
- Are voltages, loads and characteristics of electrical powered equipment compatible with the service provided?
- Have conduit stub-outs and circuiting been shown / located for future planned needs?

Section 16200 - Diesel-Electric Generators
Show the following information on the project drawings:

- Verify that general information and data below has been shown:
  a. Piping plans and elevations.
  b. Fuel Piping and tank details.
  c. Engine setting plan and details.
  d. Civil; architectural; structural; heating, ventilating, and air conditioning; plumbing; and electrical plans and details.
  e. Flow Diagrams indicating the number of engines and other system requirements.
  f. Diagrams indicating sizes of all piping not provided by the engine manufacturer.
  g. Indicate any additional specified water treatment requirements.

- One-Line Diagrams:
  a. Indicate the number of engine-generator units and other system requirements.
  b. Are wiring and raceway requirements shown?.
  c. Are elevations of switchgear arrangements, the secondary unit substation, motor control centers, and the control switchboard shown?.
  d. Are ratings for buses, instrument transformers, relays, instruments, circuit breakers, motors, motor controllers, lighting transformers, and other requirements shown or covered in the specifications?

- Miscellaneous: Provide any limiting dimensions, not covered in the specifications, by codes, or defined on to-scale drawings, which are necessary for proper system operation.

Section 16400 - Service and Distribution

Show the following information on the project drawings:

- On electrical site plan, show location of service to property and overhead or underground routing of service to building. Show transformer location, if applicable, and service entrance location.

- Show service cable size and type (aluminum or copper) wire.

- Show ground service and tie to protective ground.

- Show single line main power riser diagram from service entrance to distribution panelboards. Connection of equipment should be indicated by circuit runs. Indicate type of insulation, wire size, number and type of conductors for feeders including equipment ground and ground fault protection.

- Indicate wiring and raceway requirements. Provide elevations of switchgear arrangements, the motor control centers, and the control switchboard.

- Show ratings for buses, instrument transformers, relays, instruments, circuit breakers, motors, motor controllers, lighting transformers, and other requirements not covered in the specifications.

- On electrical power floor plans, show location and identification number of Main panel and of distribution panelboards.

- Show Panelboard Schedules to include size, rating, circuit breaker ratings, class and number of poles, terminals and equipment ground.

- Verify that sufficient space exists to install panelboards in locations as indicated.

- Verify that panelboards are not improperly recessed in fire rated walls.

- Disconnects shown for motors and electrical powered equipment

- Has spare capacity (25%) been included in all Mains and Panelboards?

- Have structural supports been designed and shown for electrical equipment, masts, and such?

Section 16510 - Interior Lighting
Show the following information on the project drawings:

- Type, style, mounting, lamp arrangement, Ballast type, Power Factor, and Lumens per watt . Use Schedule if necessary.

- Location of fixtures on plan. Coordinate with reflected Ceiling Plan.

- Wattage, voltage, and frequency rating required

- Type of reflector, diffuser required

- Glass/plastic lens

- Accessories required, such as photocell, time switches, and auxiliary lamps

- Mounting height above floor or grade to bottom of fixture

- Indicate type of rods or straps used to suspend fixtures. (if more than one type of hanger is used)

- Reflecting or non-reflecting surface finish

- Shielding required

- Referenced sketch

- Exit and emergency lighting shown for corridors, stairs and egress routes. (See UFAS 4.28.3)

Section 16530 - Exterior Lighting (and accessories)

The following information shall be shown on the drawings or included in the project specifications:

- Luminaire schedule indicating pertinent information (mounting, lamps, ballasts, and voltage).

- Type of luminaire;

- Voltage and wattage rating required;

- Accessories required, such as photocell, time switches, and auxiliary lamps;

- Location of poles or standards;

- Referenced sketch; and

- Extent and location of the work to be accomplished and wiring and equipment necessary for a complete installation.

- Detail of pole base and foundation including anchorage and grounding

Section 16700 - Communication Systems
Show the following information on the project drawings:

- On electrical site plan, show location of service to property and overhead or underground routing to building.

- Show location and size of communications equipment mounting board.

- On electrical power floor plans, show location of control panel

- Show single line **communications riser diagram**. Connection of equipment should be indicated by circuit runs in lieu of conduit runs. Do not indicate number and size of conductors for interconnection of communications components.

- Show mounting height for outlets on elevation or note on drawings.

Section 16722 - Interior Fire Alarm System
Show the following information on the project drawings:

- On electrical power floor plans, show location of control panel, battery and charger, transmitter, annunciator, fusible safety switch, remote trouble device, alarm devices, and each actuation device including fire extinguishing system switches.

- On electrical site plan, show location of master fire alarm box, annunciator, circuit run to the connection to the campus fire alarm circuit, circuit run into the building and connection to control panel, and circuit run for master box marker light. Circuit runs should show conduit size and numbers and size of conductors.

- Show single line fire alarm riser diagram. Connection of equipment should be indicated by circuit runs in lieu of conduit runs. Do not indicate number and size of conductors for interconnection of fire alarm components.

- Show mounting height for panels on elevation or detail drawings, if critical.

- Location of Visual Annunciators (strobe lights) adjacent to Exits or EXIT signs to meet requirements of UFAS 4.28.3

- Intercom system for Areas of Rescue Assistance

APPENDIX R: RECORDS RETENTION POLICY

REFERENCE: RECORDS RETENTION AND DISPOSITION SCHEDULE
GENERAL SCHEDULE NO's. 101, 102 and 106

The following guidance is intended to supplement and clarify the records retention requirements of General Schedules 101, 102, and 106 as they relate to specific records and documents which are usually a part of the files for the procurement and administration of Construction and Professional Service Contracts to include a Capital Project, a Non-capital Construction Project, a building renovation project or the erection or placement of a temporary or permanent structure on state property.

Construction and Professional Service Procurement Records

Refer to LVA GS-102, *Fiscal Records Retention and Disposition Schedule*.

Public Announcements, RFP's and Notifications *(CO-7a,*

Retain 3 years after publication of notification, then destroy when no longer needed administratively.

A/E Qualification Forms for 'Small Purchase' Procurements *(AE-1 thru AE-6)*

Retain until information is superseded or 3 years after date on forms, then destroy.

Bids and Proposals

- Bid and proposal files *(Includes responses to RFP's, AE-1 thru AE-6, CO-16,)*
Retain 3 years after award to successful bidder, closure, cancellation, or until audit, whichever is longer; then destroy when no longer needed administratively. (Refer to LVA GS-102, *Fiscal Records Retention and Disposition Schedule)*

- Unopened bids
Return to bidder unopened. (Refer to LVA GS-102, *Fiscal Records Retention and Disposition Schedule)*

Contracts and Authorizations for Capital Construction & Improvement Projects

- Construction Contracts, Attachments, Change Orders *(CO-7, CO-9, CO-9a, CO-9b, CO-9.1, CO-9.2, CO-10, CO-10.1, CO-11, Final CO-12,)*
Permanent. (Refer to LVA GS-102, Fiscal Records Retention and Disposition Schedule)
Duplicate copies - Retain until no longer having administrative value, then destroy.

- A/E Contracts, MOU's, and Change Orders *(CO-3, CO-3.1, CO-3.1A, CO-3.2, CO-11a/e*
Retain originals 5 years after the terms of the contract are fulfilled and audited, then destroy.
Retain duplicates as long as administratively required, then destroy.

- Change Order Backup Material *(CO-11a, Cost data, quotes, calculations,*
Retain 5 years after contract completed or until audited, whichever is longer.

Furnishings, Equipment & Service Contracts Files
Retain originals 5 years after the terms of the contract are fulfilled and audited, then destroy.
Retain duplicates as long as administratively required, then destroy.

Purchase orders
Retain 3 years or until audit, whichever is longer, then destroy. (Refer to LVA GS-102, *Fiscal Records Retention and Disposition Schedule)*

Invoice and accounting files *(monthly CO-12's, A/E Invoices,*
Retain 3 years after project completion or until audit, whichever is longer, then destroy.
(Refer to LVA GS-102*, Fiscal Records Retention and Disposition Schedule)*
Destroy duplicate copies when no longer needed for administrative purposes.

Construction Project Planning and Design – Capital & Non-capital

Capital Project Authorizations and Approvals *((CO-2, CO-4, CO-5, CO-6, CO-8, CO-*
Retain Record Copy of each form including revised editions in the permanent project record.
Retain duplicates as long as administratively required, then destroy.

Capital Project Requests, Justifications and Ranking for Projects *(DPB 'H' forms and 'P' forms and associated data)*
Retain 5 years after completion of project or denial of request, then destroy.

Design Progress Plans for Construction *(schematic, preliminary* ***& prefinal plans, documentation and specifications*****)** *(CO-5a, Submitted documents*
Retain Record Copy of each 1 year after project completion and acceptance, then destroy.
Dispose of duplicate copies when no longer administratively required.

Project Design Progress Review Comments and Memoranda
Retain Record Copy of each 1 year after project completion and acceptance, then destroy.
Dispose of duplicate copies when no longer administratively required.

Site Drawings and Plans

– Master Planning & Site Development Plans
Retain preliminary / working copies until final version approved, then destroy when no longer needed administratively.

- Site Utility Plans
Retain preliminary / working copies until final version approved, then destroy when no longer needed administratively.

- Topographic Site Plans & Surveys

Retain preliminary / working copies until final version approved, then destroy when no longer needed administratively.

Construction Contract Administration – Capital & Non-capital

Temporary Certificates of Use and Occupancy *(CO-13.3,*

Retain 5 years after the issuance of the Certificate of Use and Occupancy, then destroy.

Construction Inspection Files (Building, Electrical, Mechanical, and Plumbing) *(CO-13.1a, CO-13.2a, CO-13.3a, CO-13.3b,*

Retain 5 years after final inspection or the issuance of the Certificate of Use and Occupancy, then destroy.

Other Inspection Files

Retain 3 years after the close of the inspection, then destroy.

Project Correspondence, Reports and Memoranda

Retain 5 years after project completion, then destroy records no longer considered to have administrative or legal value.

Equipment Reference Files

Retain until superseded ***or equipment is no longer owned***, then destroy.

Warranty File

Retain 1 year after warranty expiration, then destroy.

Construction Record Documents

Capital Project *As-Built Record Plans, Specifications, Drawings, Plats & Maps (CO-13.3, CO-14 and CO-17.1)*

Retain original or microfilm copies until building disposed of, then transfer to the Archives, Library of Virginia for permanent retention. Refer to Construction & Professional Services Manual, Department of General Services, for microfilm standards.

Capital Project Affidavits and Certificates *(CO-13, CO-13.1, CO-13.1b, CO-13.1c, CO-13.2)*

Retain *original or microfilm copies* permanently. Refer to Construction & Professional Services Manual, Department of General Services, *for microfilm standards*.

Construction or Renovation Record Drawings, Plans, and Specifications *(CO-13.3, CO-14, CO-17.1)*

Retain as-built record drawings until disposal or removal of the building, lines, or facility from state inventory; then contact Description Branch, LVA concerning document archival or destruction.

Retain 'As-Built' marked-up drawings 3 years after transfer of data to record drawings is completed, then destroy when no longer needed administratively.

Surveys, Plats and Maps

Retain final plats, maps and unrecorded surveys permanently.

Uniform State Building Code Variances

Retain approved applications and supporting documentation for the life of the building to which the modification relates, then destroy.
Retain denied applications 3 years after denial, then destroy.

Policy Variance Files

Retain approved applications and supporting documentation permanently.
Retain denied applications 3 years after denial, then destroy.

Certificates of Use and Occupancy *(CO-13.3 including any subsequent versions for changes in use or occupancy)*

Retain for the life of the building in state inventory to which the certificate relates, then destroy or transfer to new owner.

Site Drawings and Plans

- Master Planning & Site Development Plans

Retain final approved development plans, maps and unrecorded surveys permanently.

- Site Utility Plans

Retain approved utility plans and unrecorded surveys permanently.

- Topographic Site Plans & Surveys

Retain approved plans and unrecorded surveys permanently.

Photographs of Construction Activities / Progress

Refer to LVA GS-101, *Administrative Records Retention and Disposition Schedule*.

Permits

Building Permits *(CO-17, CO-6a, CO-6b,*

Retain 5 years after project completion and permit expiration, then destroy.

Building Demolition Permits *(CO-17.1*

Retain 3 years after disposal or removal of the building, lines, or facility from state inventory; then contact Description Branch, LVA concerning document archival or destruction.

Drawings & Specifications, Building Permit copy

Retain 5 years after final inspection and issuance of Certificate of Use and Occupancy, then destroy.

Temporary Use Permits *(versions of CO-13.3*

Retain temporary permits 1 year after the expiration of the permitted activity or use, then destroy.

Special Use & Other Permits (versions of CO-13.3

Retain 3 years after the expiration of the permitted activity or use, then destroy.

Annual Building Permit & Reports

Retain 3 years after end of report period, then destroy.

Elevator & Boiler Inspection Reports / Records

Retain 3 years after reinspection date, then destroy.

APPENDIX S: AARB GUIDELINES AND SUBMITTAL INSTRUCTIONS

COMMONWEALTH of VIRGINIA
DEPARTMENT OF GENERAL SERVICES
ART AND ARCHITECTURAL REVIEW BOARD

GUIDELINES FOR SUBMITTALS AND PRESENTATIONS
JANUARY 2003
REVISED July 2003

Purpose of the Board

The Art and Architecture Review Board consists of five members appointed by the Governor (and a representative of the Department of Historic Resources) to advise him on the "artistic character" of buildings and works of art which are to be paid for by the state, or to be located on or over state property. In practice, the Board recommends approval or disapproval to the Director of General Services, to whom the Governor has delegated this authority. Membership criteria are set out in Section 2.2-2400 of the Code of Virginia.

The Board interprets its mandate from the commonwealth in straightforward terms: to encourage the design of buildings and works of art which are both aesthetically and functionally appropriate to the agency for which they are intended. While no rigid prescriptive standards exist, the Board generally requires each submission to demonstrate:

- A resolution of basic functional and organizational requirements.
- A command of the fundamental principles of good design, including refinement of color, form, scale, material and craft.
- A positive contribution to the order and aesthetic of the physical setting.
- Due consideration of its environmental, historical and cultural factors.
- Concern for the greater public good.

Board Meeting Schedule

The Board meets at 10:00 a.m. on the first Friday of each month of the year, unless the first Friday or the following Monday is a state holiday, in which case the meeting will occur on the second Friday of the month, (please refer to the Commonwealth Calendar, http://www.vipnet.org/portal/cgi-bin/calendar.cgi for schedule and updates). Meeting locations will be noted on the Meeting Agenda. Generally speaking, meetings are held at the Science Museum of Virginia at 2500 West Broad Street, Richmond, VA 23219.

Submittals

All requests for a place on the Board's Agenda will be made in writing via a Fact Data Sheet and **must** arrive in the office of the Board Chairman **no later than 4:00 p.m. on the Friday two weeks before the date of the meeting,** (**strict adherence to this policy is necessary**), at which the Agency wishes to make its presentation. Agency requests should also include, where possible on 8 ½'' x 11" sheets, the location and general form of the building, complete with north arrows and graphic scales. **Eight original copies** of presentation documents/materials shall be provided for distribution to Board members. These documents will comprise the Board Agenda and also serve as the basis for the recording of the Board's actions.

Items to be included in the Consent Agenda or for demolition consideration should include enough information to allow Board deliberation without Agency representation at the meeting. Submission should include a site plan, proposed building plan and elevations and site photographs at a minimum.

Two submittals are normally required for Capital Outlay projects. The first submittal will occur at the Schematic Design phase. The second submittal is made during the Design Development phase and should include samples of materials and colors. Presentations during the Construction Documents phase may be required in unusual circumstances. If necessary, special arrangements can be made to review projects at intermediate stages.

Presentations to the Board

In general, Agency presentation should be organized so that they may be completed with 15 minutes, in order to allow adequate discussion within a 30-minute time frame. However, the Chairman will make a reasonable effort to accommodate the request of any Agency which feels that additional time may be required because of the complexity of a particular project, if this request is made at the time of the Agency's initial submittal.

The following items should be addressed (and well illustrated) by the Agency and it's Architect/Engineer at each presentation to the Board:

- Program: A brief description of the building program, including the purpose for the project and primary internal relationships.
- Relationship to the Surrounding Community, Adjacent Sites, and Agency Master Plan: Include discussion of land use policy, pedestrian and vehicular circulation systems, landforms, and architectural character.
- Site Plan Strategy: Discuss the relationships of the proposed design to existing topography and plantings, adjacent structures, service and pedestrian access, surface drainage, and orientation to the sun and wind. Photographs or slides and site diagrams are essential.
- Mass, Scale, Form and Architectural Character: Discuss the impact of the proposed design on existing views and the mass and scale of nearby structures. Explain how the proposed design conforms to the architectural and planning principles embodied in the Master Plan or in precedent examples. Describe and illustrate proposed materials, colors, finishes and constituent details. Include a brief description of the proposed site development, including grading, site drainage, paving, lighting, landscaping and site furniture.

Presenters should be organized and well prepared. Presentations should not be elaborate and overly formal. Sketches and study models are often more useful than finished professional renderings and highly detailed models.

How to Contact the Board

The Board may be contacted through its Chairman, who also maintains the Board Agenda:

Richard L. Ford, Jr., A.I.A.
Commonwealth Architects
101 Shockoe Slip, Third Floor
Richmond, Virginia 23219
Phone: (804) 648-5040
Fax: (804) 225-0329
Email address: rlfaia@comarchs.com (*please note, **no** presentation information will be accepted via email*)

ART AND ARCHITECTURAL REVIEW BOARD
SUBMITTAL FORMAT

Submittal Data is **Due Two Weeks Before Meeting**

Date of Meeting:

Agency Name (include address, contact person, telephone, fax, E-mail):

Project Title (include project code and location: city, county, etc.):

Current Project Status and Schedule (Phase: Schematic, etc.; next milestone date):

Project Description (area, number of stories, building and roof forms, and predominant exterior materials):

Brief Program Description:

Relationship to Approved Master Plan (include date of master site plan):

Contextual Issues and Design Intent:

Previous History with AARB (dates and action):

Names and Titles of Representatives for the Agency and the Architect/Engineer:

Estimate of Time Required for the Presentation:

Action this Date for use by AARB):

AARB 1-2003

APPENDIX T: RESERVED

APPENDIX U: RESERVED

APPENDIX V: RESERVED

APPENDIX W: RESERVED

APPENDIX X: RESERVED

APPENDIX Y: RESERVED

APPENDIX Z: RESERVED