COLORADO COLLEGE

FACILITY DESIGN GUIDELINES MANUAL

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PREFACE

The purpose of the Facility Guidelines Manual is to provide design teams with clear and concise guidance related to specified and designed material and system performance requirements for Colorado College facilities. The guidelines are to be used for both new and renovation construction types. It is anticipated that the Manual will serve as the initial technical design concept development point in the course of preparing and delivering project construction documents. The Manual also provides a comprehensive description of the college's intended design and submittal process, design intent and requirements for the design of high-performance facilities, and specific design and built environment requirements for various elements of facilities and infrastructure at Colorado College.

The guidelines are organized according to The Construction Specifications Institute's ***UniFormat***™ system of construction assemblies. This represents a unique, innovative, and repeatable approach to communicate design and construction requirements for college facilities. The design guidelines are subdivided into major elements including Substructure (foundations), Shell (structural frame and enclosure), Interiors (construction and finishes), Facility Services (building environmental control systems), and Site Construction (infrastructure and landscaping). Other major elements are under consideration for future development within the ***UniFormat***™ structure, including Equipment, Furnishings, and Special Construction. Each Section within these element categories addresses detailed requirements which prescribe general methods of construction desired by the College. Included also are built system performance requirements including basic function, amenity and comfort, health and safety, structural requirements, durability and life-cycle requirements, and operations and maintenance considerations.

These Facility Design Guidelines, when completely implemented with a strong sense of commitment by all participants in the design and construction process, are anticipated to result in superior building and outdoor environments at Colorado College. Using the guidelines as an initial step, we believe design teams are encouraged, supported, and empowered to develop exciting, innovative, and creative 21st century educational, social, and pedagogically rich environments for the students and faculty of Colorado College.

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PART 1 GENERAL

1.01 SECTION INCLUDES

A. Design requirements for the construction of:
   1. New facilities.
   2. Major building additions.
   3. Major renovations of existing facilities.
   4. Other facilities as determined by College Facilities Services Department.

1.02 DEFINITIONS

A. Building Committee: Consisting of representatives of the Project's educational department, primary user group, and other Project stakeholders including but not necessarily limited to College Facilities Services Department, Information Technology, and others to be determined who will best serve the needs and intended outcomes of the Project.

B. Code: The code referred to herein consists of all applicable local, state, and federal regulations, and the following:
   1. Building Codes: The following documents are incorporated into the definition of "the code" for the purposes of these design and construction guidelines, except for administrative provisions contained therein; where referenced, the code enforcement official is the Pikes Peak Regional Building Department of Colorado Springs. Editions currently enforced by the Pikes Peak Regional Building Department of Colorado Springs are applicable:
      a. ICC International Fire Code.
      b. ICC International Building Code.
      c. ICC International Plumbing Code.
      d. ICC International Mechanical Code.
      e. ICC International Fuel Gas Code.
      f. ICC International Energy Conservation Code.
      g. NFPA 70 - National Electrical Code.
      h. 2010 ADA Standards for Accessible Design, Department of Justice, September 15, 2010. The 2010 Standards for public accommodations and commercial facilities, which consist of the Title III regulations at 28 CFR part 36, subpart D, and the 2004 ADAAG at 36 CFR part 1191, appendices B and D. Regulations can be found on DOJ website at www.ADA.gov.
      i. FED-STD-795 - Uniform Federal Accessibility Standards; 1988 (Residential Facilities only).
      j. 29 CFR 1910 - Occupational Safety and Health Standards; current edition; as a work place.

C. College Facilities Services: Represents Colorado College for all facility design and construction activities on the campus; term used interchangeably with "Owner", "User", and similar terms referring to representatives of Colorado College.

D. Communications: Services that provide voice and data transmission, sound reinforcement, and television reception and distribution.

E. Conveying Equipment: Mechanized means of conveying people and goods, comprising people-moving equipment, material handling equipment, and maintenance conveying equipment.

F. Demolition: Removal of unneeded and undesirable existing elements.

G. Design Phases: Detailed requirements are included in DESIGN PROCESS AND SUBMITTAL REQUIREMENTS.

H. Electrical: Provision and distribution of electrical power to operate all electrically-operated devices, including those included under other services and those provided separately by the College Facilities Services; artificial lighting to illuminate spaces and tasks, both interior and exterior, without reliance on natural light; grounding systems, including lightning protection, and cathodic protection.

I. Electronic Safety and Security: Services that provide fire detection and alarm, access control, intrusion detection, and remote surveillance.

J. Equipment: Fixed or portable equipment elements usually having services connections.

K. Exterior Enclosure: All non-structural vertical exterior elements, including openings and elements closing or covering openings, comprising the exterior skin, the structure supporting the skin unless part of the superstructure, weather barriers, balcony walls and railings, parapets, joint sealers, insulation, exterior ceilings and soffits, and wall mounted appurtenances, but not including the interior finish unless an integral part of the enclosure.

L. Fire Suppression: Automatic fire sprinklers, standpipes, and extinguishing systems.

M. Fixed Seating: All types of fixed seating, including audience seating, conference seating, lounge seating, pews, and benches.

N. Fixtures: Fixed elements used by occupants in the functioning of the project but not having services connections.

O. Food Service Equipment: Fixed equipment relating to commercial and institutional food service whether or not requiring services connections and movable equipment requiring services connections, including refrigeration, storage, food preparation, serving, cleaning, and exhaust hoods and fans. Not including residential appliances.

P. Furnishings: Movable elements used by occupants in the functioning of the project, not requiring services connections; not site furnishings.

Q. General Equipment: Equipment that could occur in buildings of any occupancy, such as fire protection specialties, loading dock equipment, solid waste handling equipment and chutes, anchorage systems for working on the roof, and built-in vacuum system.

R. Hazardous Waste Abatement/Remediation: As prescribed by College Facilities Services Department Environmental Health and Safety Coordinator.

S. HVAC: Artificial means of maintaining interior space comfort and air quality, including heating, cooling, ventilation, and energy supply.

T. Information Fixtures: Fixed elements relating to communications but not part of communications services, such as signs and other identifying devices (including those mounted on the roof, exterior walls, or in the site), visual display surfaces, including projection screens, and fixed mountings and enclosures for communications equipment.

U. Integrated Automation: Integrated systems for centralized and/or remote monitoring and/or operation of services and non-services elements.

V. Interior Finishes: All applied finishes on the interior of the building, including on the interior side of exterior wall elements; wall finishes, including wall bases, trim, corner guards and other protection; floor finishes, including recessed mats and grilles; suspended ceilings and soffits, applied ceiling finishes; stair finishes and other finishes.

W. Interiors: All elements necessary to subdivide and finish the enclosed space, including partitions, doors, interior windows and other openings, stairs, finishes, and fixtures, except fixtures associated with services and specialized equipment.

X. Landscaping: Plants and turf throughout the site and indoors, and elements that contribute to their maintenance, such as irrigation.

Y. Maintenance Conveying Equipment: Vertical and horizontal conveying equipment for moving people and goods for facility maintenance, such as swingstages and lifts for window washing.

Z. Plumbing: Means of delivery of water to points of utilization; automatic heating and conditioning of domestic water; and unattended removal of water, rainwater, and liquid waste.

AA. Process Elements: Equipment and services serving a specialized process that is the primary objective of the facility other than support of occupants.

AB. Roofing: All elements forming weather barriers at the sloped or essentially flat weather-proof enclosure over the entire "top side" of the building, including all elements from the top of the deck up, roof coverings, gutters and downspouts, wearing surfaces, roof openings and elements that close openings, such as skylights, vents, and hatches, and roof mounted appurtenances.

AC. Services: Mechanized, artificial, automatic, and unattended means of supply, distribution, transport, removal, disposal, protection, control, and communication.

AD. Shell: The superstructure, exterior enclosure, and roofing.

AE. Site Fixtures and Equipment: All kinds of elements installed outdoors, primarily fixed or permanently mounted, such as fences and other barriers, athletic fixtures and equipment, miscellaneous minor structures, site furnishings, and flagpoles (including those mounted on roof or exterior wall).

AF. Site Improvements: Pavements and surfacing, site fixtures and equipment, landscaping, and tunnels that are not part of substructure or a utility structure applicable to a single utility.

AG. Site Elements and Work: Modifications to the site, site improvements, and site portions of services (i.e. utilities).

AH. Storage Fixtures: Fixed storage elements, usually modular, and to some extent relocatable, including built-in cabinetry, wardrobe units, lockers, anchored utility shelving, mailboxes and other postal specialties except in post offices.

AI. Substructure: Elements below grade and in contact with the ground.

AJ. Superstructure: All elements of floor and roof construction above grade and within basements, and elements required for support, including structural frame and load-bearing walls, and including fireproofing and firestopping, and vapor retarders and air barriers when an integral part of the structure.

AK. Window Treatment: Fixed elements that control view and natural light, for both exterior and interior openings, such as blinds, shades, shutters, and curtain tracks (but not the curtains).

1.03 REFERENCE STANDARDS

A. Specify conformance to reference standard date of issue current on date of Construction Documents, except where a specific date is established by applicable code.

B. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

D. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality.

E. ASHRAE Std 90.1 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.

F. ICC (IFC) - International Fire Code.

G. ICC (IBC) - International Building Code.

H. ICC (IPC) - International Plumbing Code.

I. ICC (IMC) - International Mechanical Code.

J. ICC (IFGC) - International Fuel Gas Code.

K. ICC (IECC) - International Energy Conservation Code.

L. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System (Part 1).

M. NFPA 70 - National Electrical Code.

N. NFPA 780 - Standard for the Installation of Lightning Protection Systems.

1.04 SAFETY CONSIDERATIONS

A. Design all College buildings with full consideration for the safety of the occupants and maintainers.
   1. Occupied Buildings: Safety and minimizing the disruption to the Faculty, Staff, and Students is of primary concern and may involve tightly phased and scheduled planning for both the Consultants and Contractor.
   2. Renovation Projects: The College will provide Contractor with a hazardous materials assessment report based on the identified project scope.
      a. College Facilities Services Environmental Health and Safety Coordinator will contract and organize the work to be performed by an abatement contractor so as to not adversely impact the construction schedule.
   3. Contractor is responsible for maintaining the site and completing work in a safe manner and in accordance with the applicable Occupational Health & Safety Administration (OSHA) regulations.

B. Approvals:
   1. It is Architect's responsibility to secure approval of Construction Documents from all appropriate code authorities. Furnish copies of approval letters and drawings to College Facilities Services Department. College Facilities Services Department will review and approve the final Construction Documents based on considerations identified during the design process and included in the Colorado College Design Guidelines.

C. Corridors:
   1. Corridors, means of access and egress, of an appropriate width and configuration to provide safe exiting from the building. Recess doors swinging into corridors when possible to avoid interference with the flow of pedestrian traffic. Place and secure movable furniture and equipment so as not to obstruct the required width or travel path. Provide appropriate spaces or recesses for community recycle collection stations

D. Stairs:
   1. Enclosed Stairways: Engineered smoke evacuation or mechanical pressurization for smoke control as required by the code.
   2. All Stairs: Non-slip tread nosings and constructed of materials appropriate for the location and installation.

E. Floors:
   1. Floor Construction: Design to a vibration criteria appropriate to the use. In critical installations, vibration analysis may be appropriate. When mechanical equipment is located in a Penthouse, give special consideration to transmission of vibrations into the building; providing a proper vibration isolation and structural system.
   2. Flooring in Laboratories and Chemical Storage Rooms: Constructed with chemical resistant liquid-tight flooring materials, including raised sill not less than 4 inches in height at all points, including in front and behind cabinets, but excluding doorways.
   3. Flooring in Commercial Kitchens: Constructed of a slip resistant, easily maintained material acceptable to the El Paso County Health Department.
   4. Floors in Toilet Rooms, Showers, Greenhouses and Other Special Use Spaces: Flooring appropriate for the use and as approved by the College Facilities Services Department.

F. Roofs:
   1. Provide safety railings and barriers at hazardous locations on roofs including but not necessarily limited to rooftop equipment in close proximity to parapets and roof edges. Comply with the Code as a minimum requirement, and with other requirements identified or established by the College Facilities Services Department.

G. Doors:
   1. Where utilized, connect electro-magnetic holders for rated doors to the building smoke detection and alarm system.
   2. Doors to all laboratory spaces must swing toward the corridor and have a vision panel when allowed by the Code.

3. Many exterior doors are monitored and/or controlled through the campus-wide communication/data card access network system.
    a. System: CBORD card access system.

H. Fire Extinguishers:
1. Locate fire extinguishers as required by National Fire Protection Association and the code. Provide and install a recessed cabinet or semi-recessed cabinet and the College will provide the fire extinguisher unit. All aspects of fire extinguisher location and installation conform to the currently applicable International Fire Code (IFC), title 29 of the Code of Federal Regulations (29 CFR) section 1910.157, other sections in this document and applicable codes.
2. Fire Extinguishers: 5 lb type ABC dry chemical, unless otherwise determined by the code.
3. Locations: A minimum of one fire extinguisher in the following locations, with additional units as required:
    a. Laboratory: 1 Unit/650 gsf
    b. Chemical Storage: Unit/500 gsf
    c. Shops: 1 Unit/650 gsf
    d. Stage Platforms: 1 each side.
4. The Architect is responsible for locating the fire extinguisher cabinets on the drawings.

I. Fire Protection:
1. A fire alarm system is required in each new or remodeled building.
2. While the NFPA is a specification guide, it does not necessarily address all requirements of the local Fire Department. The Architect is required to contact the Chief of the Colorado Springs Fire Department and/or City of Colorado Springs Fire Inspector to coordinate design aspects to ensure an expedient fire response is designed and specified. Building fire alarm systems must be connected to the Campus central monitoring network.

J. Building exterior and interior designs must identify locations and clear access to the following:
1. Fire and emergency vehicles.
2. Hydrant and water supply.
3. PIV and Fire Department standpipe.
4. Fire alarm annunciator panel(s).
5. Special fire suppressant agent storage.
6. Knox box key and fire plan storage.
7. Sprinkler control valve room.
8. Emergency exit signage.

K. Fire Protection Sprinkler and Suppression Systems:
1. An automatic fire suppression system will be required where design and code dictate and when included in the Owner's Project Requirements. Discuss with College Facilities Services Department during the design process and review the system.
2. Provide all commercial kitchen hoods with an approved fire suppression system. In chemical storage rooms, a chemical fire suppression system, such as "Barricade" or "AFFF" is preferred. In central computer rooms, the College "when required" desires gaseous fire extinguishing systems. Consider "Inergen" as the extinguishing material and review with College Facilities Services Department and Information Technology Services (ITS).

L. Fire Hazard Safeguards:
1. Flammable or Combustible Material Storage: Exceeding 10 gallons, stored in a small fire-resistive room or in an approved flammable liquid safety cabinet.
2. Chemical Storage Cabinets: When included in the contract, selected as follows:
    a. When the chemical storage cabinets are purchased by the Owner, the Architect is required to coordinate and design to accommodate them.
    b. All Laboratories: At least one (1) and no more than (3) flammable liquids storage cabinets, as specified in the most recently published version of the International Fire Code (IFC).
    c. The number of flammable liquids storage cabinets determined by program design. Review with the College Facilities Services Department and incorporate into the design as approved.

M. Coiling Doors/Fire Curtains:
   1. The use of this type door is strongly discouraged, and only used by permission of the College Facilities Services Department.

N. Eyewash and Safety Showers:
   1. All Laboratories: At least one plumbed eyewash unit with a floor drain below, that meets or exceeds the requirements for plumbed eyewash units in the most recent printing of the ANSI Standard Z387.1 “American National Standard for Emergency Eyewash and Shower Equipment.”
      a. Units properly tested.
      b. Install safety showers installed in laboratory buildings as required by the code.

O. Asbestos Removal:
   1. Most College buildings and utility tunnels constructed before 1970 contain asbestos materials in some form or another. The most typical use is mechanical insulation and other building materials.
   2. Generally, it is the policy of the College to remove and dispose of these materials, whenever a construction project is undertaken, to remodel a building or part of the project.
   3. Based on the Scope of Work established in the Architect’s documents, the College will provide the design team and Contractor a written report from a State Certified Inspector identifying the areas of concerns. The actual removal and disposal will be accomplished through the Facilities Services Environmental Health and Safety Coordinator using an outside contractor prior to the start of the remodeling project or when appropriate to the construction sequence of the Project. If the removal project is large enough to require a bidding process, the Owner may contract with a consultant for preparation of contract documents. These services will be separate and distinct from the Architect/Engineer's services. If during the course of remodel construction, additional suspicious material is discovered, notify the College Facilities Services Environmental Health and Safety Coordinator immediately. The College will assess the situation and remove the material appropriately.

P. Use of Asbestos or Products with Asbestos:
   1. The use of asbestos or any product containing asbestos banned by the Environmental Protection Agency and Department of Labor's Occupational Safety and Health Administration is absolutely prohibited from use in College facilities. Any contractor installing any product with asbestos will bear full responsibility and liability for any penalties, damages, suits or loss and will be required to pay for any and all costs of removal and replacement and also all legal costs if they are involved. Any product specified that unknowingly contains asbestos must be brought to the attention of the Architect/Engineer in writing prior to its purchase, and must not be installed.

1.05 GENERAL DESIGN CONSIDERATIONS

A. A sound, functional plan is the single most important factor in obtaining an acceptable solution to the Facility Program. This can best be achieved through a careful study of the space relationships and a thorough understanding of the needs of the users as expressed in the Building Program and in subsequent meetings and discussions held between the Architect and the Building Committee and/or Facilities Services Director.

B. It must also be recognized that changing curricula and modifications of space are frequent occurrences in College operation. Flexibility should be a consideration in any plan to accommodate anticipated as well as unanticipated changes and future growth.

C. Exterior design of the building is expected to be compatible with neighboring buildings and with the campus as a whole. Exterior materials as well as the building form will be examined very carefully at every step of the process to ensure compliance with the requirements of the project and College design standards. This design will be reviewed by the Campus Design Review Board (DRB) to ensure consistency with the Campus Master Plan.

D. It is neither the policy nor the intent of the College to limit the creative individuality of the Architect/Engineer in design or selection of materials. The recommendations presented in the Colorado College Facility Design Guidelines are based upon College experience with materials and construction methods and details that have resulted in the fewest problems in operation and maintenance, and in the best service and life of materials and equipment. Uniformity in the use of materials and equipment throughout the campus limits the range of cleaning and maintenance products and reduces the variety

of parts and materials which must be stocked for repairs and replacements as well as providing a continuity of aesthetic and functional user-experiences.

E. New materials and products and new methods of construction, when proven sound, may justify deviation from these guidelines. Give special consideration to technology and careful analysis to accommodate future advancement. Consider and discuss design with building sustainability concepts, and integrate into the Project. Planning for technological flexibility within budgetary constraints is a primary task. Review proposals to use such new applications and secure approval by the College Facilities Services Department prior to presenting them to the entire Building Committee and incorporating them into the Documents. General durability of construction, selection of appropriate materials, parts availability, adequate parts inventory, and long term maintenance must be a primary concern during the design, and must be specifically identified in the Construction Documents.

F. The College's East Campus properties on North Weber, east of the alley easement, between Uintah and Cache la Poudre Streets are in the North Weber/Wahsatch Historic District. Historical Design Guidelines have been developed for this area.
   1. Be aware of these historical design guidelines and review the design with the Owner's Representative and, if warranted, History Colorado or the Colorado State Historical Fund, as applicable.

G. The College also has buildings in the Old North End Historic District and many campus buildings on the National Register of Historic Places which require special design considerations for historic buildings. In some cases College historic buildings carry 20 to 50 year covenants requiring that exterior or site changes or modifications comply with the Department of Interior Standards and require review and approval by the Colorado State Historical Fund (SHF) due to the prior use of SHF grant funds for restoration work

H. **Energy efficiency and opportunities for high performance energy efficiency design goals and strategies** must be given special consideration in the design of new or remodeled College buildings in order for the College to achieve its long-term sustainability goals. Additional high performance design goals and strategies information is provided in the "**Facility High Performance Design Criteria Checklist**" in the Colorado College Facility Design Guidelines Manual. Colorado College requires a life-cycle cost analysis, where appropriate, on major components of new facilities and renovation projects. Review building operating cost analysis with the Owner's Representative at the Design Development and/or General Contractor construction submittal Phases.

I. The College and their Utility Consultants have an understanding of the functioning and future expansion of the Central Plant design, distribution and operations. In the beginning of all Projects, the Architect and their Engineers are required to review the scope of the Project to understand the need and constraints of the Central Distribution System.

J. **Colorado College supports and promotes sustainable and environmentally conscious building design**, a systematic consideration of a project's true cost to the environment and energy resources. Sustainable design opportunities should be identified, and innovative strategies and concepts should be applied within the budgetary and programmatic constraints of the specific projects. Additional sustainable design information is provided in the "**Facility Life-Cycle Design Guidelines for Sustainability**" in this Colorado College Facility Design Guidelines manual. A primary motivating premise for sustainability is to make wise resource decisions that will minimize our impact on future generations. The Colorado College campus becomes a prominent forum for educating the public, promoting greater community consciousness and leading by example. The building and associated landscape have substantial influence on teaching and learning. The benefits of improved indoor air quality, energy efficiency and enhanced visual surroundings promote a healthy and productive environment for inhabitants.

K. During the design process, develop and discuss a reasonable and feasible analysis of potential sustainable design opportunities and strategies to understand the financial, programmatic schedule, and greenhouse gas impacts of the strategies on the entire Project. The level of analysis should be proportional to the project and determined at the beginning of the project. The Consultants are required to facilitate an integrated multi-disciplinary design process that evolves through the entire design and construction process. The Architect is responsible to prepare and maintain a **Design Intent and**

Criteria Manual, containing design intent and performance criteria that will be of use during construction, occupancy, and operation of the project. Conduct discussion and review of potential sustainable design opportunities and strategies with the Building Committee and/or Facilities Services Director at each Design Phase. Produce a commissioning plan and develop an implementation process for projects with substantial mechanical or electrical work. Consideration of mechanical and lighting system efficiency, daylighting schemes, reduction/elimination of environmentally harmful substances, regional material availability and indigenous or xeric plant usage are general strategies that should be evaluated.

1.06 FACILITY PROGRAM

A. For larger Projects over $1 million, the Architect will provide a written Facility Program, including a comprehensive design narrative for all Project design functions. For smaller Projects under $1 million, the College will develop a Facility Program to include both design and construction specific details and goals. The typical Facility Program may include the following:
   1. Introduction:
      a. A statement of the nature and function of the end user of the facility, background information regarding development of the project to date, and identification of the site.
   2. Design Considerations:
      a. A statement of general design and construction specific details and goals pertinent to the project, including functional area narratives covering site design details, civil engineering design details, electrical design details, mechanical design details, sustainability design details, interior design details, life-safety design details, and information technology/audio-visual design details.
   3. Project Cost Considerations:
      a. An estimated Project Cost is included in the Building Program. The Architect should be especially concerned with the amount identified as Construction Cost. The heading "Construction Cost" normally includes all built-in or fixed equipment for the Project. It is the responsibility of the Architect to design within that estimated figure or immediately advise the College Facilities Services Department that this cannot be accomplished. The Owner may budget and provide certain aspects of the Project (furnishings, special equipment, etc.) The Architect shall thoroughly review these costs with the Building Committee and College Facilities Services Department assisting in developing the overall Project Budget.
   4. Project Time Considerations:
      a. The Building Program usually incorporates a tentative time schedule indicating when various phases of the work are expected to be completed. This schedule is based on a critical occupancy date(s) which in turn relate to other planned programs and the College academic calendar. A revised time schedule may be developed after discussions between the Architect and the College Facilities Services Department.
   5. Space Requirements Summary:
      a. A tabulation of net areas required for assignable spaces. Net areas given in the Program shall be maintained in the Architect's design as closely as possible. Any significant deviation from the areas given or functional relationships shown in the program could result in rejection of the schematic design unless previously approved by the College Facilities Services Department.

1.07 NON-PROGRAMMED SPACE REQUIREMENTS

A. Corridors:
   1. Attention should be given to adequate corridor widths for the loads generated by the particular occupancy of each part of the Project. Obviously corridors serving classrooms must be wider than those to offices. When possible, doors opening in the direction of the exitway should be recessed in an alcove to prevent intrusion into the pedestrian flow. Provide drinking fountains and other public facilities such as benches to serve the building occupants. The area under drinking fountains and recycling bins shall have an impervious floor material. Drinking fountains should include filtered water bottle filling dispensers. Provide appropriate spaces or recesses for community recycle collection stations.
   2. Make similar analysis for determination of number and size of elevators and number and size of public toilets.

3. Corridor walls are required to be designed and constructed of durable materials. Generally, corridors will be of framed gypsum board construction. Use vandal resistant or plywood backing on the passage face of the partition.

B. Public Toilets:
   1. Provide adequate and code-compliant facilities to accommodate building occupants including physically handicapped. Particularly in remodel projects, review toilet count with the code official to provide a reasonable accommodation in an existing condition.
   2. In large public toilets, provide pipe space behind water closets minimum 36 inches clear and readily accessible. Include lighting and a separate 120-volt duplex receptacle in each pipe space.
   3. The code will determine the required fixture count. It is particularly important in building renovation and/or addition projects to discuss and resolve this issue early in the design process.

C. Mail:
   1. Discuss with the College Facilities Services Department the nature of mail facilities for each individual building.

D. Custodian Closet:
   1. A custodian closet is preferred on each floor of the building for storage of cleaning equipment and supplies. The minimum size space required is 80 square feet. If possible, provide a larger custodian room on the main floor near the service entrance and near an elevator, (minimum size 120 square feet); space requirements on other floors may be reduced to 50 square feet.
   2. Equip each custodian closet with curb-type utility floor sink, hose bibb, hot and cold water, and shelves. Provide adequate ventilation where battery chargers or other similar devices are used. Each custodian space must have adequate electrical outlets. Coordinate with College Facilities Services and the College custodial contractor for specific requirements in closets.
   3. Custodian closets should not be shared with other functions (i.e., telecommunications boards, pipe chases, etc.).

E. Waste Disposal:
   1. Trash, compost, and recycle material disposal is an almost continuous operation. Trash, compost, and recycle material pick-up is on a daily or more frequent basis to each building, using packer type trucks into which containers are emptied. Building custodians take trash, compost, and recycle materials from individual spaces to the nearest exterior collection containers. Verify and accommodate for the interior container sizes as identified by the Owner's Representative. Accommodation for specially required interior trash recycling and composting containers is to be considered during the design process.
   2. Biological wastes, chemical wastes and radioactive materials require special consideration and their requirements will be analyzed and programmed in specific buildings where it occurs.
   3. The College has extensive single-stream recycle waste materials and other materials recycling programs. Review both internal and exterior waste collection requirements with the College and provide adequate space in the design to accomplish this efficiently.

F. Maintenance Personnel:
   1. When identified by the Owner's Representative, provide a secure work area for building maintenance personnel with a service sink, workbench and/or space for tools. For HVAC mechanics, this may be in a mechanical room if sound levels permit.

G. Maintenance Materials Storage:
   1. Provide a storage space of 100 square feet for storage of spare maintenance parts and materials items for the building such as spare floor tiles, etc. For public spaces, additional storage may be required for events furniture.

H. Utility Closets:
   1. Locate telecommunications equipment and electrical branch circuit panel boards in the same utility closet dedicated to this purpose when possible. Some utility closets require provision of adequate ventilation equipment. Provide proper clearance around equipment.

I. Elevators:
   1. To provide code-compliant access in buildings over two stories, provide ADA qualified elevator(s). In remodel projects, particularly in historic buildings, it may be difficult to find a reasonable shaft location. In such cases, a custom size elevator in accordance with ADAAG requirements or larger may be provided.

1.08 CLASSROOM DESIGN

A. Due to the nature of the Block Plan, classroom design will require flexibility and adaptability. There needs to be a variety of lighting levels and controls designed for various classroom uses with adequate and durable daylighting controls to accommodate special AV media uses. Each Faculty instructor and/or program will have unique teaching methods and classroom configurations, which may be modified for the new instructor of the next Block. The structured class will generally last the entire morning with one break at mid-morning. Discuss these unique needs with the College Facilities Services Department.

B. Classrooms need to be a friendly, desirable facility that promotes good relationships. A classroom design promoting interaction includes principle features as comfort, appearance and use of visual displays.

C. A general circulation plan of entryways and corridors must accommodate student interaction and relaxation during break periods.

D. Materials should be primarily chosen with durability, cleanability, and acoustical properties in mind. Acoustical treatment is important to control sound within the room as well as reduce noise between rooms.

E. Review specific technology needs, both current and future, with the building users. Generally, the College will hire Contractors directly for installation of Data/Com Systems and equipment. The Architect and their Consultants are responsible for assisting and coordinating these needs and accurate indicating what is needed to support the completed system.

F. General Guidelines:
   1. Normally, install chalkboard/markerboards/tackboards on the front and rear walls and sidewalls in some cases; review the specific placement with the Users. White markerboards are used in classrooms with computer installations. Above all chalkboards and markerboards, provide a cork tackstrip with spring clips and hooks. Usually a projector screen will be located centered in the front of the room.
   2. Generally, classrooms should have effective, easily operated and durable closures over the windows allowing the room to be completely darkened for projection. Blackout blinds are preferred.
   3. Audience entrances/exits should be at the back of the room.
   4. Provide adequate wheelchair locations in fixed seating rooms.
   5. Normally the instructor's table/lectern and student's desks/tables will be moveable furniture unless utilities are required.
   6. Provide College telecommunications voice-data jack near outlet on center front wall below chalkboard/whiteboard with exact location in consultation with Owner Representative and the College's Information Technology Services (ITS) media services.
   7. Provide quiet and adequate mechanical systems.
   8. Left-handed fixed seating writing tablets should be provided for about 10 percent of the seats. Exact location in consultation with Owner’s Representative.
   9. Generally, classrooms with a seating capacity in excess of 50 and scheduled for fixed seating should be designed for the use of sloped floor and/or risers toward rear of room.
   10. Classrooms must be designated and include a minimum of a console at the front of the room with a network computer cabling and adequate space for a variety of Audio/Visual sources (VCR, DVD, CD, etc.). These needs should be specifically discussed with the College's Information Technology Services (ITS) media services.
   11. Lecture Hall Seats: Not be less than 20 inches in width with preference of 22 inches.
   12. Folding Tablet Arms: Rattle-free mechanisms.
   13. Review lighting general requirements with the specific user. The following recommendations are suggested:
       a. Student Seating: 50 foot-candles.

b. Instructor-Presenter Area: 100 foot-candles.
c. Chalkboard/Markerboard: 70-90 foot-candles.
d. Aisle Lights in Lecture Halls: As required by Code.
e. Note taking light level should be 5 foot-candles-minimum without light spillage to projection screen.
f. Light Switches: Clearly labeled functions.
g. Generally, classrooms should have two lighting levels, one for general use and a lower level for projector use. Dual level switched fluorescent lights are preferred. The row adjacent to the screen should be shut off with the lower level lighting.
h. Dimmable fluorescent lighting systems are generally NOT acceptable, without prior approval by the Owner's Representative. Enhanced dimmable fluorescent lighting circuit systems that address "flickering" will be considered.
i. To avoid interference with a ceiling mounted projector, ceiling light fixtures should not extend below 9 feet above the floor.
j. Note: Consideration for maintainability and efficiency should be incorporated into the lighting design. An excessive number of fixtures and/or types of fixtures and lamps is not acceptable.
k. Occupancy sensor controls should be used to turn off lighting in unoccupied classrooms.

14. Electrical requirements to be reviewed with the specific user.
    a. Provide three duplex boxes and one duplex outlet on the left or right side of the front wall for the media equipment rack approximately 24 inches x 24 inches x 42 inches high. Provide one box with one 1-inch conduit terminating above the ceiling for the data service. Provide one duplex outlet and one box with one 1-1/2 inch empty conduit from a duplex box terminating in the ceiling approximately 14 feet from the front of the room for the data projector. Provide one box with two 1/2-inch empty conduits terminating outlet boxes approximately 8 feet above the floor and 9 to 12 feet apart on the front wall for speakers. Coordinate the layout of the audio visual system with the Building Committee and the College's information technology media services.
    b. When required by the program, provide empty 1½" conduit between front and rear walls with blank faceplates for slide projectors.
    c. For portable media devices and utility, provide one duplex outlet in the front center and on the side and rear walls.
    d. All electrical circuits should be fed from "clean" legs from the contact panel.
    e. Provide electrical operating projection screen in all classrooms with capacity of 30 or larger. Size, location and quantity will be determined during the planning process.
    f. When requested by the User, provide one duplex outlet with adequate empty conduits terminating an outlet boxes at 6 foot high on a sidewall near the front of the room for a wall-mounted TV/VCR/DVD.
15. Audio-Visual recommended requirements to be reviewed with the specific user and the College's Information Technology Services (ITS) media services.
    a. Specific requirements for conduit sizes, cable trays, etc. will be developed for individual projects with the Owner's Representative and the College's information technology media services.
    b. In auditorium and classrooms, controls for operation of equipment and for lights should be provided at and interconnected between the speaker's station at the front and the projector location at the rear of room. Separate projection rooms may be required.
    c. Projection screens over eight feet wide used in large rooms are normally electrically operated. Screens seven feet or smaller may be manually operated.
16. Media Utilization Design Guidelines and Criteria:
    a. All group instructional facilities need to be designed to accommodate the following visual and audio educational practices:
        1) Proper viewing angles (sight lines for all students) and size of projection surfaces.
        2) Effective lighting control and levels.
        3) Quality audio listening levels and acoustics. The design of the room should be conducive to intelligible un-assisted listening.
        4) Proper storage and installation of media equipment and general storage for special events. Security control of the media equipment for special events shall be considered in the design.

5) Control of installed media equipment from the front and rear of facilities.
6) Provision of standard, high quality and serviceable models of media equipment.

G. Specific Recommendations:
1. Classroom (16-49 seats):
   a. When a permanent installation is not requested by the Building Committee and/or Facilities Services Director, provide space for a media rack. In addition, provide one outlet duplex box with an empty ½ inch empty conduit from the rack location to the center of the front wall for a microphone.
   b. Minimum workspace at front of room should allow 8 feet of distance between screen surface and transparency projector position.
   c. Largest dimension should be from front to rear of the classroom. Depth of room is critical to proper viewing angle for projection. Seating outside of a 30 degree angle on each side of the room's center line is poor viewing for front screen viewing of overhead or other projection equipment.
   d. To allow for unobstructed viewing, when feasible, classroom screens should be 72 inches high vertically with the bottom at 42 inches above the floor.
   e. All interior and exterior windows shall have black-out shades.
   f. Markerboard or tackboard must be used adjacent to the media rack installation.
2. Lecture/Presentation Room (50 seats and larger):
   a. When a permanent installation is not requested by the Building Committee and/or Facilities Services Director, provide space for a media rack. In addition, provide one outlet duplex box with an empty ½ inch empty conduit from the rack location to the center of the front wall for a microphone and one from the rack location to a ceiling box for speakers, then to a public address system location.
   b. Front projection screens larger than 8 feet wide should utilize electrical models and controls
   c. Minimum workspace at front of room should allow 8 feet of distance between screen surface and transparency projector position.
   d. Largest dimension should be from front to rear of the classroom. Depth of room is critical to proper viewing angle for projection. Seating outside of a 30 degree angle on each side of the room's center line is poor viewing for front screen viewing of overhead or other projection equipment.
   e. Halls may need to utilize a riser at room front or sloped seating to allow proper viewing for halls larger than 80 seating capacity.
   f. To allow for unobstructed viewing, the screens should be a minimum of 72 inches high vertically with the bottom at 42 inches above the floor. When feasible, size the screen using the formula H (height) = MDV (distance to the most distant viewer) / 6.
   g. Provide one duplex ceiling outlet for a video/data projector located 14 to 20 feet from the front of the room. Coordinate required monitor bracket support. If the projector is placed in a Control Booth, provide a duplex outlet within 3 feet.
3. Auditoriums:
   a. Space (5 feet x 10 feet minimum) for an enclosed, secure projection booth should be provided at rear of auditorium. Provide space (10 inch x 20 inch min) to accommodate audio lighting and video controls. In primary performance spaces, the design criteria will vary and shall be reviewed in detail to determine the size and equipment needs.
   b. Booth should contain:
      1) Fixed glass projection window.
      2) All controls similar to those in front of auditorium.
      3) Power outlets above counter surface.
      4) Two 1-1/2 inch conduits to front control panel.
      5) Two entrances (one to auditorium, one to foyer).
      6) Network data jack.
      7) Intercom system connecting the booth with two locations backstage, two locations in front of house and additional location as required.
   c. Minimum work space at front of auditorium should allow 10 feet of distance between screen surface and overhead projection position. Should utilize a second corner mounted 84 inch minimum screen for overhead projection.
   d. Centered front projection screen should utilize electrical recessed ceiling models.

e. Largest dimension should be from front to rear of the classroom. Depth of room is critical to proper viewing angle for projection. Seating outside of a 30 degree angle on each side of the room's center line is poor viewing for front screen viewing of overhead or other projection equipment.
f. Auditoriums may need to utilize a riser at room front or loped seating to allow proper viewing.
g. Auditorium ceiling height should allow viewing of a vertical 96 inch image without obstruction from all seating positions.
h. Provide for a ceiling mounted video projector mount to be:
    1) Approximate 15 feet from front, centered screen.
    2) Minimum of a 2 inch conduit from projector position to front control panel location.
    3) 110V AC power outlet at ceiling mount location.
i. Provide a control panel/storage cabinet at front/side of room. Panel should contain:
    1) All lighting, electrical, projection, voice/data, and audio controls and jacks.
    2) Lockable storage compartment for video player, PA/sound system amplifier, and remote control unit for video projector.
    3) Storage space for microphones.
    4) Equipment controls should be duplicated in the control booth to enhance flexibility of the space.
j. Potential use of auditorium for remote video conference reception and origination should be reviewed with potential users, and the College's information technology media services. If usage is probable, the planning should include:
    1) Conduit for remote camera locations.
    2) Extra space and a switching console in projection booth.
    3) Interconnects (conduit and cable runs) to building broad band and fiber band and fiber optics panel.
    4) Extra conduit (2-3/4 inch) from projection booth to front control panel.

4. General Environment:

	Classrooms (16-49 Seats)	**Lecture/Presentation** (50-120 Seats)	**Auditorium** (120-400 Seats)
Lectern-Mobile	When Requested	X	X
Projection Cabinet/Storage-Cabinet/ Storage-Rear of Room	When Requested	X	X
Projection Booth-Fully Enclosed/Secure	When Requested	X	X
Projection Screen for Slides/Film/Video (Front Surface, Matte White)	X	X	X
Overhead Projection Screen	When Requested	X	X
Video Projection Capabilities	X	X	X
Control Switches at Control Booth	When Requested	X	X
In-Wall Panel at Front of Room	X	X	X
Control Switches Near Exit Door(s)	When Requested	X	X

5. Audio Requirements:

	Classrooms (16-49 Seats)	**Lecture/Presentation** (50-120 Seats)	**Auditorium** (120-400 Seats)
PA System	When Requested	X	X
Voice/Data Communications	X	X	X
Audio Inputs to Sound System (various levels)	X	X	X

6. Visual Requirements:

	Classrooms (16-49 Seats)	**Lecture/Presentation** (50-120 Seats)	**Auditorium** (120-400 Seats)
Slide Projection	When Requested	X	X
Overhead Projection	X	X	X
Video Recording with Video Camera	When Requested	X	X
Video Projection	X	X	X
Live Demo with Video Camera	When Requested	When Requested	X

7. Media Equipment:

	Classrooms (16-49 Seats)	**Lecture/Presentation** (50-120 Seats)	**Auditorium** (120-400 Seats)
Overhead projector/Cart and Screen	S When Requested	S When Requested	S/B
Film Strip Projector	When Requested	When Requested	When Requested
16mm Film Projector	When Requested	When Requested	When Requested
Video Projector	S/B	S/B	B
Slide Projector(s) and Audio Playback	When Requested	When Requested	When Requested
DVD/Videotape System (VCR)	S/B	S/B	B
Video Conferencing System	When Requested	When Requested	When Requested
Interactive Video (Video and Computer)	S/B When Requested	S/B When Requested	B
Front Surface Projection Screen	B (60-70 Inch Wide)	B (70-84 Inch Wide)	B (10-14 Feet Wide) (1)
Sound System	S/B	B	B

LEGEND:
S - Space and power provided in facility only.
B - Item stored or built into facility.
(1) - Electrically operated; size depends on distance from most distant viewer, ceiling height, etc.

1.09 FIXED AND MOVABLE EQUIPMENT

A. Two classifications of equipment are identified on all projects; fixed and movable.
   1. Fixed Equipment:
      a. This includes all built-in items such as laboratory casework, fume hoods, benches, wall cabinets and shelves, counters, chalkboards, tack boards, permanently installed projection screens, coat racks, etc. All such items shall be included in the specifications and shown on the working drawings. Their costs are included in the total construction cost for the project. "Owner supplied" fixed equipment/furnishings such as carpet, drapes, window blinds, etc. will be noted in the Project Budget during the Building Program or Schematic Design Phase.
      b. Prepare the drawings and specifications to ensure that all required utilities for fixed equipment items are called for and properly located. Provide specifications that leave no question as to which of the several trades and suppliers has responsibility for making all necessary connections and installation of equipment and responsibility for unloading, uncrating and disposal of rubbish.
   2. Movable Equipment:
      a. This includes such items as office furniture, file and storage cabinets, free-standing bookcases, scientific equipment, copying machines, etc. and are generally "Owner supplied". Any movable equipment included in the contract will be specified and shown on the drawings for the project.
      b. Show all movable equipment items on the Design Development drawings to demonstrate there is adequate space and appropriate utility services for their proper placement in each room. The Architect is not responsible for design or selection of such items.

1.10 PROVISIONS FOR ACCESSIBILITY

A. General: Attention is directed to the necessity of providing entrances and other architectural features of College buildings for the functional use by physically handicapped persons. The following are College requirements in addition to those required by the 2010 ADA Standards for Accessible Design, Department of Justice, September 15, 2010 code.
   1. 2010 ADA Standards for Accessible Design, Department of Justice, September 15, 2010 Code: The 2010 Standards for public accommodations and commercial facilities, which consist of the Title III regulations at 28 CFR part 36, subpart D, and the 2004 ADAAG at 36 CFR part 1191, appendices B and D. Regulations can be found on DOJ website at www.ADA.gov.
   2. Entrance Doors: Electric door openers for use by the physically handicapped must be provided at primary entrances to all major buildings. Locate entrances to provide direct access from an accessible route and/or handicapped parking. Review with College Facilities Services Department.
   3. Elevators: All major buildings must have an accessible elevator. In existing buildings, it may be difficult to reasonably locate a new shaft using dimensions of a new, full-sized elevator. In such cases, a cab size as allowed by ADAAG for inside dimension of elevators is acceptable.
   4. Restrooms: All major buildings must have accessible restroom facilities. In existing buildings, it may be difficult to reasonably re-arrange spaces as required in new construction. In such cases, creative, reasonable solutions must be explored, including the use of gender-neutral facilities.

1.11 TELECOMMUNICATIONS REQUIREMENTS

A. The following Standards apply to all facilities:
   1. EIA/TIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
   2. EIA/TIA 568A - Commercial Building Telecommunications Cabling Standard.

B. Review additional telecommunication requirements with the College Facilities Services Department and Information Technology Services (ITS).

1.12 SITE CONSIDERATIONS

A. General:
   1. The site for a proposed new building is determined by the College to be consistent with the Campus Master Plan. The facility design must address not only its relationship to nearby buildings, but its function in connection with the open spaces and landscaping around it. Give careful attention to entrances and their effect on pedestrian travel patterns, and to service drives, parking, ADA accessibility, weather considerations, and loading dock locations.

2. In the Schematic Design Phase, be aware of the location of utility lines and utility tunnels/vaults serving the building and adjacent spaces. Locate the mechanical equipment room and transformer room in relation to those lines.

B. Site Design Criteria:
   1. The portion of walkway adjoining building entries may have an appropriate “doormat” of specially designed materials consistent with the Campus Master Plan.
   2. Design sidewalks, terraces and patios to support snow removal equipment or Fire department access in accordance with the College's recommendations, and of a material consistent with the Campus Master Plan.
   3. Locate walks away from walls, which may cause snow drifting. Where walls must adjoin walks or paved areas the walls should be designed with openings to allow for snow removal.
   4. Avoid surface drainage of storm water across walks.
   5. Primary entrances to buildings must be accessible. Discuss with the Owner Representative and identify on the drawings, including the accessible path to the building from the parking access and the primary accessible route(s) connecting to the Campus.
   6. Fixed objects to be part of the landscaping of the building should be designed for ease of maintenance and snow removal.
   7. Use of window wells and below grade open structures should be avoided possible.
   8. The proposed design of such features requires approval of the College Facilities Services Department prior to incorporation into the design.
   9. Maximum slope for banks is 3:1 (Horizontal: Vertical). Use 4:1 or less where possible.
   10. Provide for protection of existing plant material during construction.
   11. Service drives should have a minimum inside radius of 35 feet. Verify all requirements for Fire Department access including paving materials and fire lane location and configuration.
   12. The College waste removal is provided by commercial companies. Investigate and verify container sizes and frequency of disposal with assistance from the College. Space for containers should be in service areas, and/or adjoining grade flush with front of dock in an appropriate trash enclosure construction. Provide for compost and recycling containers. Trash enclosure design and location is a requirement of the Campus Master Plan.
   13. Bicycles are a major method of transportation on the campus. Bicycle parking area should be considered in the development of the site plan for the building. Appropriate campus standard bicycle racks and site accessories are required to be located during the design process.
   14. Submit Schematic Design/Design Development/Construction Document site plan showing layout of new site utilities to the College Facilities Services Department for use by Facilities Services. The Owner will advise the Architect concerning the central utilities extension proximity to the project site and any required extensions that will be included in the project budget.
   15. The entire Campus is considered a parking district by City Planning. Additional parking requirements are usually minimal, but must be determined during the Schematic Design Phase.

C. Land Survey:
   1. For most projects, the College Facilities Services Department will provide the Architect/Engineer a site survey created by a registered land surveyor as described in the Agreement Between Owner and Architect. These drawings will be created by referencing College maps and by actual utility locates. Invert elevations will be determined on existing utilities so that both plan and profile drawings can be created for new utility installations.
   2. Discuss exact location of the proposed building with the Building Committee and the College Facilities Services Department who will review it with Facilities Services Staff and other College personnel for final approval.

D. Subsurface Investigation:
   1. As soon as the Architect/Engineer has developed the design to the point where approximate foundation design loads can be determined, make request through the College Facilities Services Department that test borings be made to determine subsurface conditions. This generally will occur during the Schematic Design phase. The College Facilities Services Department will arrange to have the necessary borings made and will provide a geotechnical investigation report and recommendations.

E. General Landscape and Irrigation:
   1. The landscaping is a major contributing element to the overall campus presence, with some of the planting dating to the earliest planning. The historic elements and trees should be respected and modification should be specifically discussed with the College during the design process. Landscape designs should be consistent with the Campus Master Plan. Paving materials vary throughout the Campus depending on the hierarchy of walkways. Major Projects may have an entry "doormat" extending from the building to transition to the walkway paving material consistent with the Campus Master Plan. The map of the Campus walkway system is available through College Facilities Services. The use of hardscape paving at building entrances for design expression and durability is generally acceptable, but should be limited. The Architect/Engineer, Owner's Representative, Building Committee, and Campus Design Review Board will review and approve these issues during the design process.
   2. Colorado College, both in education and in practice, maintains an emphasis on environmental issues. The Architect and consultants should consider xeriscape, native planting materials, energy/water conservation planting/grading techniques and other environmentally conscious concepts in developing the design consistent with the Campus Master Plan.
   3. The main campus has a central non-potable irrigation system. Consult with the College Facilities Services Department for system development and design criteria. Refer to the Colorado Springs Utilities Water Resources Department "Standard Specification for Installation and Operation of the Non-potable Water Distribution System" for the primary system technical requirements. Some of the smaller buildings, primarily residential dormitory buildings located in the eastern and northern portion of the campus, have residential grade exterior potable water systems operated from individual house taps; this should be reviewed with the Owner's Representative.
   4. The City of Colorado Springs owns the trees, planting, curbs/gutters and sidewalks in the street right-of-ways and medians. Any removal or redesign must be approved by the Parks and Recreation/Forester and Public Works Departments. All City owned trees located in the construction limits must be adequately protected during construction to avoid damage assessments by the City. The College is generally responsible for the removal and replacement of damaged curbs/gutters and sidewalks. All associated costs must be included in the project budget.
   5. The College's East Campus properties on North Weber, east of the alley easement, between Uintah and Cache la Poudre Streets are in the North Weber/Wahsatch Historic District. Historic Design guidelines have been developed for landscaping, including fences, grading, planting and signage, for this area. The design must conform to the guidelines and be reviewed with the Owner's Representative and, if warranted, History Colorado or the Colorado State Historical Fund, as applicable.

1.13 CLIMATE AND WEATHER CONDITIONS

A. Temperature and humidity, rainfall, solar intensity and elevation should all be considered in building design. The following data shall be used for design purposes.

B. Colorado Springs, Colorado is located at latitude 38 degrees 49' N and 104 degrees 43' west longitude at an elevation of 6145 feet.
   1. Highest recorded temperature was 100 degrees on June/July 1954.
   2. Lowest recorded temperature was minus 27 degrees on February 1951.
   3. Sunshine Frequency: 48 percent of possible days in December to 75 percent in July.

C. Outdoor design conditions as specified by Pikes Peak Regional Planning Code are:
   1. Winter Design Dry-bulb: 2 degrees F.
   2. Summer Design Dry-bulb: 88 degrees F.
   3. Summer Design Wet-bulb: 57 degrees F.
   4. Degree-days Heating: 6415.

D. Appropriate safety factors should be used for critical spaces to ensure that required indoor air conditions are properly maintained.

E. Research completed by the Rocky Mountain Chapter of ASHRAE indicates that ASHRAE's Solar Heat Gain Factors (SHGF) need to be adjusted by a multiplier of 1.173 to account for the higher elevation and lower moisture content and thus greater transmissivity of the air.

F. All psychometric, heat transfer and air movement calculations are to be adjusted for elevation above sea level.

G. Indoor Conditions:
   1. Indoor conditions shall be maintained as follows unless otherwise required by specific design requirements:
      a. Winter: 72 degrees F.
      b. Summer: 78 degrees F.
   2. If humidification is provided in the winter, design for no more than 30 percent RH. Design de-humidification in the summer for not lower than 60 percent RH unless equipment operation is less energy consuming at a lower level.

1.14 ROOM NUMBERING SYSTEM

A. Use room names indicated in the Facility Program on the project Drawings, Floor Plans and Schedules.

B. At the time Construction Document drawings are started, prepare a final numbering system for rooms and all other spaces with the assistance of the College Facilities Services Department's Locksmith Shop using the campus standard building room numbering convention. These numbers and the room or space names must be incorporated on the final floor plans and schedules. Use only room and door numbers approved by the College Facilities Services Department on the Design Development documents. Specify that the Contractor and their supplier use the established numbering systems.

C. For all Contract Documents and “As-Built” Documents, the room finish schedule is required to include the original building room numbers as well as any changes to the final room numbers for coordination purposes.

D. Room Numbering Procedures:
   1. Number rooms with three digit numbers whenever possible, with the first digit always referring to the floor.
   2. Example:
      a. Basement: 1 - 99.
      b. First Floor: 100 - 199.
      c. Second Floor: 200 - 299.
      d. Third Floor: 300 - 399, etc.
   3. The numbering sequence should be clockwise.
   4. A “room” is defined as a space enclosed on all sides or, in other words, a space with one or more open sides is not considered to be a room.
   5. Typically, begin the numbering sequence at the main entrance of the building. Maintain even numbers on one side of a corridor and odd numbers on the opposite side.
   6. In addition to rooms, number all interior spaces that can be directly accessed, such as corridors, vestibules, stairwells, and other accessible spaces shall have a room number and appear on the room finish schedules.
   7. A primary room is accessed directly from a corridor, to the exterior or a general circulation path. When rooms are accessed from a primary room and not directly from a corridor (a “suite” of rooms), use the primary room number followed by a letter suffix (example: Office 105 A or Office 105 F).
   8. Number internal courtyards as rooms, but do not number roof areas unless approved by the College Facilities Services Department. Number stairs extending to the roof as a floor.
   9. Where large rooms that may be subdivided occur, allow for new number assignments within the normal sequence.
   10. Design the numbering sequence to be easily extended when future additions are constructed.
   11. Complete final room numbering and secure approval by the Owner during the Design Development Phase. Any changes in the final numbering in the Construction Documents, as may be generated by a change order during construction, must be approved by the College Facilities Services Department.
   12. The numbering system will be used for the permanent building signage.
   13. The HVAC building automation system graphics software must also use the same room numbers as the Contract Documents and As-Built Documents.

E. Door Numbers Procedures:
   1. The door numbering scheme is similar to that of the room numbering. Generally, the number the door is the same as the number of the room and is the primary entry into the space. Where secondary doors occur within a room, add a letter suffix to the primary door number (example: Door 219A). Include existing doors requiring work of any kind, including hardware changes or refinishing, on the door schedule.
   2. Normally, the door number is identified with (and on the lock cylinder side of) the room or area the access is to (assume stairwell-to-corridor doors have a cylinder on the stairwell side). If there is no cylinder on a door between rooms, the door will usually be identified with the innermost room, or with the room the door swings into. If a door has a locking cylinder on each side, the door will have a different door number on each side.
   3. The numbering of roof access doors or hatches are identified with the room or area the access is from followed by letter suffix. Note that door numbers and cylinders of roof doors or hatches are located on the interior side of the door or hatch. Include in the specifications, that the contractor and the door/hardware supplier shall utilize the numbering identified on the drawings.

1.15 BUILDING AREA CALCULATIONS

A. From the first concept of a building need to the final occupancy of the space, there is a continuing reference to the net and gross areas involved. These areas must be considered in the original program planning and are used in reference to unit costs in preliminary estimates, in establishing budgets and in final accounting.

B. To avoid any possible misunderstandings of the meaning of the terms used, the following definitions and methods of calculations are provided.

C. Gross Area:
   1. Definition: The sum of the floor areas within the outside faces of the exterior walls for all stories that have usable floor surfaces.
   2. Basis for Measurement: Gross area shall be computed by measuring from the outside face of exterior walls, disregarding cornices, pilasters, buttresses, etc., which extend beyond the wall face.
   3. Description: In addition to ground to top-story internal floored spaces, gross area shall include basements (except unexcavated portions), attics, garages, enclosed porches, penthouses and mechanical equipment floors, lobbies, mezzanines, all balconies - inside or outside - utilized for operational functions, and corridors, provided they are within the exterior face lines of the building. Roofed loading or shipping platforms should be included whether within or outside the exterior face lines of the building.
   4. Limitations: Open courts and light wells, or portions of upper floors eliminated by rooms or lobbies which rise above single-floor ceiling height, should not be included in the gross area, nor should unenclosed, roofed-over area or floored surfaces with less than 6 feet-6 inches clear head-room be included without discussion and agreement with the College Facilities Services Department.

D. Net (Assignable) Area:
   1. Definition: The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant, including every type of space functionally usable by an occupant; except Custodial Area, Circulation Area, and the Mechanical Area.

1.16 FIELD CONDITIONS

A. Trees and Vegetation:
   1. College Facilities Services requires preservation of trees to the greatest extent possible.
   2. Existing vegetation that must be preserved includes trees, shrubs, ground cover plants, and sod.
   3. Extent of preservation and salvage of vegetation is specified in the project program.

B. Other site features that may affect the design or construction include irrigation systems, site lighting, site emergency phones, fencing, and other designated items.

C. Work by College Facilities Services: College Facilities Services will perform the following work, with its own forces or using other consultants and contractors:
   1. Pre-Construction Survey: To be prepared by College Facilities Services; control and reference points will be indicated.

2. Hazardous waste remediation, including cleanup of contaminated soils.
3. Installation of items identified as NIC; prepare spaces and provide applicable utility connections.
4. Design and documentation of any impacted specialized high temperature hot water (HTHW) connections or system modifications to existing infrastructure systems.

D. Existing Built Elements:
1. Extent of preservation, restoration, re-use, or adaptation is specified in the project program.
2. Preservation: The following existing elements must be preserved:
   a. Existing structures and fixed elements are of historical value to the College Facilities Services and must be preserved and restored in their entirety.
   b. As much of the existing structure(s) as possible.
   c. Existing historic facades.
3. Relocation: Relocate other existing construction and utilities as required for the design.

PART 2 PRODUCTS

2.01 DO NOT USE:

A. CFC-based refrigerants.

B. HCFC's or Halon.

C. Plastic piping or conduit, unless approved by the College Facilities Services Department.

D. Aluminum electrical conductors, unless approved by the College Facilities Services Department.

E. Other materials or products restricted by College Facilities Services Department.

PART 3 DESIGN REQUIREMENTS

3.01 BASIC FUNCTION

A. Code: Make all portions of the project comply with the code.

B. Provide design for built elements and site modifications as required to fulfill needs described in the project program and as specified.

C. Provide design for permanently enclosed spaces for all functional areas shown in the project program, unless otherwise indicated.

D. Provide design for a physical enclosure that keeps out weather, unwelcome people, animals, and insects without requiring specific action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside.

E. Provide interior design services for efficient and functional space utilization, including appropriately subdivided interiors with level floor areas, comfortable ceiling heights, vertical walls, and finishes and fixtures suitable for the occupancy and functional needs.

F. Provide design for the following services:
1. Plumbing.
2. HVAC.
3. Environmental Controls. Verify BMS system compatibility with College Facilities Services.
4. Electrical.
5. Fire suppression. Verify system with College Facilities Services.
6. Fire detection and alarm. Verify system with College Facilities Services.
7. Access control. Verify system with College Facilities Services.
8. Voice and data communication. Verify system with College Facilities Services.
9. Acoustic treatment as required.
10. Other services as determined by project program.

G. Provide design for the following fixtures as shown in the project program and as specified:
1. Information fixtures.
2. Window treatment.

3. Fixed seating.
4. Toilet, bath, and laundry accessories.
5. Other fixtures as determined by project program.

H. Provide design for the following equipment as shown in the project program and as specified:
1. General equipment.
2. Food service equipment.
3. Other equipment as determined by project program.

I. Provide design for the following furnishings as shown in the project program and as specified:
1. General furnishings.
2. Food service furnishings.
3. Other furnishings as determined by project program.

J. Provide design for the following site elements and work:
1. Site preparation, earthwork, erosion control.
2. Hazardous waste remediation, if required.
3. Pavements and surfacing.
4. Site fixtures and equipment.
5. Landscaping.
6. Site services between buildings on same campus, if required.
7. Other site construction as determined by project program.

3.02 SUSTAINABLE DESIGN AND HIGH PERFORMANCE GOALS

A. Sustainable Environmental, Economic, and Social Responsibilities:
1. In addition to other requirements, the Architect/Engineer is responsible for designing facilities that enhance the quality of the indoor and outdoor environment, and minimize consumption of energy, water, construction materials, and other resources. Refer to the **Colorado College Facility Life-cycle Design Guidelines for Sustainability** in this Facility Design Guidelines manual.
2. The College's April 2009 signing of the American College and University President's Climate Commitment required initiation of tangible actions to reduce greenhouse gases. The College agreed to "establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent". The college's goal is to use customized high performance building design standards criteria which exceed the LEED Silver minimum standards in order to meet its long range sustainability strategies for achieving carbon neutrality. Applying the college's criteria to achieve building high performance design goals for new construction and renovation projects is the responsibility of Architect/Engineer, in consultation with Colorado College Facilities Services, unless otherwise indicated. Additional high performance design goals and strategies information is provided in the "**Facility High Performance Design Criteria Checklist**" in this Colorado College Facility Design Guidelines manual.
3. The College Facilities Services Department will collaborate with the Architect/Engineer to identify high performance design opportunities that are feasible, based on each project's available funding, building energy use targets, building condition, etc. Based on whole building life-cycle cost savings analysis by the Architect/Engineer, Facilities Services will authorize the design and implementation of those high performance measures which will be most beneficial in helping the college achieve its long term sustainability goals.
4. Sustainable Design Emphasis: Design of facilities is strongly encouraged to emphasize the following categories within the LEED-NC credit structure:
    a. Water use reduction and water efficiency.
    b. Energy performance and energy efficiency; this includes design of the exterior envelope as a high-performance and integral component of the facility's energy management system.
    c. Fundamental and enhanced refrigerant management.
    d. Indoor environmental quality; with emphasis on the use of low-emitting materials, finishes, and furniture systems.
    e. Implementation of construction phase Indoor Air Quality (IAQ) procedures.
    f. Review and consideration of all LEED-NC prerequisites is required.

5. The College Facilities Services Department should be consulted for consideration of the applicability of the following LEED prerequisites and credit categories to the Facilities O&M Program related to specific design projects:
    a. Site selection, development density, and community connectivity.
    b. Brownfield redevelopment (if applicable).
    c. Alternative transportation strategies. (if applicable)
    d. Fundamental and enhanced commissioning (where applicable).
    e. Renewable power.
    f. Other prerequisites and credits as determined by College Facilities Services Department.

B. Facility Life-Cycle Design Guidelines for Sustainability:
    1. In addition to other requirements, incorporate the Design Guidelines for Sustainability processes, and design facilities to address the life-cycle of the facility in general conformance to the Facility Life-Cycle Design Guidelines for Sustainability in this Facility Design Guidelines manual.

C. College Reference for Historical Design Guidelines:
    1. In addition to other requirements, design applicable facilities to address specific historic preservation guidelines in conformance with most current edition of The Secretary of the Interior's Standards for Rehabilitation & Guidelines for Rehabilitating Historic Buildings (& Illustrated Guidelines on SUSTAINABILITY for Rehabilitating Historic Buildings).
        a. These guidelines are accessed website online at http://www.nps.gov/tps/standards/rehabilitation/rehab/index.htm.

3.03 AMENITY AND COMFORT

A. Thermal Performance: Comply with requirements specified in this Facility Design Guidelines manual, Section D30, and the code.
    1. Shell: Provide construction that will have thermal resistance as necessary to maintain interior comfort levels specified and in accordance with applicable sustainable design requirements and the code.
        a. Condensation: None on interior surfaces under normal interior temperature and relative humidity conditions, during 98 percent of the days in the coldest 3 months of the year.
            1) Components That Have Surfaces Facing Both Interior and Exterior Environment: Condensation Resistance Factor (CRF) as required to meet requirement above, when tested in accordance with AAMA 1503.

B. Air Infiltration: Maximum of 0.06 cfm per square foot of exterior surface area, measured in accordance with ASTM E283 at differential pressure of 6.24 psf.
    1. Use supplementary air barrier if necessary to maintain performance over entire shell.
    2. Use method of sealing joints between elements that will be effective given available construction practices.

C. Water Penetration Resistance: Design and select materials to prevent water penetration into the interior of the building, under conditions of rain driven by 50 mph wind.

D. Natural Light: Provide fenestration in shell as required to meet requirements for natural light in accordance with code and the following:
    1. See Environmental Responsibility, above.
    2. Exterior Glazing: Minimum 10 percent of total floor area for each habitable room; not required for bathrooms, toilet compartments, closets, halls, or storage and utility spaces.
    3. Compliance with LEED requirements for daylight and views credit criteria to the greatest extent possible or practical according to proper functioning of affected spaces.

E. Ventilation:
    1. Indoor Air Quality: Comply with the code and the following:
        a. Acceptable air quality as defined by ASHRAE 62.1.
    2. Ventilation of Attics, Crawl Spaces, and Similar Semi-Enclosed Spaces: Outside air movement through enclosed shell volumes in accordance with code.
    3. Equipment Producing By-Product Heat: Design and specify requirements to ventilate housings and cabinets as required by equipment manufacturer and rooms and spaces as required to maintain specified environmental conditions.

F. Condensation Resistance: Provide design to prevent condensation from forming on interior elements under normal thermal and humidity conditions inside building.
   1. Exception: Insulated drain pans and piping to remove condensation from cooling coils.

G. Sound Transmission and Vibration Resistance:
   1. Shell: Design shell to limit sound transmission as follows:
      a. Ambient Sound Level: Maintain ambient sound levels in perimeter spaces within Noise Criteria (NC) ranges specified in Section DC C during normal hours of occupancy.
      b. Exterior Noise Level: Maintain maximum average daytime and nighttime noise level from interior sound sources in accordance with local regulations, measured at the project property line.
      c. Vibration Control: Use shell elements that will not resonate at frequencies that are characteristic of ambient exterior sound sources at the project site.
   2. Services:
      a. Design to maintain sound transmission characteristics of assemblies through which services must pass.
      b. Prohibited Plumbing Noises: All sounds of flushing and of liquid running through pipes ("bathroom sounds") are prohibited outside of the rooms housing toilets, bathtubs, and showers, with the exception of when doors to those rooms are open.
      c. Equipment Noises: Noise level below that which will be objectionable, based on occupancy of spaces.
      d. When services are located within assemblies that perform sound isolation functions, consider the noise produced by the service itself as one of the external sound sources.
   3. Structure-Borne Sound and Vibration: Design to prevent transmission of perceptible sound and vibration from equipment that rotates, vibrates, or generates sound, by isolating such equipment from superstructure or by isolating equipment support foundations from building foundations.

H. Cleanliness:
   1. Exterior Surfaces: Design and select materials to:
      a. Prevent attraction and adherence of dust and air-borne dirt and soot, and minimize appearance of settled dust and dirt.
      b. Be washed reasonably clean by normal precipitation.
      c. Prevent precipitation from washing settled dust and dirt over surfaces exposed to view.
   2. Services, such as air handlers, chillers, pumps, switchgear, and panelboards by one or more of the following methods.
      a. Provide 4 inch thick, concrete housekeeping pads.
      b. Provide corrosion-resistant equipment stands.

I. Appearance:
   1. Exterior Appearance: Design and select materials to provide exterior appearance with characteristics as follows:
      a. Compatible with adjacent buildings on same campus, as ultimately approved by College Facilities Services.
      b. Matching College Facilities Services' concept design and rendering.
      c. Concealing mechanical equipment, plumbing equipment, electrical equipment, piping, conduit, and ducts, and similar items from view from the street.
      d. Concealing rooftop mechanical equipment, plumbing equipment, electrical equipment, piping, conduit, and ducts, and similar items from view from the street, windows in the project that overlook the roof, and windows in adjacent buildings that overlook the roof.
   2. Services Elements:
      a. Conceal services elements from view to greatest extent possible, with exposed portions of simple, neutral design and color.
         1) Exception: Standard designs of manufacturers, without consideration for appearance, may be used for fire suppression sprinkler heads.
         2) Where exposed portions are acceptable, do not obstruct or diminish clear dimensions of doorways, windows, other operable openings, access panels and cabinet doors, or passageways, stairs, and other exitways.

3) Where exposed piping is acceptable, install it close to walls and overhead structure, parallel and square to finished construction, plumb and nominally horizontal (except where required to slope for drainage).

b. Specify requirements to conceal spaces around pipes, ducts, and conduits, where they pass through walls, ceilings, and floors with escutcheons or cover plates.

3.04 HEALTH AND SAFETY

A. Fire Resistance: Design and select materials to provide fire resistance in accordance with code.
1. Provide type construction as specified in the code, subject to the approval of College Facilities Services.
2. For all elements required to have a fire resistive rating and which are not made of materials and systems specified as acceptable by the code, use proven-by-mock-up construction.
3. Acceptable Testing Agencies: Agencies include Underwriters Laboratories Inc., Underwriters' Laboratories of Canada, Inchcape Testing Services (Warnock-Hersey), and Factory Mutual.
4. Provide design to maintain fire resistance of walls, floors, ceilings, and other fire-rated assemblies that services must pass through, in accordance with requirements of the section in which the fire-rated assembly is specified.
5. Provide design for fire-rated separations between equipment rooms and other spaces where required, and as specified by the code.
6. Select and specify products which are fire rated for the specific locations where they are installed.

B. Prevention of Accidental Injury: As required by code and as follows:
1. Safety Glazing: As defined by 16 CFR 1201; provide in locations required by code, glazed areas subject to human impact, glazed areas at grade, and doors.
2. Design to prevent ice and snow from falling off building elements onto pedestrians, building occupants, and vehicles.

C. Lightning Hazard: Design to prevent damage to occupants, structure, services, and contents due to lightning strikes.
1. Provide protection equivalent to that specified in NFPA 780; supplementary strike termination devices, ground conductors, and grounding electrodes are required only where the integral portions of the structure cannot perform those functions.

D. Health Hazards:
1. Design to prevent growth of fungus, mold, and bacteria on surfaces and in concealed spaces on a long-term basis.

E. Electric Shock Hazard: Select equipment which is designed to protect personnel from electrical shock.
1. Electrically-Operated Equipment and Appliances: UL listed for application or purpose to which they are put; suitable for wet locations listing for exterior use.

F. Explosion Hazard:
1. Shell: Design shell to provide relief from explosion hazards so as to minimize effect on occupants and structural members.

G. Excess Pressure Hazard: Design pressurized components to withstand operational pressures without failure and to relieve or reduce excessive pressure to prevent failure.

H. Materials Selection: Choose materials that are environmentally friendly, worker friendly, and user friendly.

3.05 STRUCTURAL

A. Structural Performance: Design and select materials to support all loads without damage due to loads, in accordance with code.
1. Existing Elements To Remain: Design elements to prevent movement or settlement of existing elements that are to remain.
2. Earthquake Loads: Accommodate loads as prescribed by code.
3. Special Loads: In addition to loads defined by code, design for loads from moving machinery, elevators, cranes, vehicles, and similar items.
4. If design method is not specifically prescribed by code, design in accordance with ASCE 7.

5. Design shell elements to resist loosening or detachment in winds equivalent to the code design wind speed.
6. Shell elements engineered by their manufacturer or fabricator, rather than by the engineer-of-record, shall be specified to comply with the following additional requirements:
    a. Manufacturer/fabricator employs licensed structural engineer to accomplish design of structural elements.
    b. Manufacturer/fabricator has minimum of 5 year's experience in the design and manufacture of similar structures.

B. Services Components and Their Supports: In accordance with code.
1. Safety Factor for Component Structural Elements: Two; based on weight of component.
2. Supports for Piping, Conduit, Ducts, and Other Services Components: Design for attachment to, and support by, the superstructure, not to or by non-structural construction or sheet metal elements, so that they do not move or sag, using the following:
    a. Supports that allow movement of the rigid linear elements (pipe, etc.) without undue stress on the piping, tubes, fittings, components, or the superstructure.
    b. Intermediate supports mounted between structural members to limit distance between supports.
    c. Supports capable of handling seismic forces in accordance with the code.
    d. Mounting frames, bases, or pads, designed for ease of anchorage or mounting.
    e. Rigid sway bracing at changes in direction of more than one-half of a right-angle, for all pipes.

C. Concealed or Buried Components: Design cover or concealment so that components are not subjected to damaging stresses due to applied loads.

D. Construction Loads and Erection Stresses: Accommodate temporary construction loads and erection stresses during construction.

3.06 DURABILITY

A. Expected Service Life Span: Expected functional service life of campus facilities is 50 years.
1. Ducts, Piping, and Wiring in All Services: Same as the service life of the building.
2. All Components Permanently Installed Underground or Encased in Concrete: Not less than service life of building.
3. Software and Firmware Integral to Operation of Services Equipment: Minimum 20 year's functional life without reprogramming required.
4. Service life spans of individual elements that differ from the overall project life span are defined in other sections.
5. Additional requirements for elements not required to have life span equal to that of the project as a whole are specified below under "Operation and Maintenance."
6. Manufacturer warranties are not considered adequate substantiation of expected service life span.

B. Water Penetration Resistance:
1. Shell: Design and select materials to prevent water penetration into the interior of shell assemblies, under conditions of rain driven by 35 mph wind.
    a. Exception: Controlled water penetration is allowed if materials will not be damaged by presence of water or freezing and thawing, if continuous drainage paths to the exterior are provided, and water passage to the building interior is prevented.

C. Moisture Vapor Transmission Resistance: Design to prevent deterioration of materials due to condensation of moisture vapor inside assemblies.
1. Use supplementary vapor retarder if necessary to meet requirements.
2. Use method of sealing joints between elements that will be effective given available construction practices.

D. Corrosion Resistance: Design shell elements to prevent corrosion by specifying corrosion-resistant materials, designing and specifying assemblies that will prevent galvanic action, by designing and specifying requirements that prevent contact between metals and concrete and masonry, and by designing assemblies that will prevent condensation on metals.
   1. Separation of Dissimilar Metals:
      a. Where different metals subject to galvanic action are exposed to weather or moisture, prevent direct contact between them.
      b. Piping Connections for Piping of Dissimilar Metals: Dielectric adapters.
   2. Aluminum: Prevent direct contact of aluminum with concrete or cementitious materials.
   3. Steel: Where permitted to be coated with other than zinc, zinc-alloy, or aluminum-zinc alloy, follow the recommendations of Society for Protective Coatings (SSPC) in regard to preparation for coating and coating type.
   4. Outdoor Metal Elements Except in Contact with Soil: The following are considered corrosion-resistant metals:
      a. Aluminum.
      b. Stainless steel, Type 304 or 316.
      c. Brass and bronze, but not copper.
      d. Cast iron, ductile iron, and malleable iron.
      e. Hot-dipped galvanized steel, with minimum zinc coating of 0.90 oz/sq ft total, both sides, or equivalent aluminum-zinc alloy coating.
      f. Cadmium-plated steel, with minimum coating of 12 micrometers.
   5. Indoor Metal Elements Potentially Exposed to Moisture: The following are considered corrosion-resistant metals:
      a. All metals listed above for exterior exposure.
      b. Steel coated with high-build epoxy, with minimum coating thickness of 15 mils.
      c. Chrome-plated steel.
   6. Underground Metal Elements: without maintenance, unless otherwise required by product manufacturer.
      a. Underground metal elements include, but are not limited to, pipes, tanks, conduits, ducts, structural members.
      b. 3 inches of concrete cover is considered to be permanent protection.
      c. Coatings or wrappings are not considered sufficient protection for the following types of elements:
         1) Underground elements subject to movement due to structural loads or thermal expansion or contraction.
         2) Metal elements buried in a soil environment known to cause corrosion on similar nearby structures.
         3) Metal elements buried in a soil environment in which stray DC electrical currents are present.
         4) Metal piping carrying petroleum products or other hazardous or toxic materials buried or otherwise installed without means of visual observation of entire exterior surface of piping.
         5) Metal tanks holding petroleum products or other hazardous or toxic materials buried or otherwise installed without means of visual observation of entire exterior surface of tank.
      d. Cathodic protection alone is not considered sufficient protection for some underground metal elements.

E. Weather Resistance: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, and atmospheric pollutants.
   1. Weather resistance requirements apply to all components exposed to the outdoor environment, including services, unless specifically excepted; equipment enclosures are considered the equivalent of the exterior enclosure.
   2. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
   3. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.
      a. Coated Finishes: Minimize use of materials with separate coated finishes.
      b. Coating Performance: AAMA 2605 (10-year), minimum.

c. Coating Salt Spray Resistance: No deterioration when tested in accordance with ASTM B117 for 1000 hour exposure with 5 percent salt fog at 95 degrees F.
d. Use one of the following:
1) Fluoropolymer coating (70 percent Kynar 500 (tm) or Hylar 5000(tm)), minimum two coats.
2) Siliconized polyester coating.
e. Do not use:
1) Baked enamel.
2) Paint.
3) Field finishes of any type.

4. Joint Components and Penetration Seals: Specify materials and systems capable of resisting expected thermal expansion and contraction; use overlapping joints that shed water wherever possible.
5. Transparent Elements (Glazing): No haze, loss of light transmission, or color change, during entire expected service life.
6. Service Temperature: Low temperature equal to historically-recorded low; high temperature equal to that expected due to any combination of air temperature and heat gain from solar and other sources.
7. Freeze-Thaw Resistance: Adequate for climate of project.
8. Ozone Resistance: Do not use materials that are adversely affected by ozone.
9. Buried Water Piping: Minimum of 12 inches below lowest recorded level at which the ground freezes.

F. Temperature and Humidity Endurance: Design equipment to endure temperature and humidity that will be encountered and to resist damage due to thermal expansion and contraction.

G. Impact Resistance: Design and select materials to resist damage due to impact in accordance with code and the following:
1. Minimize damage from windborne debris propelled at up to 35 mph.
2. Design and select materials to resist damage from hail of size up to 1/2 inch.
3. Minimize damage due to potential vandalism.
4. Natural Hazards: Design to resist damage from perching, nesting, and feeding birds.

H. Wear Resistance: Design and select materials to provide resistance to normal wear-and-tear in accordance with code and the following:
1. Elements Within Reach of Pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.

3.07 OPERATION AND MAINTENANCE

A. Space Efficiency: Design facilities to minimize floor area required while providing specified spaces and space relationships, plus circulation and services areas required for functions.

B. **High Performance Energy Efficiency Goals**: Comply with requirements specified, in accordance with the code and the following:
1. **In general, the minimum goal for new construction will be to provide energy efficient design having at least 30 percent less energy consumption than that of an equivalent minimally-complying baseline building, demonstrated by comparing the actual Design Energy Cost to the Energy Cost Budget of a prototype building, both calculated in accordance with ASHRAE 90.1. For renovations, the general goal will be to provide energy efficient design having at least 30 percent less energy consumption based on historical energy usage records over the previous three years.**

C. Water Consumption: Design facilities to minimize water consumption.

D. Ease of Operation and Use:
1. Provide design of facilities, equipment, and systems that are easily operated by intended personnel.
a. Space Around Components: Working clearances and access routes as required by code and as recommended by component manufacturer.

b. Access: All mechanical and electrical equipment located to allow easy access. Provide access doors for equipment accessed through walls, partitions, or fixed ceilings.
c. Valves and Other Control Devices: Accessible handles, switches, control buttons; valve handles on top/upper side; chain or other remote operators where located out of normal reach above floor level in SU1 and SU2 spaces.

2. Design facilities to minimize the need for specialized training in operation of specific equipment or systems; identify all equipment and systems for which the manufacturer recommends or provides training programs.
3. Preparation for Use: Specify requirements to prepare services for use by testing appropriately for proper operation before start-up, eliminating operational anomalies, adjusting control systems for optimum operation, and demonstrating proper functioning.
    a. Specify requirements to perform demonstration, training, and commissioning as recommended by recognized professional societies for all services systems, building envelope, doors, and non-services equipment included in contract.

E. Ease of Maintenance:
1. Design facilities to minimize the amount of maintenance required.
2. Do not design the location of any equipment requiring maintenance on the roof, in attics, in crawl spaces, where access must be through attics or crawl spaces, or where access is not possible using removable panels or doors.
3. Light Levels: Design for adequate lighting for locating and maintaining equipment; emergency lighting for critical components.
4. Cleaning: Where not otherwise specified, design equipment mountings to allow easy cleaning around, and under, equipment, if applicable, without crevices, cracks, and concealed spaces where dirt and grease can accumulate and with raised, closed bases for equipment mounted on the floor.
5. Equipment Enclosures: Design and specify removable access panels to allow cleaning.
6. Site Utilities: Specify requirements to record or mark locations of existing, abandoned, and new utility lines in such a manner that they can be easily located during and after completion of construction.
7. Piping Systems:
    a. Piping Other Than Gravity Drains: Design systems to provide means of isolating convenient portions of piping system, so that small portions may be shut down leaving the remainder in operation and so that drainage of the entire system is not required to enable repair of a portion of it.
    b. Piping: Design entire systems to be drainable without disassembly of piping.
    c. Above Ground Piping: Specify labeled to identify contents and direction of flow, each shut-off valve, each piece of equipment, each branch take off, and at 20 ft maximum spacing on exposed straight pipe runs.
    d. Equipment in Piping Systems: Specify each unit to be provided with a union or flanged connector at each pipe connection to allow easy removal.
8. Replaceability of Parts:
    a. Parts Having Service Life Less Than That Specified for Element: Specify easily replaceable parts, without de-installation or de-mounting of the entire element, component, or equipment item.
    b. Valves: Specify easily replaceable internal parts, eliminating necessity of removal of entire valve for repair.
    c. Parts Availability: Specify readily available parts from stocking distributors within 50 miles of project location.
9. Exceptions: Elements that do not meet the specified requirements for ease of maintenance are provided, and College Facilities Services' acceptance is granted.

F. Ease of Replacement:
1. Elements Not Required to have Expected Service Life Span Equal to that Specified for the Facility as a Whole: Specify provisions for replacement without undue disruption of building operation.
2. Large Equipment: doors and corridors large enough for removal of major pieces of equipment, such as, chillers and boilers.

END OF SECTION

DESIGN PROCESS AND SUBMITTAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Working relationships between Colorado College, the design team members, and the construction team members.

B. Procedures for design of new facilities and major renovations, based on applicable design and construction requirements.

C. Description of design phases, and requirements for work products and deliverables for each phase.

1.02 WORKING RELATIONSHIPS

A. General:
   1. Agreement: The Agreement Between Owner and Architect establishes the basic terms and conditions for delivery of professional services between the College and the Architect.
   2. Owner, Owner's Representative, Building Committee and Design Review Board:
      a. Owner: Colorado College (or College); Administrative Office located in Armstrong Hall, 14 E. Cache la Poudre Street, Colorado Springs, CO 80903-3294.
         1) The Vice President for Finance & Administration's signature is required on all financial and contractual documents.
      b. Owner's Representative: Each project will have an appointed Owner's Representative, generally the Director of Facilities Services or an appointed designee. The Owner's Representative will review the Documents for conformance to the Design and Construction Guidelines.
         1) Facilities Services Department: Located at 1125 Glen Avenue, Colorado Springs, CO, 80905. When the Owner's Representative is a member of the Facilities Services Staff, correspondence should be addressed accordingly.
         2) Direct all communication from the Architect to the College to the Owner's Representative unless otherwise arranged.
         3) Owner's Representative will be identified by the College.
         4) Owner's Representative will be responsible for construction issues.
      c. Building Committee: Major projects may have a Building Committee appointed by the College. The Building Committee will consist of a Chair, the Director of Facilities Services, and members of the academic, administrative, support staff, and students.
         1) During the design phases the Building Committee chair will recommend approval or other action to the College.
         2) The Building Committee chair and/or Director of Facilities Services will present the project conceptual design documents to the DRB for review and recommendations.
         3) The Building Committee and/or Director of Facilities Services will be responsible for design issues.
      d. Design Review Board (DRB): The campus Design Review Board is responsible for reviewing development of Campus facilities and associated landscaping to ensure consistency with the Campus master plan.
   3. Architect:
      a. Throughout these Design and Construction Guidelines, wherever the term Architect is used in referring to a professional engaged by the College for a particular project, the term is equally applicable to an engineer or other specialized consultant similarly retained by the College.
      b. Defined as an Architect or Engineer and their consultants licensed to practice in the State of Colorado.
         1) Architect is required to designate one Principal and one Project Manager who will represent their office throughout all phases of the project. The Architect's Project Manager is responsible for all communications with the Owner and the Contractor.
         2) Architect is responsible to communicate all relevant information from these Design and Construction Guidelines to the Contractor.

3) Change in the Architect's Project Manager during the life of the Agreement Between Owner and Architect may be made only after written request by the Architect and written concurrence of the Owner's Representative.

4. Contractor:
   a. Includes the term Construction Manager / General Contractor (CM/GC), General Contractor (GC), Design-Build Contractor (D-BC), or other types of construction Contracts; this will be identified in the Architect's agreements.
   b. College will select a contractual relationship with the Contractor that is appropriate for the project.
5. Project Title:
   a. The official title of the project will be stated in the Agreement Between Owner and Architect. It is required that all correspondence, drawings, and other project documents be identified with the official project title.
6. Architect's Invoices:
   a. Submit to Owner's Representative or Designee: Applications for payment and statements for compensation earned under the terms of the Agreement.
      1) Make each application on the Architect's invoice, clearly indicating the agreed upon payment schedule based on the scope of services phase.
      Include the total amount requested to date, less amount already paid, and amount requested on current invoice. Indicate the amount requested on the current invoice as a percentage of the total contract amount.
      2) Describe any adjustment to the scope of services on an approved Consultant Agreement Amendment, and indicate the approved amendment on the invoice or payment request.
7. Minutes of Meetings:
   a. Architect is responsible for conducting and documenting all meetings between its office personnel and College personnel, including telephone conversations for all phases of services covered under the Agreement Between Owner and Architect.
      1) Prepare and transmit written minutes of meetings or phone conversations to the Owner's Representative and all affected participants no later than the third working day following the telephone conversation or two working days before the next scheduled meeting.
      2) Owner's Representative will distribute copies to other appropriate parties as needed or required.

1.03 CONSULTANTS

A. The Agreement Between Owner and Architect usually requires the Architect to include design consultants, including structural, electrical, plumbing, and mechanical engineering services for the project. Specialized consultants may also be required, including but not limited to acoustics, vibration, radiation, cost estimating, and others.
   1. All Consultants must be approved by the Owner's Representative.
   2. The Owner reserves the right to contract with special consultants on the project.
   3. When the Architect contracts with consultants which are not direct employees of the Architect for these services, Owner's approval is required of those consultants.
   4. Consultants may be approved by inclusion in the Agreement Between Owner and Architect or by the Owner's Representative after execution of the Agreement Between Owner and Architect. The latter must be requested in writing by the Architect and approved prior to the any consultant performing work on the project.

B. Any change of consultant during the term of the Agreement Between Owner and Architect must be approved by the Owner's Representative.

C. The employment of consultants does not relieve the Architect from design responsibility for the entire project, for full coordination and management of services required under the Agreement Between Owner and Architect, whether the work is performed by the Architect or by the Architect's consultants.
   1. Agreements between the Architect and its consultants may be reviewed by the Owner's Representative before they are finally executed.
   2. The Architect's consultants are required to be active on the project through all phases, and to attend all meetings where their work is discussed.

D. An Architect's or Professional Engineer's seal must be affixed on the Construction Documents for their portion of the design work whether this design work is performed by the Architect's directly employed staff or by an independent consultant.

E. The College may directly contract with other architectural or engineering consultants, most commonly landscape architects and utility engineers, or suppliers/installers of carpeting, furniture, scientific casework, window shades/blinds, and other furnishing items.
   1. The Architect and its consultants are responsible for providing information and reasonable coordination of these other consultants' design work during the design and construction phases of the project.

1.04 PROJECT DELIVERY THROUGH A CONSTRUCTION MANAGER / GENERAL CONTRACTOR

A. Construction Manager / General Contractor (CM/GC):
   1. For some projects, the Owner may elect to retain a Construction Manager / General Contractor (CM/GC). The CM/GC may be expected to provide various services including value engineering, cost estimating and project scheduling during both design and construction.
   2. The Architect will be required to cooperate and work closely with the CM/GC for the benefit of the total project. This requirement has only a minor effect on the procedures outlined in these Design and Construction Guidelines.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DESIGN PHASES - GENERAL

A. College Facilities Services will appoint representatives of the following departments to provide details of functional needs, review proposed solutions, and participate in design phase meetings as needed:
   1. User groups.
   2. Operations staff.
   3. Maintenance staff.
   4. College Facilities Services' commissioning agent (CxA).
   5. Others as may be determined for specific project or facility.

B. Design phases are generally defined as follows:
   1. Schematic Design: Confirmation of facility programming, definition of mission-critical design criteria and intent **(New Process Step)**, and conceptual design to define basic scope and character of the project.
   2. Design Development: Detailed design of the project based on the facility program, design criteria and intent **(New Process Step)**, and development of the scope and character of the project to a level of detail sufficient for preliminary pricing and review for conformance with design criteria and intent.
   3. Construction Documents: Preparation of detailed documentation, including construction drawings, construction specifications, and other documentation required to fully communicate the design of the project to the construction team for purposes of securing necessary building permits and of constructing the project.
   4. Bidding or Negotiation: Participation in the process of bidding or negotiating the Contract Sum for the project.
   5. Construction: Performing construction contract administration services, including project closeout, as stipulated in the Agreement Between Owner and Architect, the General Conditions of the Contract for Construction, and any other applicable supplementary conditions or provisions of the construction Contract.
   6. Post Construction: Preparation of project record documentation, and participation in post-occupancy inspections.

3.02 PROGRESS DOCUMENTATION

A. Progress Schedule:
   1. Submit updated schedule for the design phases of the Project whenever adjustments that change the Project Schedule are approved.

B. **Design Intent and Criteria Manual (New Requirement):** Architect is responsible to prepare and maintain a Design Intent and Criteria Manual, containing design intent and performance criteria that will be of use during construction, occupancy, and operation of the project.
   1. Prepare initial draft of Manual and submit with other submittals at the conclusion of the Schematic Design phase.
   2. Submit refined and developed versions of Manual with other required submittals at the conclusion of the Design Development and Construction Documents phases.
   3. Manual will be used to review and evaluate compliance of the design with established design intent and performance criteria for the project.
   4. Organize Manual's content according to the following table of contents:
      a. Project Intent Statement.
      b. Project Description (scope summary).
      c. Facility Program (copy of program provided by Architect in collaboration with the College, including any additions or clarifications developed during the Schematic Design phase).
      d. Design Criteria:
         1) **Sustainable Design and High Performance Goals** (See General Facility Design Guidelines Requirements).
            (a) Summary of High Performance Goals and/or LEED Scorecard if required.
            (b) Summary of strategies addressing Facility Life Cycle Design Guidelines for Sustainability in this Design and Construction Standards manual.
            (c) Energy model/performance calculations and conclusions if required.
         2) Compliance Statement (stating that design substantially complies with applicable Design and Construction Guidelines).
            (a) Guidelines Deviations (list substantial deviations from applicable Design and Construction Guidelines, if any).
         3) Facility Maintenance Considerations (list of design strategies employed and products selected which support effective and efficient facility maintenance by the College).
         4) Supplemental Information (include if required).

C. Construction Documents:
   1. Construction Drawings: Prepared using PC-based CAD software, using College Facilities Services' specified drawing and layering conventions.
   2. Specifications: Prepared in substantial conformance to current editions of industry standards established and maintained by The Construction Specifications Institute (CSI), including *MasterFormat*, *SectionFormat*, and *PageFormat*.
   3. **Design Intent and Criteria Documentation (New Requirement) Included in Construction Documents:** Organized logically (from the point of view of operations staff) and placed in a prominent location in drawing sets or in specifications, as applicable.
      a. This information is not to be characterized as Contract requirements to be fulfilled by the Contractor, but is to be provided only for reference by the Owner and others during the design, construction, occupancy, and operation phases of the facility's life-cycle.

D. Documentation during the Construction phase may consist of annotated modifications to and amplification of the Construction Documents, including changes that may affect Contract Times or Contract Sum.
   1. College Facilities Services will retain the project documents, modified by the design consultants and the Contractor to reflect changes made during refinement of the design and during construction.

E. Documentation for College Facilities Services's Project Record:
   1. During Construction: Digital photographic record of concealed items including but not limited to valves, adjustable components, and similar items, taken from consistent locations, distances, and angles; mark locations on ceilings and other covering surfaces in a recognizable but inconspicuous manner as directed by the College.

2. During Closeout: Detailed digital photographic record of each interior room and space, each exterior elevation, the roof, and all site areas as directed by the College.
3. Operation and Maintenance Manuals: Two (2) hard-copy manuals (multiple binders if necessary) and one (1) electronic copy in portable document format (.pdf) with table of contents hyper-linked to individual and grouped files.
4. Photographs and Videos: Include the date taken, a short title of the view, and the compass orientation in each view; data must be in the actual photograph or frame, rather than added after printing (hand-printed lettering on an erasable marker board is acceptable).

3.03 SCHEMATIC DESIGN PHASE

A. General: The Architect is responsible to prepare the following, at a minimum:
   1. Schematic Design Studies: Illustrating the scale and relationship of project components for approval by the Owner's Representative.
      a. Number of studies may vary with the complexity of the project. In remodel and renovation Project, adequate field investigation beyond information provided by the Owner, must be performed by Architect to ensure the practicality of proposed design solutions.
      b. Continue generating studies until the requirements of Project are met and a Schematic Design is approved by the Building Committee and/or Facilities Services Director.
      c. Proceed to the Design Development Phase only when written approval has been received.
   2. **Sustainable Design Opportunities and Strategies:** Develop and review with the Owner's Representative and the Building Committee and/or Facilities Services Director to establish realistic expectations within budgetary constraints. Explore options and creative solutions as early in the design process as possible.
   3. Occupancy and Construction Type: Establish building occupancy, mixed occupancy considerations, and general exiting systems.
   4. Addition and Renovation Projects: Where portions of existing buildings are to be renovated, include adequate drawings to establish general scope of the demotion work.

B. Submittal Requirements: The Architect is responsible to provide the following, at a minimum:
   1. **Design Intent and Criteria Manual (New Requirement):** First draft, as specified under DESIGN PHASES - GENERAL in this Section.
   2. Drawings:
      a. Dated and scaled, with consistent view orientations and title block information.
      b. Include site plan, floor plans, roof plan, and exterior elevations of all sides.
         1) Floor Plans: Include room names as identified in the Building Program, gross area of each floor, and total gross area of the building.
   3. Technical Information:
      a. Building and occupancy classification.
      b. Type of construction.
      c. Location on property/site.
      d. Allowable floor area for code analysis.
      e. Height and number of stories.
      f. Exiting and accessibility.
      g. Structural analysis:sketches and descriptions of proposed structural systems
      h. Building systems, including sketches and descriptions of plumbing, mechanical and electrical systems.
      i. Building materials, including outline description of proposed construction materials, including sustainable materials.
      j. Tabulation of areas; indicate the Net Assignable Square Feet (NASF) of all spaces.
      k. Cost Estimate:
         1) When required by the Agreement Between Owner and Architect, prepare an opinion of probable construction cost for each Schematic Design study. Include appropriate amounts for contingency and inflation to reflect anticipated condition at the time of bidding.
         2) When the Owner employs an independent Cost Consultant or CM/GC Contractor, review estimates/reports and notify the Owner in writing if the Architect takes exception to any item or items in reports.

l. Architectural Models and Perspective Drawings:
   1) Provide perspective rendering and/or a presentation quality model of the project. The actual requirements for each project will be specified in the Agreement Between Owner and Architect.
   2) When architectural models are required, show as much detail as possible at the scale to which they are built; large enough to include adjacent streets, approach drives, walks, associated parking and service facilities, and a clear plastic cover.
   3) When a perspective rendering is required, show the proposed building on its actual site with representative surrounding or adjacent buildings. Pedestrian view is preferred.
   4) Perspective renderings and architectural models become the property of the Owner.
   5) Study models (not architectural models) are encouraged, but not specifically required, to help in developing the design and communicating it to the Building Committee and/or Facilities Services Director. Study models are considered a part of the Architect's basic services.

C. Reviews:
   1. First Formal Review: Made after a single Schematic Design has been selected by the Building Committee and/or Facilities Services Director.
   2. Detailed Review: Made by the Building Committee, Campus Design Review Board (DRB), other Representatives (not on the Building Committee), College Facilities Services Department, and other Administrative and Academic Personnel. Written comments will be assembled by the Owner and will be transmitted to the Architect for inclusion in the design or for further study or discussion. Each comment requires a written response from the Architect and/or Consultant.
   3. Code Review: Architect is responsible to review the accepted schematic design with the code officials and furnish the Owner's Representative with copies of resulting comments and suggestions.
   4. Approval to Proceed: After the schematic design submittal has been approved by the Building Committee and/or Facilities Services Director, the Architect will be notified in writing to proceed with preparation of the Design Development Documents.

3.04 DESIGN DEVELOPMENT PHASE

A. General: The Architect is responsible to prepare the following, at a minimum:
   1. Design Development Documents: Drawings and other documents, including specifications, to fix and describe the size and character of the entire project as to kinds of materials, type of structure, mechanical and electrical systems, and other work that may be required for construction of the project.
   2. Meet with the Building Committee and Facilities Services to determine specific and detailed requirements of all spaces in the proposed building and surrounding site requirements. Determine and describe mechanical and electrical systems to serve the building.
   3. Study and analysis in such detail that all data is sufficient to begin construction drawings without additional consultation with the using departments.
   4. **Sustainable Design Strategies and Options:** Determined, identified in the documents, and integrated into the Cost/Budget Estimate for this phase.
   5. Resolve all substantial design decisions and budget issues for the College to approve the Design Development Phase submittal.

B. Submittal Requirements: The Architect is responsible to prepare the following, at a minimum:
   1. **Design Intent and Criteria Manual (New Requirement):** Second draft, as specified under DESIGN PHASES - GENERAL in this Section.
   2. Drawings:
      a. Code Compliance: Information identifying Occupancy Type and Construction Type, allowable and actual calculations in sufficient detail to support the specific design. Include additional code excerpts as applicable. Code compliance must be reviewed and accepted by the Building Official prior to completion of the Design Development submittal. Include the Owner in these reviews with the Building Department.
      b. Site plan showing new site construction information, and including legal and physical improvements existing on the site.

c. Floor plan(s), including structural frame and envelope dimensioning; room, door, and other opening identification numbering; construction assembly identifications; and other functional improvements included in the design.
    1) Coordination Plan: Provide consultant coordination plan(s) identifying general workstation layout with the associated electrical, tele/data and other specialized utility connection locations.
    2) Demolition Plan(s): On remodel/addition projects when substantial demolition occurs, provide a demolition plan clearly identifying the Scope of Work.
d. Roof plan(s), showing drainage patterns and points of discharge, openings and equipment locations, and similar information.
e. Exterior elevations, identifying all materials and intended detailing.
    1) Remodel and Renovation Projects: Graphically differentiate between existing and new.
f. Building sections.
g. Reflected ceiling plan(s).
h. Enlarged floor plan(s) and section(s) (as applicable).
    1) Toilet Room Plans: Show plumbing fixtures, accessories, stall layout and handicap accessibility. Verify plumbing fixture count with local code official and Owner's Representative, particularly on renovation and addition projects.
    2) Kitchens: Provide a commercial kitchen equipment plan and schedule when applicable.
    3) Stair and Elevator Section(s): Show vertical/horizontal dimensions and hand/guardrail design.
i. Schedules:
    1) Doors, windows, and associated frames, including preliminary opening schedules.
    2) Preliminary room finish schedule.
j. Wall/Partition Types and Rated Assemblies:
    1) Provide a legend identifying the materials used and fire/smoke and acoustic ratings as applicable; cross referenced to the plans and sections.
k. Structural General Notes:
    1) Live Loads: Floor, stairs, corridors, roof, snow, earthquake and wind.
    2) Dead Loads: Material weight, mechanical and electrical weight, wet-pipe or dry-pipe fire sprinkler system, and soil bearing pressure.
    3) Materials Strength: Concrete, masonry, steel and wood. Foundation design based on College accepted recommendations contained in Soils Report.
    4) Foundation design based on College accepted recommendations contained in Soils Report.
    5) Outline to NOT include:
        (a) Incorporation of the geotechnical report by reference as a Contract Document.
        (b) Detailed administrative, product/material, and execution specifications that duplicate same specifications contained in the Project Manual.
l. Structural Plans:
    1) Foundation and framing plan(s) that indicate floor, roof, and load-bearing wall construction.
    2) Particularly in buildings containing sensitive equipment, incorporate vibration analysis and mitigation appropriate to the projects requirements.
m. Mechanical Drawings:
    1) Scaled plans of each floor, showing double-line duct layouts, equipment locations, and typical heating and cooling devices (e.g., scaled VAV boxes and branches with supply and return diffusers).
    2) Mechanical-room drawings, showing locations and sizes of AHU(s), fans, pumps, compressors, heat exchangers, and similar design components. Show elevation cross sections where necessary.
    3) System schematics showing all system components and control devices and sequence of operation, including sustainable design measurement and verification features, if applicable.
    4) Particularly in buildings containing sensitive equipment, incorporate vibration analysis and mitigation appropriate to the projects requirements.

n. Plumbing Drawings:
    1) Plans of each floor, noting fixture locations and types. Indicate routing of main distribution lines with sizes.
    2) Preliminary fixture schedule(s).
    3) Utility connections to piping distribution systems if required by the design.
o. Electrical Drawings:
    1) Plans of each floor, noting device locations and types.
    2) Proposed electrical room/closet areas.
    3) Main electrical feed type of service and location.
    4) Identify and locate proposed electrical sub-panel locations; type and size at each floor.
    5) Preliminary lighting fixture layout and schedule(s).

3. Draft specifications; include table of contents of all Sections anticipated to be included in the construction documents, identifying those Sections not yet included; include drafts of Sections that can be adequately prepared and reviewed for content at design development level.
4. Tabulation of areas; updated, indicating the Net Assignable Square Feet (NASF) of all spaces.
5. Cost Estimate:
    a. When required by the Agreement Between Owner and Architect, prepare updated opinion of probable construction cost. Include appropriate amounts for contingency and inflation to reflect anticipated condition at the time of bidding.
    b. When the Owner employs an independent Cost Consultant or CM/GC Contractor, review updated estimates/reports and notify the Owner in writing if the Architect takes exception to any item or items in reports.
6. **Energy report or model describing energy considerations and recommendations including building operations first-cost and life-cycle cost projections.**

C. Reviews:
1. Formal Review: Made after the Design Development Phase submittal has been presented to and approved by the Building Committee and/or Facilities Services Director.
2. Detailed Review: The Building Committee, other Representatives of the using departments, College Facilities Services Department, and other Administrative and Academic personnel will critically examine this submission to ensure that all requirements of the Building Program have been satisfied. Written and/or “redlined” drawing comments will be assembled by the Building Committee and transmitted to the Architect for inclusion in the design or for further study or discussion. Each comment requires a response and resolution by the Architect or their Consultant. Substantial issues must be resolved to the Owner’s satisfaction; a revised Design Development Phase submittal may be required as determined by the Building Committee.
3. Cost Estimate: Reviewed by the Building Committee and/or Facilities Services Director to determine that the estimated construction cost is within the limits of the available funds. If estimated costs exceed the budgeted funds, the Architect will be required to make changes to reduce the cost.
4. Code Review: Architect is responsible to review the Design Development Phase documents with all required City of Colorado Springs and State agencies including Regional Building, Utility, Fire and Health Departments. Provide copies of agency review comments and the Architect’s responses to Colorado College. Resolve substantial design and budget issues for the College to approve the Design Development Phase submittal.
5. City of Colorado Springs Planning Department: Requires submittal and approval of a Development Plan. Refer to the City of Colorado Springs Zoning Ordinance for requirements and achieve compliance with those requirements.
6. Approval to Proceed: Once submittal has been approved by the Building Committee and/or Facilities Services Director, the Architect will be notified in writing to begin preparation of the Construction Documents.

3.05 CONSTRUCTION DOCUMENTS PHASE

A. General: The Architect is responsible to prepare the following, at a minimum:
1. Construction documents which are complete in all respects to permit fully informed bidding and construction. All elements must be accurately shown, appropriately detailed, and properly specified.

2. Construction Documents: Consisting generally and usually of component parts listed below. This is not a complete list of all the Contract Documents that may be used during the Bidding/Negotiation and Construction Phases of a Project.
    a. Advertisement for Bids (provided by CM/GC or required for open bids only) and Instructions to Bidders (required for open bids only).
    b. The Form of Bid (required for open bids only) and General Conditions.
    c. Supplementary Conditions and Special Conditions.
    d. Construction drawings and technical specifications, including Division 01 General Requirements specifications.
3. Construction Drawings and Technical Specifications: Prepared in conformance with these Design and Construction Guidelines; other documents listed above will be developed by the Owner's Representative utilizing Colorado College forms.
4. Materials, Components, Systems and Equipment: Perform a diligent investigation to ensure the College that these items are not specified, approved, or used which will be discontinued or significantly redesigned by the manufacturer or suppliers in the near future, (preferably within 5 years).
5. Remodel and Renovation Projects: Perform adequate field investigations, beyond the information provided by the Owner, to ensure that work indicated on the construction documents represents an accurate description of the scope of work and feasibility of proposed construction.

B. Submittal Requirements: The Architect is responsible to prepare the following, at a minimum:
1. **Design Intent and Criteria Manual (New Requirement):** Final document, as specified under DESIGN PHASES - GENERAL in this Section.
2. Drawings and Specifications - General:
    a. Quality Control Review: Carefully reviewed by the Architect to achieve coordination between all consultants, civil, structural, mechanical, electrical specialized consultant and fixed equipment.
    b. Proprietary Names: Do not use propriety product names on the drawings, except when instructed by the Owner’s Representative, and properly coordinated with the specifications.
    c. Professional Seals: Affixed to construction documents as required by code officials, with corresponding signatures and registration numbers.
        1) Deliver one (1) stamped set, with the jurisdiction authority's Building Permit approval notice, to the College as a permanent record set.
3. Drawings Content and Organization - Minimum:
    a. CAD Standards: Comply with general guidelines of the Uniform Drawing System components of the United States National CAD Standard, current edition, a product of the National Institute of Building Sciences buildingSMART alliance (NIBS bSa) for drawing set organization, sheet numbering, terms and abbreviations, notations, and layering conventions; www.nationalcadstandard.org.
    b. Title sheet.
        1) Based on information provided by the College, identify types, amounts and locations of all hazardous materials intended to be stored or used. List actual quantities and compare to exempt amounts. Projects with extensive quantities of hazardous materials will be required to submit a “Hazardous Materials Management Plan” as prepared by the Facility Services Environmental Health and Safety Office.
    c. Site plan(s).
    d. Demolition plan(s) (Conditional).
    e. Architectural floor plan(s).
    f. Architectural roof plan(s).
    g. Architectural exterior elevations.
    h. Architectural building sections.
    i. Architectural reflected ceiling plan(s).
    j. Architectural enlarged floor plan(s).
    k. Architectural interior elevations.
    l. Architectural schedules.
    m. Architectural building and wall sections.
    n. Architectural details and enlarged sections.
    o. Structural drawings.

p. HVAC drawings.
q. Plumbing drawings.
r. Electrical drawings.
s. Other drawings as applicable to the project.

4. Technical Specifications - General:
   a. Format Requirements: Comply with general guidelines of MasterFormat, SectionFormat, and PageFormat, current editions with supplements, as published by CSI (The Construction Specifications Institute) for specifications Division organization, section numbering, and section/page formatting; www.csinet.org.
   b. Complete specification sections for all products, materials, components, systems, and finishes.
   c. Carefully prepare specifications to include all items pertaining to the project and to omit items not intended to be incorporated into the project. Use terminology, references, and abbreviations consistently on drawings and in specifications.
   d. Submittals: Include a complete summary list of all specified shop drawings, samples, product data, and other submittals.
   e. Warranties: Include a complete list of standard warranty and extended warranty requirements, and list of items for which operations and maintenance data are required.
   f. Maintenance Materials: Include a summary list of specified Owner's maintenance materials and additional quantities specified beyond that required to complete the construction.
   g. Reference Standards: Ensure that specified industry reference standards are reviewed to verify current and correct identification of standards and date of issue.
   h. Terminology Conventions: For consistency in format the following rules should be observed:
      1) The term "Architect" refers to the Architect and/or their Consultants and Engineers who prepare the Documents. The terms should be capitalized and no other term should be used to refer to other consultants or engineers.
      2) The term "Owner" should be capitalized, and no other term should be used in reference to the College and/or the Owner's Representative.
      3) References to the "Drawings" should be capitalized and refers to the entire set of construction drawings, not to less inclusive term such as "plans." The term "Drawings" refers to that portion of the Construction Documents.
      4) "Specifications" should be capitalized when reference is made to the work results sections generally. The term "Specifications" refers to that portion of the Construction Documents.
      5) "General Conditions," "Supplementary Conditions," and "Special Conditions" are conditions of the Contract and are not parts of the Specifications.
      6) "Contractor" should be capitalized, and no other term should be used reference to any subcontractor, supplier, or other entity under contract to the "Contractor." The term "Contractor" refers to the prime General Contractor or any subcontractor or suppliers contracted directly by the Contractor.
      7) When reference is made to the "Contract" between a Contractor and the Owner it should be capitalized.
      8) The term Contract Documents refers to all the documents identified in the Contract Between Owner and Contractor and in the General Conditions.
      9) The terms "Project," "Architect,, "Owner," and "Owner's Representative" should be capitalized; no other pronouns should be capitalized.
   i. Project Manual - General:
      1) The General Conditions, Supplementary Conditions, Special Conditions (if any), and other bidding requirements should be bound together with the "Work Results (Product) Specifications" to form the Project Manual. Obtain special permission from the Owner's Representative before placing other documents such as schedules and detail drawings in the Project Manual. Number all pages, using document or section number and page number, separated by a dash ("-").
      2) Table of Contents: An index or table of contents for the entire Project Manual is required. The use of different colored paper for the major divisions is required as follows:

3) The Project Manual should include official Project title, Architect's name and date on the cover. A project directory including consultant's names and contact information should be included immediately behind the cover. This date shall be the same as that on the Drawings and, in the case were earlier editions exist, shall be titled Contract Edition. Architect's and Engineer's seals shall be placed on the title page.A project directory including consultant's names and contact information should be included immediately behind the cover.
4) Colorado College's standard forms will be used for all projects. Final copies tailored to each project will be provided by the Owner's Representative for insertion into the Project Manual.

j. Tabulation of areas; updated, indicating the Net Assignable Square Feet (NASF) of all spaces.
k. Cost Estimate:
1) When required by the Agreement Between Owner and Architect, prepare updated opinion of probable construction cost. Include appropriate amounts for contingency and inflation to reflect anticipated condition at the time of bidding.
2) When the Owner employs an independent Cost Consultant or CM/GC Contractor, review updated estimates/reports and notify the Owner in writing if the Architect takes exception to any item or items in reports.

C. Reviews:
1. Building Permit: Reproduce the Drawings and Specifications in the number of sets required by the jurisdictional authority and submit the authority. The Architect is required to secure all required jurisdiction approvals and permits, including City of Colorado Springs and State of Colorado. Provide copies of jurisdictional authority review comments and resolutions to Colorado College with one (1) sealed and approved set of Construction Documents.
2. Mass Reproduction of Documents: Because changes will probably be required, the reproduction in multiple sets of documents for bidding should not be made until after jurisdictional reviews and approvals are completed. If significant changes are required due to the jurisdictional authority review, addenda, and/or Owner's review, the Owner's Representative may request the Architect to consolidate these modifications into the final Construction Documents. If required, it is the Architect's responsibility to complete this at no additional cost to the Owner.
3. Alternates: The Architect is responsible to include provisions for alternate proposals in the bidding documents to permit a reduction in the scope of the project should this become necessary to award contracts within the budgeted funds. Alternates to be incorporated in the bidding documents must be approved by the Owner's Representative before they are documented and included on the bid proposal form.
4. Detailed Review: The Construction Documents will be critically examined by the Building Committee, Owner's Representative, Owner's Commissioning Authority (CxA), Facilities Services Staff, Environmental Health/Safety, Information Technology, and other College Administrative staff to ensure that the requirements of the Building Program are satisfied. The primary emphasis is to assure that the approved Design Development has been described in adequate technical terms to complete the project on time and within budget. Some of the primary concerns include construction durability, life/safety related to applicable codes, sustainability goals, building environmental controls, energy efficiency and general completeness/coordination of the documents. Colorado College is not the building code official, and compliance to all applicable codes is the responsibility of the Architect and its consultants.
5. Scope of the Work: Must be sufficiently defined in the documents to prevent unreasonable cost escalation during construction. The Owner's written and "redlined" comments will be transmitted to the Architect. The Architect and its consultants are required to respond to the Owner's Comments in writing and incorporate all necessary modifications into the final Construction Documents.
6. Approval to Proceed: After the Construction Documents have been approved by the Owner, the Architect will be notified in writing to issue the final Construction Documents for Bidding or Negotiation.

3.06 BIDDING OR NEGOTIATION PHASE

A. General:
1. Date for Receipt of Bids: Will be established by the Construction Manager or Owner's Representative.

2. Open Bids Only: The advertisement will be placed in the official papers by the Owner's Representative, or the CM/GC acting in the College's behalf. Release of Contract Documents to bidders should be simultaneous with the date of appearance of the advertisement.
3. Bidding Documents: Will not be released to bidders until such release has been approved by the Owner's Representative.
    a. Documents will be released by the Architect or CM/GC from his office and must be returned to same office after bid date. Copies for bidders' inspection will be made available at the Colorado College and at various construction reporting agencies and builders' exchanges, the number and locations to be determined by the size and nature of the Project.
4. In a CM/GC Contract, a select list of qualified bidders will be developed by the CM/GC and Owner.
    a. Deposits may be required on the documents. On some projects the Owner may choose to charge a non-refundable amount equivalent to the actual cost of reproducing and handling the documents. In a CM/GC Contract, the original Construction Documents will be given to the CM/GC's office for reproduction and distribution.
5. During the bidding period, the Architect will prepare and issue bidding Addenda) to all documents holders. In a CM/GC Contract, the Contractor will be responsible for distribution of Addenda. If the requested Addendum clarification becomes too numerous, the Architect may be requested to consolidate these changes into a Final Construction Documents. If required, it is the Architect's responsibility to complete this at no additional cost to the Owner.
6. The Owner's Representative or Construction Manager will prepare Bid Tabulation sheets for the Bid Opening.
7. Recommendations for award of contract(s) will be made to the Colorado College if the bids received are within the available funds for the Project.
8. A notice of award letter will be sent to the successful bidder by the Owner's Representative or Construction Manager.

3.07 CONSTRUCTION PHASE

A. General:
1. The Architect and its Consultants are expected to make periodic visits to the site during the construction period to observe the progress of the Project. The frequency of these visits will vary with the contractual obligations of the different stages of the Project with the minimum being once every two weeks. A written report shall be issued containing observations and issues.
2. The Architect is required to review specified submittals, including shop drawings, product data, samples, and other submittals, and take appropriate action on approvals in conformance with the specifications. During construction, the Architect is required to provide necessary interpretations of the construction documents and provide supplemental details and instructions which may be required to explain the intent of the documents.
3. The appropriate G-series American Institute of Architect's (AIA) standard forms will be utilized.
4. Architect is required to review decisions on finish materials and color selections with Owner's Representative, and secure Owner's approval, before instructions are given to the Contractors for implementation.
5. Monthly Payment Procedures:
    a. Three (3) originals submitted by Contractor to Architect, om the date prescribed in the Agreement.
    b. Architect reviews and coordinates approval with Owner's Representative.
    c. Architect provides one (1) certified original to Owner.
6. The Architect's responsibilities include issuing and responding to the following in a timely manner at no additional cost to the Owner. If identified as having a cost or schedule impact, the Architect will advise the Owner's Representative on the validity of the claim.
    a. Request for Information (RFI).
    b. Architect's Supplemental Instructions (ASI).
    c. Construction Change Directives (CCD).
    d. Proposal Request (PR).
7. The Contractor is required to maintain record documents, which will be the basis for the Architect's preparation of the project Record Documents.

8. Meetings are scheduled generally weekly with Architect, Contractor and College personnel. The Architect and its consultants, when directly concerned, are expected to be present at these meetings. The Contractor will:
    a. Take minutes, prepare a report of each meeting, and distribute to the primary attendees within 48 hours of the meeting.
    b. Provide current construction progress schedule, RFI Log, PR/CO Log, and Submittal Log, which will be reviewed during the meeting and incorporated in the meeting minutes.
        1) One copy sent to the Owner's Representative for reproduction and distribution to appropriate College offices.
9. The Architect is required to be present, with their Consultants, to conduct the Final Inspection of the building, together with the Owner's Representative or their authorized Facilities Services representatives. At Substantial Completion and Final Acceptance, the Architect is required to certify to the Owner's Representative that the Project was completed in substantial compliance with the Contract.
10. Substantial Completion: Defined in the General Conditions and AIA G704, Certificate of Substantial Completion, and includes the following, at a minimum, subject to Architect and Owner's determination of Substantial Completion:
    a. In the case of Owner’s requested portion of the Project, extension of the exiting systems and life/safety systems; completion of those systems through unfinished portions of the Project.
    b. Final Inspection Certificates: Receipt of Temporary Certificate of Occupancy or Certificate of Occupancy from Building Officials, Fire Department, Health Department and all applicable jurisdictional authorities; original certificates delivered to the Owner.
    c. Permanent utilities, plumbing, mechanical and electrical systems fully operational and commissioned.
    d. Exiting systems, life/safety systems, and circulation systems complete, including installation of door and opening hardware.
    e. Exterior development and building access sufficiently complete for egress and building maintenance including vehicular access.
    f. Initial Balancing Report complete and submitted to the Architect, Engineers, and Owner. Commissioning of the building systems sufficiently complete to assure that the building is functioning properly for human habitation, comfort, safety, and in conformance with the Owners Project Requirements.
    g. Punchlist: List of corrective and defective work to be completed by the Contractor issued b y Contractor and supplemented by Architect, including the Owner’s identified items. Punchlist completed by Contractor, and re-inspection completed by Architect. Outstanding items, particularly those which are dependent on shipping or manufacturing, identified in writing including the anticipated completion date.
11. Final Acceptance of the Contractor’s includes the following, at a minimum:
    a. Operation and Maintenance Manuals, including all specified warranties, reviewed and accepted by the Architect and Owner.
    b. Building Commissioning and Owner’s training, including the final balancing report, completed.
        1) LEED Projects (if applicable): Initial credit submissions to GBCI complete and accepted by Owner. Fulfillment of some LEED Credits may extend beyond the Final Acceptance date; if so, the Owner and the responsible party will establish a reasonable cost and time frame for completion.
    c. Punchlist items completed by the Contractor and accepted by the Architect and Owner.
    d. Specified Contractor-furnished Owner’s maintenance materials received and accepted by the Owner.
    e. Record documents by Contractor submitted and accepted by the Architect and Owner.
        1) **Design Intent and Criteria Manual (New Requirement):** Verification and comments for the Architect and Owner regarding design intent and criteria achievement or non-achievement as indicated through the commissioning process.
    f. Required lien waivers received by the Owner.
    g. The General Contractor is required to complete and file the City of Colorado Springs Tax Rebate Form ST 16.

B. Warranties:
   1. Specified to commence on the Date of Substantial Completion. If an item or system is identified on the Punchlist as defective or incomplete, such item's or system's warranty will not commence until completion of the remedial work and acceptance by the Architect and Owner.
   2. Commissioning Authority and Owner Warranty Review: Conducted to review all building systems at 6 months and 10 months after the beginning of the established warranty period. All work identified as not meeting the Owner's Project Requirements must be corrected within the specified warranty period.

3.08 POST CONSTRUCTION PHASE

A. Record Documents:
   1. Architect's Responsibility: Prepare Record Documents and submit to Owner, based on information provided by the Contractor in their record documents, and on document modifications made during construction, the Record Documents consisting of updated Drawings and Specifications. Record Documents consist of the following:
      a. Drawings on reproducible mylar media and in digitized (CD) copies in PDF and DWG (AutoCad) fils formats.
      b. Two notebooks containing all RFI's, ASI, CCP, PR and other information documenting modifications to the documents.
      c. Operations and Maintenance Manual: Reviewed and approved to be in conformance with the construction documents, then be delivered to the Owner for review and final acceptance. Upon Owner's approval of the O&M Manuals, the Contractor is required to provide two (2) hard copy (binder notebooks) sets and two (2) digitized (CD) copies to Owner.
         1) Digitized File Format: PDF; each mechanical equipment tag and/or device type represented by separate files.
   2. Provide two (2) copies of the Quality Assurance Manual to the Owner as stated in the Commissioning Plan, if applicable.
   3. The Contractor's record drawings are required to be completed and delivered to the Architect prior to final acceptance of the construction.
   4. Final payment to Architect will not be authorized until the Owner's Representative has received and accepted the Record Documents from the Architect.

B. Post-Occupancy Inspection:
   1. The Architect and all professional consultants retained by the Architect are required to accompany the Owner's Representative or their authorized representative on a post-occupancy and warranty review prior to the expiration of the warranty period. This should take place after the Owner has had an adequate opportunity to detect any defective conditions.
   2. Commissioning Authority and Owner Warranty Review: Conducted to review all building systems at 6 months and 10 months after the beginning of the established warranty period. All work identified as not meeting the Owner's Project Requirements must be corrected within the specified warranty period.

END OF SECTION

Colorado College Facility Life-Cycle Design Guidelines for Sustainability

A. Design Goals for Sustainability

The design team should follow the Colorado College Campus Master Plan guidelines and processes. The strategic program states that the college serves as a "model of environmental stewardship and innovation by advancing both the study and the practice of sustainability." The college strives to reflect innovation in the application and evolution of sustainability practices related both to the built environment and the management of College resources.

1. The President's signing of the American College and University President's Climate Commitment pledge in April 2009 included the goal of achieving carbon neutrality by 2020. Achieving carbon neutrality by 2020 requires a three strategy approach.
    a. The first strategy is to reduce building energy use by **20%** through conservation measures to include improved building systems scheduling, sustainability education and energy usage awareness, and encouraging behavioral changes throughout the college community.
    b. The second strategy is to reduce energy usage by **30%** through maintenance and renovation of building structures, electrical systems, mechanical systems to improve energy efficiency; and investment in technological improvements to reduce energy usage.
    c. The third strategy is to purchase or produce all electric energy through renewable energy sources and provide supplement heating through renewable energy technologies. The college plans to reduce its carbon footprint by **50%** through producing enough energy through renewable resources to offset the carbon footprint in other sectors such as the use of natural gas for heating and college related travel.

    Opportunities for achieving energy and water use reductions should be identified by design and engineering professionals in every construction or renovation project and considered for implementation based on life-cycle cost savings, impact on reaching carbon neutrality, and the importance of demonstrating social responsibility by supporting the college core values and taking a leadership role in nurturing the ethic of environmental sustainability.
2. The College's April 2009 signing of the President's Climate Commitment required initiation of tangible actions to reduce greenhouse gases. The College agreed to **"establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent"**. The College has established a **High Performance Building Design Criteria** program which exceeds the LEED Silver minimum prescribed requirements in order to meet its long range sustainability strategies for achieving carbon neutrality.
3. New buildings, additions to existing buildings, or existing building renovations should minimize building life-cycle costs, direct and indirect, relating to energy use, maintenance, waste disposal and occupant health & productivity. Life-cycle costs should be based on a "whole-building perspective", rather than from the perspective of individual building systems or components.
4. Minimize environmental impacts throughout the building life-cycle, including product manufacturing, construction activity, use/occupancy, and demolition or renovation/reuse.
5. Purchasing of goods and services from manufacturers and vendors shall comply with the Colorado College Sustainable Purchasing Guidelines.
6. Optimize indoor environmental air quality.

B. Design Process

1. The Project Design Team is to evaluate sustainable design opportunities and strategies appropriate for project program, site and budget.
2. **Building performance design standards**: US Green Building Council LEED Rating System, or a LEED equivalent design standard, or the college's **High Performance Building Design Criteria** exceeding LEED prescriptive requirements, customized to meet Colorado College's sustainability goals, is to be used on all new building construction and existing building renovation projects over $1 million in cost. Colorado College Facilities Services will provide the project design team with **project specific high performance building design criteria to be used to develop the project design intent documentation**. The highest feasible facility energy use reduction goals in excess of minimum energy code requirements will be attained based on each project's available funding, each building's optimum performance design potential, and each building infrastructure system's conditions, etc. All new construction and renovation projects are to follow the Colorado College Facility Design Guidelines Manual, Colorado College Facility Design Guidelines , which contains expected high performance building design requirements for new construction and renovations.
3. Do not make project funding decisions based on first costs only. Evaluate life-cycle costs of design alternatives to reduce long term operating and maintenance costs of major building systems. Life-cycle costs should be based on a "whole-building perspective", rather than from the perspective of individual building systems or components.
4. Evaluate use of renewable energy sources for electric use or supplementing heating requirements to help reduce the carbon footprint and achieve the goal of carbon neutrality by 2020.
5. Use energy simulation/modeling software on projects greater than $1 million cost where feasible and within available funding resources.
6. Life-cycle cost saving strategies used should have maximum payback period of 5-10 years, or contribute significantly to the 30% reduction of energy use or carbon footprint goal by 2020.
7. Architectural/Engineering consultants are to include the above services in the Professional Services Agreement.
8. Architects and Engineers selected for the project should demonstrate proficiency and experience in sustainable design. Consultants with these qualifications should be included in the earliest programming and conceptual design phases to help identify and evaluate high performance design opportunities beyond the minimum LEED Silver certification feasibility, or feasibility of higher energy design standards attainability.

C. Design Guidelines

1. Energy Use
   a) Integrate Buildings with the Site: Consider local climate & site influences on building energy use. Utilize "free" energy sources where feasible, such as solar energy, daylight, exterior temperature variations and winds.
   b) Optimize Energy Performance: Select building envelope, mechanical and electrical systems for improved energy efficiency. Where applicable, research products in order to meet Colorado Springs Utilities efficiency requirements for utility rebate savings. Typical strategies & technologies:
      1) Building Envelope
         - Control & utilization of solar heat gain
         - Daylighting of interior spaces
         - High performance windows/glazing
         - Energy efficient window coverings
         - Optimized insulation values
         - Reduced air infiltration
         -

2) Mechanical Systems
   - High efficiency equipment
   - Direct Digital Control System (DDC) for HVAC
   - Occupancy sensors/CO2 monitoring
   - Occupancy sensors
   - Heat recovery systems
   - Economizer cycle cooling
   - Zoning of HVAC system based on building orientations & loads
   - Variable speed drives on motors and fans
   - Low flow plumbing fixtures
   - Time of day scheduling
   - Separate controls for individual spaces, where feasible
3) Electrical Systems
   - High efficiency lighting fixtures (no incandescent)
   - Occupancy sensors
   - Daylight sensors
   - Separate ambient and task lighting
   - Lighting dimmers
4) Energy Metering
   - Every building or energy using facility should have sub meters monitoring energy use. Where possible high energy consuming operations within buildings or facilities should be sub-metered locally to identify, monitor, and control energy use.

c) CFC/HCFC/Halon Reduction: Avoid use of these products in HVAC refrigerants and fire suppression systems.

d) Building Systems Commissioning
   1) All projects shall implement a Commissioning plan, with the scope to be determined by the project team.
   2) Key mechanical & electrical systems are to go through a Commissioning process, which includes the following:
      - Inspection & testing for functional performance in accordance with project objectives & the Colorado College Facility Design & Construction Guidelines.
      - Documentation of criteria, inspections/testing & acceptance.
      - Training of Colorado College operations & maintenance staff.

3. Water Use
   a) New low flow water devices are required for new construction by current building codes. Opportunities for achieving water-use reductions should be identified in the course of routine maintenance improvements and renovation projects. Older water faucets typically having flows of approximately 2.5 gpm and should be replaced with 1.5 gpm or .5 gpm flow devices depending on the applications. Older toilets have flush volumes of approximately 3.5 to 4.5 gpf and should be replaced with dual-flush toilets, or 1.6 gpf toilets, which tend to be equivalent to the dual-flush toilet flows on average.
4. Building Materials
   a) Recycled Content Materials: Use materials with post-consumer or post-industrial recycled content where feasible. Common products with recycled content include structural steel, aluminum windows, gypsum board, acoustical ceiling tiles, rubber floor tiles, carpeting, and toilet partitions.
   b) Durable & Flexible Materials: Utilize components and systems which are durable and easy to maintain. Where feasible, use materials which provide flexibility for future changes and modifications to occur.
   c) Renewable Materials: Consider use of products that are comprised of raw materials that are in abundant supply or come from renewable sources. When feasible, obtain wood products from suppliers certified as utilizing sustainable harvesting methods.
   d) Local Materials: Use products produced regionally where possible.

e) Construction Waste Management: Contractors are to develop a plan for sorting, storing & recycling of waste materials on projects. A waste minimization specification is to be used as guidance for this work. All projects shall implement a Construction Waste Minimization Plan, with the scope to be determined by the project team. A minimum of 50% of construction waste is to be salvaged, recycled or otherwise diverted from landfill or incineration.
f) Recycling Facilities: Plan for convenient areas to be designed in new buildings and building renovations for sorting & storage of recyclable items by the building occupants.

3. Indoor Environmental Quality
   a) Design for Human Health: Consider environmental needs of people in terms of daylight, ventilation, exterior views and thermal/acoustic/visual comfort for interior spaces. A direct line of sight to exterior vision glazing from 90% of all regularly occupied spaces is a long term goal.
   b) Ventilation Requirements: Optimize the amount of fresh air provided to building spaces. Connect occupancy sensors & carbon dioxide monitors to HVAC systems, where feasible.
   c) Low Emitting Materials: Utilize materials which have low levels of volatile organic compound off-gassing. Minimum requirements for 45% of materials (by cost):
      - Adhesives & sealants: VOC content less than established limits.
      - Paints & coatings: VOC emissions that do not exceed Green Seal's Standard GS-11.
      - Carpet: Comply with CRI Green Label Plus Testing program.
      - Carpet cushion: Comply with CRI Green Label Testing program.
      - Composite panels: No added urea formaldehyde resins.
   d) Construction Air Quality Management: Protect ductwork and equipment from contamination during construction. At a minimum:
      - During construction, comply with SMACNA IAQ Guideline for Occupied Buildings Under Construction, 1995, Chapter 3.
      - Protect stored on-site or installed absorptive materials from moisture damage.
      - If air handlers are used during construction, filtration media with a MERV value of 8 are to be used at each return grille, per ASHRAE 52.2-1999.
      - Replace all filtration media immediately prior to occupancy.
      - Conduct a 2 week building flush-out with new filtration media with 100% outside air after construction ends & prior to occupancy. After flush out, replace filtration media.

      or

      - Conduct a baseline indoor air quality testing procedure to demonstrate that concentration of air contaminants are below specified levels. Meet the testing requirements listed in LEED IEQ Credit 3.

4. Site Work
   a) Building Siting and Landscaping: Use the Colorado College Campus Master Plan design guidelines as a guide for design decisions.
   b) Minimize Site Disturbance: Consider the impact of project on the surrounding ecosystem. Investigate methods to minimize impacts on natural habitats and watersheds.
   c) Stormwater Management: Limit off site storm water runoff and employ methods to increase on-site infiltration.
   d) Alternative Transportation: Provide site facilities to encourage pedestrian, bicycle and bus transport, where feasible.
   e) Light Pollution Reduction: Minimize site lighting levels & off-site light spillover/ glare, while providing for adequate levels for security and way finding.
   f) Water Efficient Landscaping: Utilize drought resistant plant materials and low flow irrigation techniques, where feasible. Consider use of native plant species.

g) Erosion & Sedimentation Control: Employ techniques such as silt fencing, sediment traps/filters, topsoil stockpiling and slope stabilization to minimize erosion of soil during construction. At a minimum, comply with EPA Document No. 832/R-92-005 (1992) Stormwater Management for Construction Activities, Chapter 3: Sedimentation & Erosion Control.

D. References

General

- US Green Building Council- LEED Green Building Rating System, www.usgbc.org.
- Colorado College Campus Master Plan
- Colorado College Facility Design Guidelines
- Colorado College Sustainable Purchasing Guidelines
- American College and University President's Climate Commitment
- CC Goal to Achieve Carbon Neutrality by 2020.

Energy Use

- ASHRAE Standard 90.1-1999 Energy Standard for Buildings except Low Rise Residential Buildings US DOE/EPA Energy Star Guidelines.

Building Materials

- EPA Comprehensive Guide for Procurement of Products Containing Recovered Materials; Recovered Materials Advisory Notice III; Final rule (1/19/00) 40 CFR Part 247.
- Forest Stewardship Council Guidelines.
- Triangle J Council of Governments, "Waste Spec"- Model Specification for Construction Waste Reduction.
- Green Seal Paints and Coatings Requirements- Paints (GS-11), First Edition, 5/20/1993.
- Carpet and Rug Institute Green Label Indoor Air Quality Test Program.

Indoor Environmental Quality

- ASHRAE 62-1999: Ventilation for Acceptable Air Quality.
- ASHRAE Standard 55-1992, Addenda 1995- Thermal Environment Conditions for Human Occupancy, Including ANSI/ASHRAE Addendum 55a-1995.
- Sheet Metal & Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 1995.

Site Work

- EPA Storm water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- IESNA Recommended Practice Manual: Lighting for Exterior Environments (RP-33-99.

COLORADO COLLEGE

FACILITY HIGH PERFORMANCE DESIGN CRITERIA CHECKLIST MANUAL

MARCH 6, 2014

Colorado College Facilities Services
1125 Glen Avenue
Colorado Springs, CO 80905

Facility High Performance Design Criteria Checklist

I. Introduction

Energy efficiency, opportunities for high performance energy efficiency design goals and strategies must be given special consideration in the design of new or renovated college buildings **in order for the college to achieve its long term sustainability goals**.

The purpose of this **Facility High Performance Design Criteria Checklist** is to provide design consultants and the college design team with a guideline to assist in establishing and defining **mission-critical design criteria and design intent for new construction and renovation projects**. This criteria checklist will be used to help establish goals to reduce facility energy use by 30-50% compared to ANSI/ASHRAE/IESNA Standard 90.1 baseline building performance rating and the International Energy Conservation (IECC) Code.

This **Facility High Performance Criteria Checklist** includes applicable sections and information from the **Advanced Buildings Core Performance Guide**, which is a prescriptive program to achieve significant, predictable energy savings in new commercial construction. The program is based on the results of extensive energy modeling protocol used to identify consistent strategies that lead to anticipated energy savings. This **Facility High Performance Criteria Checklist** includes guidelines from the **Advanced Buildings Core Performance Guide** for implementing improved design processes to foster design integration, thereby improving overall building performance opportunities. These strategies set the stage for additional whole building performance improvements beyond the basic requirements. **The United States Green Building Council (USGBC) LEED V4 Minimum Energy and Atmosphere requirement, Energy Performance Prerequisite, identifies three acceptable options for compliance, one which is the use of the Advanced Buildings Core Performance Guide for prescriptive compliance.**

The college's high performance goal of reducing facility energy use by 30-50% **exceeds the USGBC LEED V4 goal**, which requires achieving reductions of building energy use by **5% for new construction, 3% for renovations, and 2% for core & shell projects** compared to the ANSI/ASHRAE/IESNA Standard 90.1 baseline. While not actually seeking LEED certification, the college's aspiration of pursuing high performance goals strives to steer the College in the direction of **making fundamentally sound business and environmental stewardship decisions for our projects.**

This Facility High Performance Design Criteria Checklist addresses those opportunities and strategies for high performance energy efficiencies which clearly contribute to reducing facilities energy use in excess of the ANSI/ASHRAE/IESNA Standard 90.1 baseline building performance rating and in excess of the local Pikes Peak Regional Building Department (PPRBD) Code and the International Energy Conservation (IECC) Code.

The design consultants and college design team are expected to use these general checklist criteria as a guideline to assist in identifying sustainable design opportunities and innovative strategies and concepts which achieve the greatest possible facility energy use reduction possible within a project's available funding for new construction and renovations, and within an existing building system's conditions capabilities for renovation projects. **However, this general criteria list does not preclude the design consultants and college design team from identifying other opportunities and innovative strategies and concepts for reducing facility energy use unique to each specific project.**

II. The Benefits of High Performance Buildings

High-performance buildings use less energy while providing a variety of environmental, economic, human resource, design and construction benefits, including:

☐**Reduced "Environmental Footprint."** High-performance facilities not only reduce energy use, fossil fuel dependence, environmental pollution, they also showcase a more environmentally benign use of materials and contribute positively to preserving the environment.

☐**Lower Operating Costs.** Energy efficiency, use of renewable energy, water conservation, design for ease of cleaning and maintenance and reduced waste streams all contribute to lower operating costs as well as improving the reliability of the building systems and reducing the long-term life-cycle costs of facility ownership.

☐**Improved Productivity and Learning Environment.** Studies have demonstrated a link between an educational facility's physical condition and student, faculty and staff morale and performance. Optimized lighting that combines controlled day-lighting and artificial lighting together with superior indoor air quality, contribute to student performance and higher faculty and staff satisfaction.

III. Criteria Category: Design Process Strategies

The criteria in this section from the **Advanced Buildings Core Performance Guide** describe desired steps for the design team to effectively implement the **Facility High Performance Design Criteria** program.

1. Identify Design Intent

Conduct a team meeting to identify key energy performance goals for the project, identify design strategies to achieve these goals, and to coordinate subsequent efforts among team members. Document the meeting summary/goals statement for use in subsequent steps to guide the design team in setting specific performance goals for the project.

2. Communicating Design Intent

Develop key information about project performance requirements to insure that design goals are translated forward through the design process. Project goals are converted into documentation incorporated into each phase to guide design, sequence of operation, specifications, bid submittals, construction, acceptance testing and building operation. All of the documentation must be developed in the design phase, updated as needed in each subsequent phase, and included in the final documentation package turned over to the college. A copy of the following documentation should be included in the operations and maintenance manual for the project:

A. Design Intent Meeting Summary Document

Complete this document before the end of the schematic design phase. Develop a written summary of the outcomes of the Design Intent meeting. This summary should be used to guide subsequent decisions on design features and performance Criteria throughout the course of the design process.

B. Operational Performance Requirements Document

This document identifies how the building is intended to operate. It should be developed as a narrative statement, before completion of the design development phase. The document should describe the following:

1) The operational performance goals, providing detailed explanation of the ideas, concepts and Criteria that the college defines as important.
2) A description of the Basis of Design of the systems including all information necessary to prepare a design to accomplish operational performance.
3) A description of how the design team has minimized energy consumption and demand by first reducing loads to a minimum then designing an appropriate mechanical system to meet those loads through a range of operating conditions.
4) A description of the Sequence of Operation of the systems and their interaction with other systems.
5) A description of the systems, including the capacities and anticipated efficiency of the equipment or systems.
6) A set of guidelines requiring that substitutions proposed in the construction process identify how the proposed substitution affects the operational parameters described above.

C. Acceptance Testing (or Commissioning Plan) Requirements Document

An acceptance testing (or commissioning plan scope) plan shall be prepared that specifies the process for meeting the college's project requirements. This document shall explain the process to be implemented to meet the requirements of the performance Criteria. The plan should be developed in the construction documents phase and included in the bid documentation as a project requirement. The document shall describe:

1) A process to verify proper coordination among systems and assemblies and between all contractors, subcontractors, vendors and manufacturers of furnished equipment and assemblies.
2) A list of key equipment to be tested and the construction phase in which testing is to occur.

3) A description of the testing requirements and the passing Criteria to be used to ensure proper equipment operation and control.
4) A list of test (or commissioning plan checklists) outcome documentation and forms necessary for review prior to final systems acceptance.

D. Construction Documents

1) The construction documents shall contain sufficient information to describe the envelope, including: air barrier; heating, ventilation, and air conditioning (HVAC); service hot water; lighting; electric power distribution systems; and system operational features and controls. All HVAC, lighting and electric power distribution system plans shall contain sufficient information to identify the system and equipment arrangements, system and equipment sizing, systems specifications, efficiency requirements and systems sequence(s) of operation.
2) The construction documents shall demonstrate that tabulation of the “building loads” used assumptions are consistent with the operational performance requirements and the statement of project goals and principles or document why different assumptions were used.
3) Specifications shall include narrative descriptions in each subsection that includes systems and equipment related to building energy performance. The narrative shall identify performance requirements for the equipment and systems and shall include a list of performance parameters that must be submitted with any proposed substitution request in the construction process.
4) The construction documents shall require the submittal of operation manuals and maintenance manuals as a condition of final acceptance, including a description of their format and content. The operation manual shall provide all relevant information needed for day-to-day operation and management of each system. The maintenance manual shall describe equipment inventory and support the maintenance program. The submittal of record drawings and control documents are a condition of final acceptance.

E. Requirements for Bid Submittals

1) The construction documents shall include specific requirements for Bid Submittals and Change Requests generated by the contractor. These requirements shall ensure that Bid Submittals contain comparative energy performance information so they can be reviewed to assure conformance with the Construction Documents. Changes shall be reviewed to assure they are consistent with the specific operational performance requirements and the statement of project goals and principles. "Or Equal" substitutions shall be shown to assure equal or better energy and indoor environmental performance when compared to the same element in the original construction document. Proposed changes that do not demonstrate equivalent energy performance shall not be considered “Or Equal” substitutions.

3. Building Configuration

Consider the implications of alternate building configurations (or modifications to existing building shell/envelope) to maximize opportunities for building energy performance, functionality and daylighting. Identify the pros and cons of several alternate building configurations using existing analysis tools, design consultants, reference material or other resources.

4. Mechanical System Design

Use project-specific load calculations based on *High Performance* requirements and part-load conditions to properly size mechanical equipment, rather than relying solely on generic rule-of-thumb sizing Criteria. Ensure that the mechanical system is designed to minimize energy consumption and maximize occupant comfort throughout the range of operating conditions. The design engineer shall document the following actions in the design process:

A. When sizing the heating and cooling equipment, perform load calculations using building shell and interior load assumptions that are consistent with the specific operational performance requirements and the statement of project goals and principles. Include accurate characterization of lighting, solar loads, glazing performance, occupancy and ventilation loads based on specific design characteristics of this project.
B. When sizing the fan and air distribution systems, document fan-sizing calculations with zone-by-zone load calculations. Perform calculations to determine critical path supply duct pressure loss. Compare fitting selections for the critical branch to minimize fan horsepower requirements. Utilize round or oval duct wherever feasible to lower leakage and reduce pressure loss, and avoid high-pressure duct systems where possible. Separate all fittings in medium and high-pressure duct work by several duct diameters to reduce system effects wherever feasible. Use relief fans in lieu of return fans where possible, and provide automatic dampers on exhaust in lieu of barometric dampers to reduce fan power and increase barometric relief.
C. Perform a second set of calculations using part-load conditions (maximum likely load and/or standard operating conditions). This includes using benchmark data, average daytime temperatures and non-peak solar gain, and other assumptions to define part-load conditions for the heating and cooling system. Include diversity factors for interior loads and other factors that will allow proper assessment of part-load operation.
D. Describe the system operation at these conditions and describe features of the design that will facilitate efficient operation at these part-load conditions. Document in design intent manual how the system will deliver ventilation air, maintain comfort in accordance with ASHRAE Standard 55 and operate in an energy- efficient manner.

The design practices described above will lead to installed system capacities that more closely match actual building loads. This reduces installed excess system capacity, reducing equipment first costs. *By* sizing the system more closely to the actual building loads, the system operating characteristics more closely match the efficiency curves and performance characteristics anticipated in manufacturer data. This increases operating efficiency, reduces operating costs, and extends equipment service life. Additional savings can be achieved *by* adopting the adaptive comfort standards described in ASHRAE Standard 55.

5. Operator Training & Documentation

Ensure that the building operations team understands how the building is intended to operate and has the resources to monitor and understand building operational characteristics.
Collect a full set of construction documents and specifications, systems manuals, maintenance and calibration requirements, control protocols, etc. for use by the building operations and maintenance team. Conduct an operator training session to make sure the building operators understand the systems and operation of the building. Information should be collected in a set of

manuals designed to facilitate building operation and future communication of this information to new operating staff. Consult with the college Facilities Services Department to identify the best way to collect, store and distribute this information.

A. Complete an Operator Training program and provide full documentation of building characteristics, equipment, operation, control, maintenance and monitoring protocols. Verify that the following steps were taken before occupancy:

    1) Operator training was performed by the building construction and design team.
    2) Systems manuals and a full set of design and installation documents were delivered and accepted by the building operations team.
    3) Appropriate maintenance schedules and calibration requirements were included in the operations manual.
    4) Information is developed and provided describing building user interface with lighting, ventilation and temperature controls.
    5) Control and data collection protocols were set up and understood by the building operations team.

B. Building specific information should be gathered and turned over to the building operations team. This information should not be limited to manufacturer information about installed equipment but should also include descriptions of system operation and maintenance procedures and a full set of design documents. A narrative describing design intent and building operation protocols should be included, with information about control system operation. Maintenance schedules and part reordering information should also be included. All of this information should be well organized and tabbed, so that building operators can use the manuals as a reference. Consider video recording the training for future reference.
C. Operator training should include a formal walk-through and training session to give the building operations team hands-on experience with the topics discussed, and to allow the opportunity for operators to ask questions of the installation team.
D. Operator training should include information about the monitoring capabilities and protocols built into the project to collect and store data and analyze energy use. Systems manuals should include a description of the data-collection protocols that will be used to verify system performance and the frequency with which this information will be gathered and reviewed. Over time, reports of building monitoring and maintenance activities should also be included in the operations manuals.

IV. Criteria Category: High Performance Design Requirements

All of the Criteria measures listed in this **Advanced Buildings Core Performance** section are required components of the **Advanced Buildings *Core Performance, 2012 IECC Supplemental Requirements*** program. Energy savings projections are based on the implementation of all applicable measures in this section.

Advanced Buildings Core Performance
2012 IECC Supplemental Requirements