

COLORADO PUBLIC SCHOOL  
**FACILITY CONSTRUCTION GUIDELINES**



Division of Public School Capital Construction Assistance



**September 3, 2008**

## **Preface**

The Colorado Public School Facility Construction Guidelines were established as a result of House Bill 08-1335 which was passed by the General Assembly of the State of Colorado, signed by the Governor and became law in 2008. This Bill requires the Public School Capital Construction Assistance Board (Assistance Board) to develop construction guidelines to be used by the Assistance Board in assessing and prioritizing public school capital construction needs throughout the state, reviewing applications for financial assistance, and make recommendations to the State Board of Education (State Board) regarding appropriate allocations of awards of financial assistance from the Public School Capital Construction Assistance Fund.

These Guidelines are not mandatory standards to be imposed on school districts, charter schools, institute charter schools, the boards of cooperative services or the Colorado School for the Deaf and Blind. As required by statute, the guidelines address:

- Health and Safety issues, including security needs and all applicable health, safety and environmental codes and standards as required by state and federal law;
- Technology, including but not limited to telecommunications and internet connectivity technology and technology for individual student learning and classroom instruction;
- Building site requirements;
- Building performance standards and guidelines for green building and energy efficiency;
- Functionality of existing and planned public school facilities for core educational programs, particularly those educational programs for which the State Board has adopted state model content standards;
- Capacity of existing and planned public school facilities, taking into consideration potential expansion of services and programs;
- Public school facility accessibility; and
- The historic significance of existing public school facilities and their potential to meet current programming needs by rehabilitating such facilities.

## **Mission Statement**

***The “Colorado public school facility construction guidelines” shall be used to assess and prioritize public schools capital construction needs throughout the state, review applications for financial assistance, make recommendations to the State Board of Education regarding appropriate allocations of awards of financial assistance from the Public School Capital Construction Assistance Fund, and help ensure that awarded grant moneys will be used to accomplish viable top priority construction projects.***

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## **SECTION ONE**

***Promote safe and healthy facilities that protect all building occupants against life safety and health threats, are in conformance with all applicable Local, State and Federal, codes, laws and regulations and provide accessible facilities for the handicapped and disabled as follows:***

1. Sound building structural systems. Each building should be constructed and maintained with a sound structural foundation, floor, wall and roof systems. Local snow, wind exposure, seismic, along with pertaining importance factors shall be considered.
2. A weather tight roof that drains water positively off the roof and discharges the water off and away from the building. All roofs shall be installed by a qualified contractor approved by the roofing manufacturer to install the specified roof system and shall receive the specified warranty upon completion of the roof. The National Roofing Contractors Association (NRCA) divides roofing into two generic classifications: low-slope roofing and steep-slope roofing. Low-slope roofing includes water impermeable, or weatherproof types of roof membranes installed on slopes of less than or equal to 3:12 (fourteen degrees). Steep slope roofing includes water-shedding types of roof coverings installed on slopes exceeding 3:12 (fourteen degrees);
  - a. Low-slope roofing:
    - i. Built-up-Roofing (BUR);
    - ii. Ethylene Propylene Diene Monomer (EPDM);
    - iii. Poly Vinyl Chloride (PVC);
    - iv. Co-Polymer Alloy (CPA);
    - v. Thermal Polyolefin (TPO);
    - vi. Metal panel roof systems for low slope applications;
    - vii. Polymer-modified bitumen sheet membranes;
    - viii. Spray polyurethane foam based roofing systems (SPF) and applied coatings;
    - ix. Restorative coatings.
  - b. Steep slope roofing systems:
    - i. Asphalt Shingles;
    - ii. Clay tile and concrete tile;
    - iii. Metal roof systems for steep-slope applications;
    - iv. Slate;
    - v. Wood shakes and wood shingles;
    - vi. Synthetic shingles;
    - vii. Restorative coatings.
3. A continuous and unobstructed path of egress from any point in the school that provides an accessible route to an area of refuge, a horizontal exit or public way. Doors shall open in the direction of the path of egress and have panic hardware when required and be constructed with fire

rated corridors and area separation walls as determined by a Facility Code Analysis. The Facility Code Analysis shall address at a minimum building use and occupancy classification, building type of construction, building area separation zones, number of allowed floors, number of required exits, occupant load, required areas of refuge and required fire resistive construction.

4. A potable water source and supply system providing quality water as required by the Colorado Department of Public Health and Environment and complying with 5CCR 1003-1 "Colorado Primary Drinking Water Regulations". Water quality shall be maintained and treated to reduce water for calcium, alkalinity, Ph, nitrates, bacteria and temperature (reference, Colorado Primary Drinking Water Act and EPA Safe Water Drinking Act). The water supply system shall deliver water at a normal operating pressure of twenty pounds/square inch to all plumbing fixtures. Independent systems and wells shall be protected from unauthorized access.
5. A building fire alarm and duress notification system in all school facilities designed in accordance with State and Local fire department requirements. Exceptions include unoccupied very small single story buildings, sheds and temporary facilities where code required systems are not mandatory and the occupancy does not warrant a system.
6. Facilities with safely managed hazardous materials such as asbestos, found in VAT and mastic, acoustical and thermal insulation, window caulking, pipe wrap, roofing, ceiling tiles, plaster, lead paint and other building materials. Public schools shall comply with all AHERA criteria and develop, maintain and update an asbestos management plan kept on record at the school district.
7. Facilities equipped with closed circuit video and keycard or keypad building access.
8. A Event Alerting and Notification system (EAN) utilizing a intercom/phone system with communication devices located in all classrooms and throughout the school to provide efficient inter-school communications on a daily basis and with local fire, police and medical agencies during emergency situations.
9. Secured facilities with a main entrance and signage directing visitors to the main entrance door. The main entrance should flow past the main office area and be visibly monitored from the office either directly or via a video camera system. All other exterior entrances shall be locked and have controlled access. Interior classroom doors shall have locking hardware for lock downs and may have door sidelights or door vision glass that allow line of sight into the corridors during emergencies.

10. Safe and secure electrical service and distribution systems designed and installed to meet all applicable State and Federal codes. The Electrical system shall provide artificial lighting in compliance with The Illumination Engineering Society of North America (IESNA) for educational facilities RP-3-00. Emergency lighting shall be available when normal lighting systems fail and in locations necessary for orderly egress from the building in an emergency situation as required by electrical code.
11. A safe and efficient mechanical system that provides proper ventilation, and maintains the building temperature and relative humidity in accordance with the most current version of ASHRAE 55. The mechanical system shall be designed, maintained and installed utilizing current State and Federal building codes.
12. Healthy building indoor air quality (IAQ) through the use of the mechanical HVAC systems or operable windows and by reducing outside air and water infiltration with a tight building envelope.
13. Sanitary school facilities that comply with The State of Colorado Department of Public Health and Environment, Consumer protection Division, 6 CCR 1010-6 "Rules and Regulations Governing Schools".
14. Food preparation and associated facilities equipped and maintained to provide sanitary facilities for the preparation, distribution, and storage of food as required by Colorado Retail Food Establishment Rules and Regulations 6 CCR 1010-2.
15. Safe laboratories, shops and other areas storing paints or chemicals that complying with CDPHE 6CCR 101-6 " Rules Governing Schools";
  - a. In laboratories, shops and art rooms where toxic or hazardous chemicals, hazardous devices, or hazardous equipment are stored all hazardous materials shall be stored in approved containers and stored in ventilated, locked, fire resistive areas or cabinets. Where an open flame is used an easily accessible fire blanket and extinguisher must be provided. Fire extinguishers shall be inspected annually. Where there is exposure to skin contamination with poisonous, infectious, or irritating materials, an easily accessible eyewash fountain/shower along with an independent hand washing sink must be provided. The eyewash station must be clean and tested annually. Master gas valves and electric shut-off switches shall be provided for each laboratory, shop or other similar areas where power or gas equipment is used;
  - b. All facility maintenance supplies, e.g. cleaning supplies, paints, fertilizer, pesticides and other chemicals required to maintain the school shall be stored in approved containers and stored in ventilated, locked and fire resistive rooms or cabinets.



16. A separate room or emergency area, with a dedicated bathroom, used in providing care for persons who are ill, infested with parasites, or suspected of having communicable diseases. Every emergency care room or area shall be provided with at least one cot for each four hundred students, or part thereof, and be equipped with a locking cabinet for prescriptions and first aid supplies.
17. A facility that complies with the American Disabilities Act (ADA) providing accessibility to physically disabled persons.
18. A site that safely separates pedestrian and vehicular traffic and is laid out with the following criteria:
  - a. Physical routes for basic modes (buses, cars, pedestrians, and bicycles) of traffic should be separated as much as possible from each other. Schools located on busy streets and on high traffic intersections should be provided with traffic lights and crosswalk signals to assist school traffic in entering the regular traffic flow. Where traffic signals are not practical dedicated turn lanes should be provided at a minimum;
  - b. When possible provide a dedicated bus staging and unloading area located away from students, staff and visitor parking. Single-file right wheel to the curb is the preferred staging method for bus unloading areas. Curbs at bus and vehicle drop-off and pick-up locations shall be raised a minimum of six inches above the pavement level and be painted yellow. Provide “busses only” and “no entry signs” at the ends of the bus loop;
  - c. Provide an adequate driveway zone for stacking cars on site for parent drop-off/pick-up zones. Drop-off area design should not require backward movement by vehicles and be one-way in a counterclockwise direction where students are loaded and unloaded directly to the curb/sidewalk. Do not load or unload students where they have to cross a vehicle path before entering the building. It is recommended all loading areas have “no parking” signs posted;
  - d. Solid surfaced staff, student and visitor parking spaces should be identified past the student loading area and near the building entrance.
  - e. Provide safe crosswalks with crossing guards, well-maintained sidewalks and a designated safe path leading to the school entrance. Create wider paved student queuing areas at major crossings and paint sidewalk “stand-back lines” to show where to stand while waiting. Except at pick-up locations sidewalks shall be kept a minimum of five feet away from roadways. There should be

well-maintained sidewalks that are a minimum of eight feet wide leading to the school and circulating around the school;

- f. Building service loading areas and docks should be independent from other traffic and pedestrian crosswalks. If possible loading areas shall be located away from school pedestrian entries;
- g. Facilities should provide for bicycle access and storage;
- h. Fire lanes shall have red markings and “no parking” signs posted;
- i. Consider restricting vehicle access at school entrances with bollards or other means to restrict vehicles from driving through the entry into the school.

19. A safe and secure site with outdoor facilities for students, staff, parents and the community based on the following criteria;

- a. New school sites should be selected that are not adjacent or close to hazardous waste disposal sites, industrial manufacturing plants, gas wells, railroad tracks, major highways, liquor stores or other adult establishments, landfills, waste water treatment plants, chemical plants, electrical power stations and power easements, or other uses that would cause safety or health issues to the inhabitants of the school. Consider fencing around the perimeter of the school sites with gates to control access. Gates shall have the capability to be locked to restrict access if desired;
- b. When possible arrange site, landscaping, playgrounds, sports fields and parking to create clear lines of site from a single vantage point. Keep shrubbery trimmed so that it will not conceal people;
- c. Locate site utilities away from the main school entrance and student playgrounds and sports fields when ever possible. Electric service equipment, gas meters and private water wells shall have fenced in cages to restrict access to unauthorized persons. Propane (LPG) tanks shall be installed in accordance with building and fire codes;
- d. Access to building roofs shall be secured to restrict access;
- e. Light exterior buildings and walkways to protect and guide occupants during evening use of the school facility;
- f. Playgrounds shall be protected by adequate fencing from other exposures such as ball fields, where injuries could occur due to flying balls. Play equipment should be installed pursuant to the manufactures specifications and current industry safety and State of Colorado Insurance pool requirements. Provide play equipment

that complies with the Americans with Disabilities Act. All playground equipment shall be purchased from an International Playground Equipment Manufacturers Association (IPEMA) certified playground equipment manufacturer with adequate product liability insurance. Each piece of equipment purchased will have an IPEMA certification. Provide a firm, stable, slip-resistant, and resilient soft surface under and around the play equipment.

## **SECTION TWO**

***School facility programming and decision-making should be approached holistically involving all community stakeholders taking into consideration local ideals, input, needs and desires. Assist school districts, charter schools, institute charter schools, boards of cooperative services and the Colorado School for the Deaf and Blind to meet or exceed state model content standards by promoting “learning environments” conducive to performance excellence with technology that supports communities, families and students and provides the following:***

1. Elementary, Middle, High and PK-12 schools built with high quality, durable, easily maintainable building materials and finishes.
2. Educational facilities that accommodate the Colorado Achievement Plan for Kids (Cap4K), No Child Left Behind Act (NCLB) and the State Board of Education's model content standards.
3. Educational facilities, for individual student learning and classroom instruction, connected to the Colorado institutions of higher education distant learning networks “internet two” with technology embedded into school facilities to provide adequate voice, data, and video communications in accordance with the latest edition of the Building Industry Consulting Services International (BICSI) and the Telecommunications Distribution Methods Manual (TDMM).

School administrative offices should be provided with the technological hardware and software that provides control of web-based activity access throughout the facility; email for staff; a school wide telephone system with voicemail, a district hosted web site with secure parent online access linked to attendance and gradebook.

The administrative software should include: Individual Educational Programs (IEP), Individual Learning Programs (ILP), Personal Learning Plans (PLP), sports eligibility records, immunization and health service management records, discipline and behavior records, transcripts, food services information, library resource management information, and assessment analysis management records.

The facility should be protected to maintain business continuity with emergency power backup, redundant A/C for data centers and data backup systems.

4. School sites that meet the recommended school facility site size guide lines below and as further described in paragraphs 6-9 following. New school sites should take into consideration: Topography, vehicle access, soil characteristics, site utilities, site preparation, easements/rights of way,

environmental restrictions, and aesthetic considerations. Site size guidelines may vary based on local requirements, athletic programming or desired alternate planning models. Site requirements may differ for urban public schools with limited space.

<b>SCHOOL FACILITY SITE SIZE GUIDELINES</b>	
Elementary Schools	Four (4) usable acres with an additional acre for each 150 students.
Middle Schools	Ten (10) usable acres with an additional acre for each 150 students.
High Schools	Twenty (20) usable acres with an additional acre for each 150 students.
PK-12 Schools	Ten (10) usable acres with an additional acre for each 150 students.

5. Elementary, middle, high, and PK-12 buildings that functionally meet the recommended educational programming set forth below are not over capacity and are located in permanent buildings. Each facility should have the potential, or be planned for, expansion of services for the benefit of the students for programs such as full-day kindergarten and preschool, and school based health services.

The Public School Capital Construction Assistance Board recognizes that due to local educational programming individual public school facilities, may not include all items following in this section.

6. Elementary schools (grades PK-5) shall provide exciting learning environments for children along with associated teaching and administrative support areas. When possible daylight with views shall be incorporated in all learning areas to supplement well designed task oriented artificial lighting. Acoustical materials to reduce ambient noise levels and minimize transfer of noise between classrooms, corridors and other learning areas will create a learning environment that focuses the student's attention. The following uses should be incorporated in elementary educational facilities:
  - a. Depending on community needs and desires public schools should consider sites that include playfields, age appropriate equipment, gardens, trees, non-traditional play features, shade structures and a gateway to the community. The objectives of the play areas include: reducing discipline issues on school grounds, providing better physical education and resources for outdoor classroom projects, establishing a gathering place for neighborhood families and strengthening community-school partnerships;
  - b. Preschool and Kindergarten classrooms with dedicated bathrooms. Kindergarten classroom sizes shall range from 1000-1200 square feet;

- c. Special Education classroom;
- d. Special program rooms;
- e. Classrooms should accommodate a maximum of up to twenty five students and provide thirty five square feet/student with a minimum classroom size of six hundred square feet. Ceiling heights in classrooms should not be lower than nine feet. The ideal classroom is rectangular in shape with the long axis 1.33 times longer than the short axis. Classrooms should have a source of natural light with a view, have conditioned well ventilated air, and provide all the necessary equipment, technology infrastructure, and storage to support the intended educational program;
- f. Band/Vocal Music room with high ceilings, and acoustical wall coverings;
- g. Art Room with ample storage cabinets and counter sinks. Finish materials in art classrooms shall be smooth, cleanable and nonabsorbent;
- h. Beginning computer lab with computer work stations or computer carts utilizing wireless connections whenever possible;
- i. Library/Multimedia Centers (LMC) should be the heart of the school providing a flexible space for students, staff, and parents to read, write and draw. If possible the space should be designed with high ceilings, exposed building structure and materials and have abundant natural light, along with well designed artificial task lighting. Window shades should be incorporated to accommodate the use of audio visual equipment requiring darker environments;
- j. Commercial Kitchen, with cooking and refrigeration equipment, dry storage, and warewashing area unless food is prepared and delivered from another location;
- k. Cafeteria/Multipurpose room to support the school and community. Ceiling heights shall be higher in these areas and daylight shall be incorporated. A tiered stage for school productions shall be included. The tiered stage shall be provided with basic theatrical lighting and sound systems;
- l. Small Gym with basket ball court, volley ball sleeves and standards, safety wall wainscoting and fiberglass adjustable basketball backstops;
- m. Administrative offices, nursing, bathrooms, conference, reception and building support areas to accommodate the educational program.

7. Middle schools (grades 6-8). When possible daylight with views shall be incorporated in all learning areas to supplement well designed task oriented artificial lighting. The facilities should be designed to provide a vibrant, cheerful, learning environment for students and scaled for teenage occupancy. Acoustical materials to reduce ambient noise levels and minimize transfer of noise between classrooms, corridors and other learning areas will create a learning environment that focuses the student's attention. The following uses should be incorporated in middle school educational facilities:
  - a. Based on local needs and desires sports fields should be considered that include age appropriate equipment, gardens, shade structures and a gateway to the community. The objectives of the sports areas include: reducing discipline issues on school grounds, providing better physical education and resources for outdoor classroom projects and providing a gathering place for neighborhood families to watch sporting events. Based on local desired athletic programming sports fields should be provided to accommodate track, football, soccer, baseball and softball sporting events along with basketball courts for school and community use;
  - b. Special education classroom
  - c. Special program rooms;
  - d. Classrooms should accommodate a maximum of up to twenty five students and provide thirty two square feet/student with a minimum classroom size of six hundred square feet. Ceiling heights in classrooms should not be lower than nine feet. The ideal classroom is rectangular in shape with the long axis 1.33 times longer than the short axis. Classrooms should have a source of natural light with a view, have conditioned well ventilated air, and provide all the necessary equipment, technology infrastructure, and storage to support the intended educational program;
  - e. Library/Multimedia Centers (LMC) should be the heart of the school providing a flexible space for students, staff, parents and the community to read, write, meet, study, and research topics. The space should be designed with high ceilings, exposed structure and materials and have abundant natural light, along with well designed artificial task lighting. Window shades should be incorporated to accommodate the use of audio visual equipment requiring darker environments;
  - f. Computer labs with technology embedded in classroom to support interactive whiteboards utilizing wireless internet access whenever possible;

- g. Distance learning labs should be centrally located in the interior of the school with no windows and isolated from sources of loud noise. To reduce acoustic effects, square rooms should be avoided, if possible. A cork shaped or rectangular room is a better shape, as it does not encourage standing waves (and thus echoes). Acoustic wall panels, heavy wall curtains and carpet flooring should be used in lieu of hard walls and floors to help acoustics. Labs should provide easy wireless access to computers and the internet. There should be at least two 20-amp electrical circuits on dedicated breakers for the interactive distance learning video equipment;
- h. Science labs with teaching demonstration table, emergency shower/eyewash, wet student work stations, equipped with adequate instrumentation;
- i. Family Consumer Science Lab;
- j. Band classrooms with conducting podium, instrument storage room and acoustic practice room. Band classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- k. Vocal classroom with conducting podium and acoustic wall panels. Vocal classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- l. Art classroom with ample storage cabinets and counter sinks. Finish materials in art classrooms shall be smooth, cleanable and nonabsorbent;
- m. Beginning shop and vocational and agricultural Career and Technical Education (CTA) classrooms;
- n. Performing arts support area to accommodate set design and building, dressing rooms with lockers, sinks and mirrors and prop storage area;
- o. Commercial Kitchen, with cooking and refrigeration equipment, dry storage, and warewashing area, unless food is prepared and delivered from another location;
- p. Cafeteria/Multipurpose room to support the school and community. The cafeteria ceiling heights should be higher than other areas in the school and incorporate day lighting when possible. A raised stage for school productions should be provided with curtains and theatrical lighting and sound systems;
- q. Gymnasium with a regulation basketball court and dividing curtain to create two smaller basketball courts. The following equipment



- should accompany the gym: Glass adjustable basketball backstops, volleyball sleeves and standards, safety wainscoting, chin-up bar, wrestling mat hoist, and scorer table;
- r. Weight training area with free weights, wall mirrors, exercise machines, rubber flooring and protective wainscoting;
  - s. Men and Women's locker rooms with independent bathrooms, showers and locking metal lockers;
  - t. Administrative offices, nursing, bathrooms, conference, reception and building support areas to accommodate the educational program.
8. High schools (grades 9-12) shall provide an environment that prepares students for higher education admittance or the workplace. When possible daylight and views shall be incorporated in all learning areas to supplement well designed task oriented artificial lighting. The facilities should be designed to provide vibrant, cheerful, learning environments for students and be scaled for adult occupancy. Acoustical materials to reduce ambient noise levels and minimize transfer of noise between classrooms, corridors and other learning areas will create a learning environment that focuses the student's attention. The following uses should be incorporated in high school educational facilities:
- a. Based on local desired athletic programming sports fields with associated equipment, gardens, trees, amphitheater, shade structures and a gateway to the community should be considered. The objectives of the sport areas include: reducing discipline issues on school grounds, providing better physical education and resources for outdoor classroom projects, establishing a gathering place for neighborhood families to watch sporting events and strengthening community-school partnerships. Based on local programming sports fields should consider accommodating track, football, soccer, baseball and softball sporting events along with tennis and basketball courts for school and community use;
  - b. Classrooms should accommodate a maximum of up to twenty five students and provide thirty two square feet/student with a minimum classroom size of six hundred square feet. Ceiling heights in classrooms should not be lower than nine feet. The ideal classroom is rectangular in shape with the long axis 1.33 times longer than the short axis. Classrooms should have a source of natural light with a view, have conditioned well ventilated air, and provide all the necessary equipment, technology infrastructure, and storage to support the intended educational program;
  - c. Special program rooms;

- d. Library/Multimedia Centers (LMC) should be the heart of the school providing a flexible space for students, staff, parents and the community to read, write, meet, study, and research topics. The space should be designed with high ceilings, exposed structure and building materials and have abundant natural light, along with well designed artificial task lighting. Window shades should be incorporated to accommodate the use of audio visual equipment requiring darker environments;
- e. Distance learning labs should be centrally located in the interior of the school with no windows and isolated from sources of loud noise. To reduce acoustic effects, square rooms should be avoided, if possible. A cork shaped or rectangular room is a better shape, as it does not encourage standing waves (and thus echoes). Acoustic wall panels, heavy wall curtains and carpet flooring should be used in lieu of hard walls and floors to help acoustics. Labs should provide easy wireless access to computers and the internet. A There should be at least two 20-amp electrical circuits on dedicated breakers for the interactive distance learning video equipment;
- f. Computer labs with technology embedded in classroom to support interactive whiteboards, utilizing wireless internet access when ever possible;
- g. Science labs with a teaching demonstration table, emergency shower/eyewash, demonstration hood student work stations with water and gas receptacles equipped with adequate instrumentation;
- h. Family consumer science lab;
- i. Band classrooms with conducting podium, instrument storage room and acoustic practice rooms. Band classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- j. Vocal classroom with conducting podium and acoustic wall panels. Vocal classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- k. Art classroom with ample storage cabinets and counter sinks. At the high school level a Kiln/ceramic storage area shall be provided. Finish materials in art classrooms shall be smooth, cleanable and nonabsorbent;
- l. Performing arts support area to accommodate set design and construction, dressing rooms with lockers, sinks and mirrors and prop storage area;

- m. Career and Technical Education (CTE) classrooms that support desired educational programs. The ideal CTA classroom should have forty five square feet/student with a minimum of seven hundred and eighty square feet of exclusive laboratory and storage space. The shop area shall have a minimum of one hundred and fifty square feet/student with a tool and supply storage room that is at least twenty feet long with a minimum width of eight feet wide for the storage of long building materials. Each Shop shall be equipped with welding booths, auto lift station, auto emissions evacuation system and required trade tools. A minimum 2400 SF outdoor patio area should be provided for storing or working on farm machinery, flammable materials, and large construction projects. If desired a minimum 1880 SF greenhouse should be provided with heat and ventilation. CTA shops should have independent bathrooms with a group hand washing sink and lockers;
- n. Commercial kitchen with cooking and refrigeration equipment, dry storage and warewashing area, unless food is delivered from another location;
- o. Cafeteria/Multipurpose room to support the school and community. Ceiling heights in cafeterias should be higher than other areas in the school and incorporate daylight to provide a captivating dining environment to keep students on site during lunch hours;
- p. Auditoriums with a raised stage, thrust proscenium stage, curtains, orchestra pit, sloped floor with fixed seating, sound and project booth, acoustic wall and ceiling panels and professional lighting and sound systems. The auditorium shall be designed to accommodate the entire student body, school staff and as required for community wide productions;
- q. Gymnasium with two regulation basketball courts and dividing curtain. The following equipment should accompany the gym: Glass adjustable basketball backstops, volleyball sleeves and standards, safety wainscoting, chin-up bar, wrestling mat hoist, telescoping bleachers and scorer table;
- r. Auxiliary gym (larger high schools) with a regulation basketball court and dividing curtain to create two smaller basketball courts. The following equipment should accompany the gym: Glass adjustable basketball backstops, volleyball sleeves and standards, safety wainscoting, and chin-up bar;
- s. Weight training area with free weights, mirror walls, exercise machines, rubber flooring and protective wainscoting;

- t. Men and Women's locker rooms with independent bathrooms, showers and locking metal lockers;
  - u. Visiting team locker room with independent bathrooms, showers and locking metal lockers;
  - v. Administrative offices, nursing, bathrooms, conference, reception and building support areas to accommodate the educational program.
9. PK-12 Rural Schools shall provide exciting learning environments for students along with associated teaching and administrative support areas. The facilities should be designed to incorporate shared community uses, such as boys and girls clubs, and separate children, grades Preschool to six, from older students, grades seven to twelve. When possible daylight with views shall be incorporated in all learning areas to supplement well designed task oriented artificial lighting. Acoustical materials to reduce ambient noise levels and minimize transfer of noise between classrooms, corridors and other learning areas will create a learning environment that focuses the student's attention. The following uses should be incorporated in PK-twelve educational facilities:
- a. Based on desired local programming, school sites should consider including sports fields, playfields, age appropriate equipment, gardens, trees, non-traditional play features, shade structures and a gateway to the community. The objectives of the play areas include: reducing discipline issues on school grounds, providing better physical education and resources for outdoor classroom projects, establishing a gathering place for neighborhood families to watch sporting activities and strengthening community-school partnerships. Based on local athletic program sports fields should be considered to accommodate track, football, soccer, baseball and softball sporting events along with tennis and basketball courts for school and community use;
  - b. Classrooms should accommodate a maximum of up to twenty five students and provide thirty two-thirty five square feet/student with a minimum classroom size of six hundred square feet. Ceiling heights in classrooms should not be lower than nine feet. The ideal classroom is rectangular in shape with the long axis 1.33 times longer than the short axis. Classrooms should have a source of natural light with a view, have conditioned well ventilated air, and provide all the necessary equipment, technology infrastructure, and storage to support the intended educational program;
  - c. Computer labs with technology embedded in classroom to support interactive whiteboards, utilizing wireless internet access when ever possible. Computer labs should be located centrally in the school;

- d. Special program rooms;
- e. Distance learning labs should be centrally located in the interior of the school with no windows and isolated from sources of loud noise. To reduce acoustic effects, square rooms should be avoided, if possible. A cork shaped or rectangular room is a better shape, as it does not encourage standing waves (and thus echoes). Acoustic wall panels, heavy wall curtains and carpet flooring should be used in lieu of hard walls and floors to help acoustics. Labs should provide easy wireless access to computers and the internet. There should be at least two 20-amp electrical circuits on dedicated breakers for the interactive distance learning video equipment;
- f. Science labs should be located centrally in the school and provided with teaching demonstration table, emergency shower/eyewash, demonstration hood and student work stations with water and gas receptacles. The lab should be equipped with adequate instrumentation;
- g. Family consumer science lab;
- h. Band classrooms with conducting podium, instrument storage room and acoustic practice room. Band classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- i. Vocal classroom with conducting podium and acoustic wall panels. Vocal classrooms shall be physically separated from other classrooms to prevent sound transmission between areas;
- J. Art classroom with ample storage cabinets and counter sinks. A Kiln/ceramic storage area shall be provided. Finish materials in art classrooms shall be smooth, cleanable and nonabsorbent;
- k. Performing arts support area to accommodate set design and construction, dressing rooms with lockers, sinks and mirrors and a prop storage area;
- l. Career and Technical Education (CTA) classrooms that support desired educational programs. The ideal CTA classroom should have forty five square feet/student with a minimum of seven hundred and eighty square feet of exclusive laboratory and storage space. The shop area shall have a minimum of one hundred and fifty square feet/student with a tool and supply storage room that is at least twenty feet long with a minimum width of eight feet wide for the storage of long building materials. Each Shop shall be equipped with welding booths, auto lift station, auto emissions evacuation system and required trade tools. A minimum 2400 SF outdoor patio area should be provided for storing or working on farm machinery,

flammable materials, and large construction projects. If desired a minimum 1880 SF greenhouse should be provided with heat and ventilation. CTA shops should have independent bathrooms with a group hand washing sink and lockers;

- m. Library/Multimedia Centers (LMC) should be the heart of the school providing a flexible space for students, staff, and parents to read, write and draw. The space should be designed with high ceilings, exposed structure and building materials and have abundant natural light along with well designed artificial task lighting Window shades should be incorporated to accommodate the use of audio visual equipment requiring darker environments;
- n. Commercial Kitchen with cooking and refrigeration equipment, dry storage and warewashing area;
- o. Cafeteria/multipurpose/stage room to support the school and community. Ceiling heights in cafeterias should be a minimum of fifteen feet above the finished floor and incorporate day light. A raised stage for school and community productions should be incorporated. The stage shall be provided with curtains, theatrical lighting and sound systems. The multipurpose room shall be designed to accommodate the entire student body, school staff and as required for community wide productions;
- p. Gymnasium with two regulation basketball courts and dividing curtain. The following equipment should accompany the gym: Glass adjustable basketball backstops, volleyball sleeves and standards, safety wainscoting, chin-up bar, wrestling mat hoist, telescoping bleachers and scorer table;
- q. Weight training area with free weights, mirror walls, exercise machines, rubber flooring and protective wainscoting;
- r. Men and Women's locker rooms with independent bathrooms, showers and locking metal lockers;
- s. Visiting team locker room with independent bathrooms, showers and locking metal lockers;
- t. Administrative, offices, nursing, bathrooms, conference, reception area and building support areas to accommodate the educational program.

### **SECTION 3**

***Promote school design and facility management that implements the current version of “Leadership in Energy and Environmental Design” (LEED for schools) or “Colorado Collaborative for High Performance Schools” (CO-CHPS), green building and energy efficiency performance standards, or other programs that comply with the Office of the State Architects “High Performance Certification Program” (HPCP), reduces operations and maintenance efforts, relieves operational cost, and extends the service life of the districts capital assets by providing the following:***

1. Facilities that conserve energy through High Performance Design (HPD). A high performance building is energy and water efficient, has low life cycle costs, is healthy for its occupants, and has a relatively low impact on the environment. In new construction it is vital that the owner set actual energy performance goals for the entire building in terms of KBTU/SF/YR total building load.
  - a. Establishing an integrated design team including school and community stakeholders, architects, engineers and facility managers. Include an experienced LEED or CO-CHPS accredited professional as a member of the integrated design team to assist with the evaluation of existing facilities and with design of new schools;
  - b. Site locations that encourage transportation alternatives such as walking, bicycling, mass transit, and other options to minimize automobile use.
  - c. Facilities that reduce demand on municipal infrastructure by encouraging denser development, reducing water consumption and with responsible storm water management and treatment design;
  - d. Reduced building footprints;
  - e. Minimizing parking to reduce heat island effect and discourage use of individual automobiles:
    - Provide preferred parking totaling 5% of total parking spaces for carpools, vanpools, or low emission vehicles;
    - High schools – 2.5 spaces per classroom plus parking for 20% of students;
    - Elementary schools and middle schools – 3 spaces per classroom;
    - Provide parking in open grassy areas to accommodate overflow parking when required for large sporting events.

- f. Facilities that utilize existing sites, buildings and municipal infrastructure;
- g. Joint-use facilities;
- h. Evaluating energy cost holistically by determining the cost of high performance strategies verses long term cost savings;
- i. Utilizing passive solar techniques such as;
  - Positive building solar orientation and building massing;
  - Sun-shading;
  - Natural Ventilation;
  - Green roofs.
- j. Utilize energy efficient and or renewable energy strategies;
- k. Metering of all utilities with the ability to submeter selected systems to manage utility usage.
- l. Evaluate necessary building materials and systems and consider holistic design solutions that serve multiple purposes;
- m. Evaluation of utility bills to determine efficiency of facilities;
- n. Investigating performance contracting potentials;
- o. Replacement of old inefficient lighting with new energy efficient fixtures and lamps. Incorporate daylighting, and utilize professionally designed task oriented lighting concepts. Use occupancy sensors and natural light sensors to keep lights off when not needed, including emergency lighting when the building is unoccupied;
- p. Design site lighting and select lighting styles and technologies to have minimal impact off-site and minimal contribution to sky glow. Minimize lighting of architectural and landscaping features and design interior lighting to minimize trespass light to the outside from the interior.
- q. Replacement of old inefficient mechanical systems with new energy efficient systems. Provide controls that monitor the efficiency of the mechanical system and control temperature range of facilities during low/non-use periods and after operating hours.
- r. Commission mechanical systems at completion of construction and retro-commission every 5 years. Pursue third party certification through CO-CHPS or LEED for schools;



- s. Replacement of single pane inefficient windows with new double/triple pane hard coat low E glazing window units. Install windows to eliminate outdoor air and water infiltration;
  - t. Landscape school sites optimizing drought tolerant trees and plantings that reduce heat island effects. Place deciduous trees on the south side of buildings to shade the buildings in the summer and allow sun to penetrate the buildings in the winter. Place coniferous trees on the north side of buildings to block and redirect north winds away from the building. Utilize landscaping or a green roof to filter and manage onsite storm water treatment. Replace turf with native grasses where ever practical. Well designed landscaping in conjunction with paved surfaces and school buildings will benefit the reducing of “heat island” effects;
  - u. Employ cool or green roofs to reduce heat island effects. The buildings cooling load should be considered when selecting roofing materials;
  - v. Identifying building wastes such as cooling condensate water, heat exhaust, and find a way to reuse it. Utilize heat recovery units when ever possible;
  - w. Providing a tight and well insulated building envelope with a minimum wall thermal value of R-19 and roof thermal value of R-30. Repair exterior building cracks, caulk building joints, and tuck-point masonry walls annually to maintain exterior shell in good condition;
  - x. Providing vestibules at main building entrances to minimize loss of conditioned air;
  - y. Utilizing, when possible, sustainable (green) building materials that are durable, easily maintained, resource efficient, energy efficient and emit low levels of harmful gases. When ever possible utilize EPA Energy Star labeled systems and equipment. Colorado based and local and regional material manufactures should be used when ever possible to reduce the impact of transportation costs and support regional and state economies.
  - z. Increase the schools community knowledge about the basics of high performance design using an educational display to serve as a three-dimensional textbook.
- 2.** Analysis of existing school facilities or desired new school facility size against the required school facility size taking into account maintenance and operational costs of the existing or desired new larger facility compared against the costs savings associated with a reduced facility size. Achieve reduced school facility size by minimizing single use spaces, building circulation, and consolidating remote facilities, coupled

with maximization of consolidated shared flexible facilities that are well scheduled, and utilize extended hours of operation.

3. A district wide energy management plan.
4. Adoption of a goal of “zero wastes” from construction of new buildings and operation and renovation of existing facilities through re-use, reduction, recycling, and composting of waste streams.
5. Training to establish district wide preventative maintenance tasks for all building systems to determine systems are functioning as designed and clearly outline follow-up maintenance procedures to keep equipment and materials functioning as intended, extend life of equipment and reduce operational costs.

## **SECTION 4**

***Evaluate school facilities based on rehabilitation costs verses replacement costs or discontinuation with consideration given to historically significant facilities by determining:***

1. The school districts desired facilities life span e.g. fifty, one hundred, two hundred years, construction costs for the desired life span based on the districts location and available labor force, and the districts five year population growth trends;
2. The facilities relative importance in history based on: notable Colorado architects, historical building materials, styles and forms, and thus determine associated costs to preserve, rehabilitate, restore, or reconstruct the facility to its original condition;
3. Building code, health, and safety deficiencies at school facilities as compared to SECTION ONE and associated costs to bring deficiencies up to current code;
4. Educational programming and green building deficiencies at school facilities as compared to SECTIONS TWO and THREE and associated costs to cure deficiencies;
5. Divide costs identified in items 2, 3 and 4 above “rehabilitation costs” by item 1 above “replacement cost” taking into consideration population growth trends and historical significance. When rehabilitation costs are more than 70% of replacement costs, with a shorter facility life span and no historical significance, replacement of the facility should be considered. If population trends do not support school facilities then discontinuation and consolidation of facilities with neighboring districts should be considered;
6. Based on the above evaluation determine the viability of facilities for rehabilitation, replacement or discontinuation. Apply evaluation to guide review of financial assistance grants for recommendation of award to the State Board of Education.

**(Rehabilitation costs ÷ Replacement costs = % of cost to rehabilitate)**