

PIKES PEAK COMMUNITY COLLEGE



PROGRAM PLAN

for

**SCIENCE LABORATORIES
RENOVATIONS**

CENTENNIAL CAMPUS

MAY, 2009

SCIENCE LABORATORIES RENOVATION PROGRAM PLAN

TABLE OF CONTENTS

Overview	Page #
Executive Summary.....	5
Academic Program.....	6
Master Plan Relationship.....	6
Justification	
Existing Conditions.....	9
Space Functionality.....	9
Current Enrollment.....	9
Current Space Utilization.....	9
Life/Safety Issues.....	10
Facility Condition Index.....	11
Projections and Changes.....	11
Projections - Enrollment	11
Changes - Space Requirements.....	12
Alternative Analysis.....	14
Implementation and Design	
Spatial Relationships.....	16
Site Improvements and Requirements.....	17
Design Requirements.....	17
Aesthetic Plans.....	19
Green Building Goals.....	20
Design Requirements Summary.....	20
Project Schedule.....	21
Cost Estimate.....	21

SCIENCE LABORATORIES RENOVATION PROGRAM PLAN

TABLE OF CONTENTS

	Page #
Proposed Budget.....	22
Financing Explanation.....	23

Appendices

- A. Course Lab Usage
- B. Proposed Equipment & Furnishings List
- C. Room Utilization
- D. Third Party Review
- E. Map of Aspen Building & Science Area

SCIENCE LABORATORIES RENOVATIONS

Program Plan

CENTENNIAL CAMPUS

OVERVIEW

EXECUTIVE SUMMARY

The renovation of the science laboratories and preparation area at Pikes Peak Community College's Centennial Campus is currently rated as high priority on the college's master plan as well as its annual five year capital development request document. The laboratories are a part of the original construction of the campus which opened in 1968 and has not been upgraded in 31 years. As enrollments in the science curriculum continue to increase, the existing space needs to be renovated to meet the teaching and technology demands. This project is envisioned as a 12,870 gross square foot renovation project consisting of 6 laboratories and the supporting preparation and storage areas into a unique center for learning and discovery.

There was a time when science laboratories were planned and built as stand alone facilities, with science encompassing a range of activities from general science to specialized physics and chemistry. Now there are new ways of thinking in which science is seen to link into the school's total curriculum, and sometimes to go beyond the school into the workplace. Science is now seen to link to technology, to the creative arts, to health and personal development and to workplace training. Synergies between components of the curriculum and also between places for learning are changing the ways in which facilities are renovated. This renovation project is planned with an emphasis on student centered learning through discovery and experimentation, team work and co-operative learning as well as greater emphasis on environmental issues and on occupational health, safety and welfare.

When planning the science laboratory renovations, the school has addressed long-term educational and structural implications. We have looked carefully to the education, environment and physical sustainability of the design.

The planning team has developed a plan that takes into account current ways of managing the college's science curriculum that will meet the needs of the curriculum and match ways in which students learn (team work, collaborative learning, and self-directed experimentation). It ensures that it reflects current and future thinking rather than replicating past practices. The plan addresses life-safety issues in the preparation and storage areas which are obsolete and overcrowded. During this phase it was recognized that pedestrian traffic is a condition that must be corrected. Currently people must move around the science area by exiting and re-entering the building. It is being proposed to remove two general academic classrooms from inventory to accommodate the traffic flow and add additional space to the preparation and storage areas for the laboratories. This will address ADA pedestrian issues as well as overcrowding of the preparation area.

The proposed environment takes into account the ways in which students will work and the range of equipment they will need. It facilitates student centered learning, group work and the use of a wide and diverse range of technology to support learning.

Currently there are 6 science laboratories, lab preparation area, storage, and office space in the science wing. The courses that have laboratory attendance attached require the student to attend 30, 45, or 60 hours per semester of lab time depending on the course. The renovation proposal is to retrofit the six laboratories, increase the lab prep and storage area and create a continuous traffic flow in the science area. Being a science laboratory environment, the costs have been allocated high per square foot, calculated on 12,870 GSF. Due to the obsolete equipment and furnishings that will have to be replaced, these also have been allocated at a slightly higher percentage than the norm. It is anticipated that

relocation of some of the instruction due to disruption of the program delivery during construction will need to take place; therefore relocation costs have been included. Thus, the funding plan calls for \$4,256,846 of General Fund support.

Following the third party review by Stephen Hall, Architect, the program plan was edited to accept his identified areas that needed adjustment or further clarification. Therefore, all comments identified in his review located in the appendix have been included in the program plan as well as the cost estimates.

In summary, this renovation will fulfill the critical need for state-of-the-art science laboratories for the science curriculum and related programs that will: 1)enable students to be optimally trained to meet future demands; 2)resolve life-safety issues in the preparation area; and 3)provide instrumentation required for state-of-the- art science experimentation and demonstration areas.

ACADEMIC PROGRAM

Student success is at the center of all College endeavors. The College remains dedicated to the highest quality of education that develops our students for success in life and work. Learner needs, rather than institutional preferences, determine our priorities for academic planning, policies, and programs. Quality instruction is required and recognized.

Pikes Peak Community College believes that connected knowing, independent learning and collaborative learning are basic to being well educated. We structure the learning experiences throughout the curriculum to provide students with the ability to think in whole systems and to understand knowledge across disciplines. Overall, the College's main focus is to practice the art of collective learning and collaboration in governance, operations and planning.

The above stated values are a part of the science curriculum as related to this program plan and the planning committee will bring these values to the table when designing the renovation of the science laboratories at the Centennial Campus. As a majority of academic programs require students to take a science course, this renovation will affect a large percentage of the college's programs. Examples of the affected programs/courses that students take that require them to use the laboratories are 4-year transfer, anatomy, astronomy, biology, chemistry, ecology, geology, meteorology, science, zoology, etc. A list of the courses that are scheduled in the laboratories during an academic year are listed in the appendices.

MASTER PLAN RELATIONSHIP

The Master Plan for Pikes Peak College, Centennial Campus, 2002 and the update of 2007 have recommended the science laboratories renovations as one of the capital development projects. This recommendation is the result of studies and analysis done by student, staff and faculty during the preparation of the Master plan indicating a need to remodel and update the science laboratories wing at Centennial Campus.

The space needs analysis outcome and enrollment projections in the Master Plan update states Centennial Campus will experience of 6058 ASF deficit in the teaching laboratory category and a surplus

of 12,515 ASF in the classroom area through the academic year 2012. The recommendation to renovate the science laboratories and address the pedestrian circulation by removing 2 general academic classrooms from inventory at this campus is supported with the study's analysis.

SCIENCE LABORATORIES RENOVATIONS

Program Plan

CENTENNIAL CAMPUS

JUSTIFICATION

EXISTING CONDITIONS

Pikes Peak Community College continues to contribute to the economic develop of the Pikes Peak region in many ways. It provides high quality, educational opportunities accessible to all, with a focus on student success and community needs, including:

- Occupational programs for youth and adults in career and technical fields;
- Two-year transfer educational programs to qualify students for admission to the level of junior year at other colleges and universities; and
- A broad range of personal, career, and technical education for adults.

In order to fulfill this mission the College offers:

- Lower division college courses for transfer to four-year schools;
- Career and technical training for employment;
- Courses to upgrade work skills;
- Developmental classes to build basic skills;
- Counseling to explore educational, career and personal goals;
- Extracurricular and cultural activities in addition to leadership development programs; and
- Resources to support community growth and development.

As these values for student success continue to be important to the college to fulfill its mission, a study of fall semester 2008 was conducted to determine how the teaching science laboratories at Centennial Campus are being utilized. From this study it was determined that the labs are utilized 70% of the time.

Space Functionality

In assessing the proper location for the science laboratories, preparation and storage area at Centennial Campus the functionality needs were addressed. For safety and cost effectiveness, laboratories must be located adjacent to the preparation and chemical storage area. With enrollment projections for the target year of 2012, at least 6 labs are needed with an organized preparation and adequate storage area. The current science wing configuration meets the needs to accommodate needed functionalities, with the preparation and storage areas connected to the science laboratories. With function needs in place with current configuration, it was determined that the best solution for upgrading the science labs is to not relocate them. When designing, the identified needs in the retrofit, such as a larger preparation area, will be addressed.

Current Enrollment

For the fall semester 2008 the Centennial Campus had a headcount of 5334 students and FTE of 3067. The six science laboratories provided service to 1120 students for a total of 2620 weekly student contact hours for this semester.

Current Space Utilization

The number of students in a lab has a direct bearing on the safety of the lab as well as on the quality of educational experience. The National Science Education Standards recommend a limit of 24 students per lab and no more than 28. A number of recent studies of laboratory safety support this limit.

Reviewing the science lab area regarding the number of students per lab at the Centennial Campus, the college meets the recommend guidelines with 24 student stations per lab.

The renovation of the current space consists of 6 science laboratories, preparation and storage areas and 2 general academic classrooms recommended to be taken out of inventory for expansion of science area. The following are the identified room numbers and associated assignable square footage at the Centennial Campus, Aspen Building that will be affected by this renovation. Appendix E includes the campus map of this area

Room A159 Chemistry Lab – 1134 ASF

Room A 164 Biology Lab – 937 ASF

Room A160 Geology Lab – 941 ASF

Room A165 Physics Lab – 820 ASF

Room A162 Biology Lab – 974 ASF

Room A166 Chemistry Lab – 1012 ASF

Room A163 Preparation & Storage Area - 1264 ASF

Instructional Classrooms to be taken out of inventory: A157 - 633 ASF and A161 – 637 ASF

The space analysis was completed to identify space needs in the science wing resulting in a surplus of 972 ASF in the laboratories using an 80% occupancy rate and 45 hours weekly student contact hours. This is based on the current 5818 ASF being used for the science labs.

The National Science Education Standards recommends a space utilization of 3 ASF per student for the preparation and storage areas for science laboratories. Currently the preparation and storage area is housed in 1264 ASF, using occupancy of 80% and a daily student contact of 9 hours results in a need of 3051 ASF, which means that there will be a deficit of 1841 ASF in the preparation and storage area for the target year 2012.

See Appendix C for details of room utilization and Appendix E for map of the Aspen Building, first floor, and the area that will be affected by renovation.

Life/Safety Issues

Adequate ventilation is a prerequisite to a safe environment. The science lab curriculum introduces many contaminant sources that are unique within the school. These contaminates may be chemicals, biological organisms and other substances. The ventilation system within the laboratories contributes to lab safety within the framework of the college's overall safety plan. For these reasons ventilation is a top priority when reviewing safety issues. The current ventilation and fume hoods have not been upgraded since the original opening of the Centennial Campus in 1968. Therefore, it is critical that renovation designs will include an upgrade to the mechanical systems and the fume hoods to protect the air flow for our staff and students.

The preparation area to support the 6 science labs is obsolete and overcrowded which is causing life/safety issues. It supports the preparation for the science experimentation that will be taught by the faculty, which includes chemicals and biological organisms. As enrollments have increased as well as the number of hours the labs are in use has required the preparation/storage area to add supplies and equipment over the years. These additions have made the area cramped and very difficult for staff to

prepare and move supplies to the instructional areas. Educational goals have been able to be obtained by the faculty and staff even with these deficiencies. Remodeling of the area will address life/safety issues of the science wing by enlarging and organizing this space.

Facility Condition Index

The Aspen Building’s, which serves as the core of the instructional area and houses the science laboratories, most current facility audit has a Facility Condition Index rating of 68%. The condition in the proposed renovation area is outdated with many facility problems, such as asbestos in the lab stations, outdated ventilation, poor lighting, windows that are not energy efficient. A rating of 68% states that the building is mid-range and remodeling is needed. The completion of the renovation project and upgrading of electrical, plumbing, ventilation, lighting, cabinetry, and providing energy efficiencies will contribute to improving the FCI for this building.

PROJECTIONS AND CHANGES

There must be a proper balance between efficient space use and utilization of the space. When determining projection needs for science laboratory space at Centennial Campus it is driven by two major components; people, and the amount of space people need for science curriculum functions. Projections are based upon the academic planning assumptions, goals and objectives that are established. The other major component is the guidelines used in projecting space needs. Guidelines used in our projections came from a combination of sources included, but not limited to, the Colorado Department of Higher Education, National Science Education Standards, MEANS Cost Data, consultant recommendations, and current college practices.

Projections - Enrollments

To determine space needs, existing science laboratory, preparation and storage areas were compared to enrollment projections to how more, or less, space will be needed to support a given enrollment level.

Table: FTE Projections

FALL SEMESTER	FALL SEMESTER FTE	% INCREASE
F2008	3067	
F2012	4132	22.3%

Based on the enrollment projections and knowing that much of the FTE growth will require science curriculum courses and laboratory usage, the needs analysis study results determined that there will be a surplus of 972 ASF for science laboratory space and a deficit of 1841 ASF for the preparation/storage area.

The chart below identifies the projected FTE growth in the science courses that require laboratory hours for the period fall 2007 to the target year of 2012, as stated in the master plan.

Course	2007	2012	Change
Astronomy (AST)	21.7	16.8	(4.9)
Biology (BIO)	163.5	170.4	6.9
Chemistry (CHE)	49.3	50.6	1.3
Geology (GEY)	26.0	29.6	3.6
Meteorology (MET)	2.1	11.1	9.0
Physics (PHY)	16.5	18.3	1.8
Science (SCI)	6.9	16.0	9.1
Zoology (ZOO)	38.3	39.9	1.6
TOTALS	324.3	352.7	28.4

Based on the college’s projections, these programs will have an FTE growth of 28.4% by the target year of 2012. With this projected growth the space analysis shows the programs can support the growth without additional space needs. But, to achieve these projected goals and attract faculty and students, modern space is essential.

Changes – Space Requirements

Laboratories: The renovation project will balance the assignable square footage for each of the six laboratories. Student stations of 24 per lab will be maintained with an average of 60 ASF per student station, which meets recommended guidelines. To accommodate the projected growth in the biology field, during design the chemistry laboratory (A159) will be equipped to handle the overflow in this course area resulting in the campus having three (3) biology laboratories vs two (2) presently.

Laboratory Preparation Area: This area directly supports the science labs by providing space and equipment for preparation of lab material. It is used for planning and setting up activities, as well as for cleaning up and storage. Management of the lab materials and chemicals take place in the prep room. The current lack of space and overcrowding presents life safety issues. These issues are the result of the preparation for student experimentation projects, i.e. chemicals, biological organisms, etc., in an overcrowded area. This area preps for six science labs which support 144 student stations hourly from 8:00 am to 10:00 pm Monday through Friday and Saturday, 9:00 am to 12:00 pm. National Science

Education Standards recommend 3 ASF of preparation space for each student served in the associated labs. Based on this standard and projecting 9 hours of 80% usage of labs indicates a deficit of 1841 ASF in the preparation area. The additional needed space is also required to provide separate preparation space for each of the laboratories to prevent cross contamination, such a special prep areas for Microbiology and Chemistry. This can be obtained in this renovation by taking 2 general academic classrooms from inventory and redesigning hallways and entrances to accommodate the expansion of the area. This will provide the laboratory preparation area with the needed additional assignable square footage. To provide the best service, this area will remain adjacent to all laboratories as well as to the science storage area.

Storage: Chemical storage poses its own set of requirements. The well-managed lab program minimizes the long-term storage of large amounts of chemicals by maintaining an inventory of only those chemicals needed for the program at hand. The current storage area is adequate and ventilated, but must be equipped with the proper shelving that will withstand an earthquake and installation of a fire suppression system. The college has received inspection comments from the Colorado Department of Health regarding the shelving deficiencies in this area.

Hazardous Material Control Areas may need to be included in design to meet current building code requirements.

The college will be expanding its number of cadavers from 1 to 2. This will require that during design an additional storage room is constructed for the storage of the cadaver with appropriate shelving and humidity control.

During the planning process it was proposed in the renovation to include storage for students' coats and bags as they first enter the instruction area.

Summary: The result of the utilization study was that the laboratory space is adequate for enrollment projections but additional space is needed for the preparation and storage area to identify the space need deficits. During the design phase this will be addressed by removing 2 general academic classrooms from inventory to incorporate 1270 additional assignable square footage to redesign pedestrian circulation areas and provide needed square footage into the science wing's preparation and storage area.

As pedestrian flow in this area is a problem as previously mentioned, this change will be addressed during the design phase and will be accommodated with the realignment of the science laboratories area and hallways to resolve this situation.

The six science laboratories will be balanced in ASF to support upgraded technology needs and experimentation requirements. The total ASF of 8352 and 12,870 GSF will be the affected square footage of this renovation.

ALTERNATIVE ANALYSIS

In reviewing alternative facilities or program solutions it was determined the following:

- ❖ Leasing additional space/facility or construction of additional space is not a feasible option as space is adequate at the Centennial Campus to support the six science laboratories and preparation/storage areas.

- ❖ Relocation of the laboratories at Centennial Campus would not be cost effective since many components of the lab's infrastructures are in place and would be costly to recreate.

- ❖ The College's contingency plan for operating the required laboratory prerequisite of the science programs curriculum would be for students to continue to meet in the outdated labs, staff to work in an overcrowded prep area and not to address indentified life/safety issues. If this renovation is not funded, it will not allow the college to provide the students with the best possible environment for them to pursue instruction and learning. As this project is delayed, it will result in additional costs each year based on yearly inflation rates.

SCIENCE LABORATORIES RENOVATIONS

Program Plan

CENTENNIAL CAMPUS

IMPLEMENTATION & DESIGN

The Implementation plan for the science laboratories renovation is the College's action plan to address the Capital Improvement Project recommended in the Facilities Master Plan. The project will require financing with General Fund (GF) monies.

The need for the project is being driven by the following factors:

- Overcrowding – the existing preparation space and storage is too small and does not provide sufficient space for growth which creates life/safety issues
- Current laboratories and teaching facilities do not meet the needs of faculty.
- Better technology and demonstration capabilities are needed
- Current laboratories are outdated
- It is more cost effective to renovate the science laboratories space than relocate to another area/building
- ADA compliance

The primary objectives for this project are:

- Accommodate growth and provide additional space
- Plan for the future
- Technology is a top priority
- Provide physical connection of the science area
- Provide flexible spaces that can adapt to different uses in the future
- Create showcase space for students and visitors, such as a student display area to create interest in science
- Make student safety a top priority in the building by providing lab spaces that meet current codes and standards.
- Energy efficient

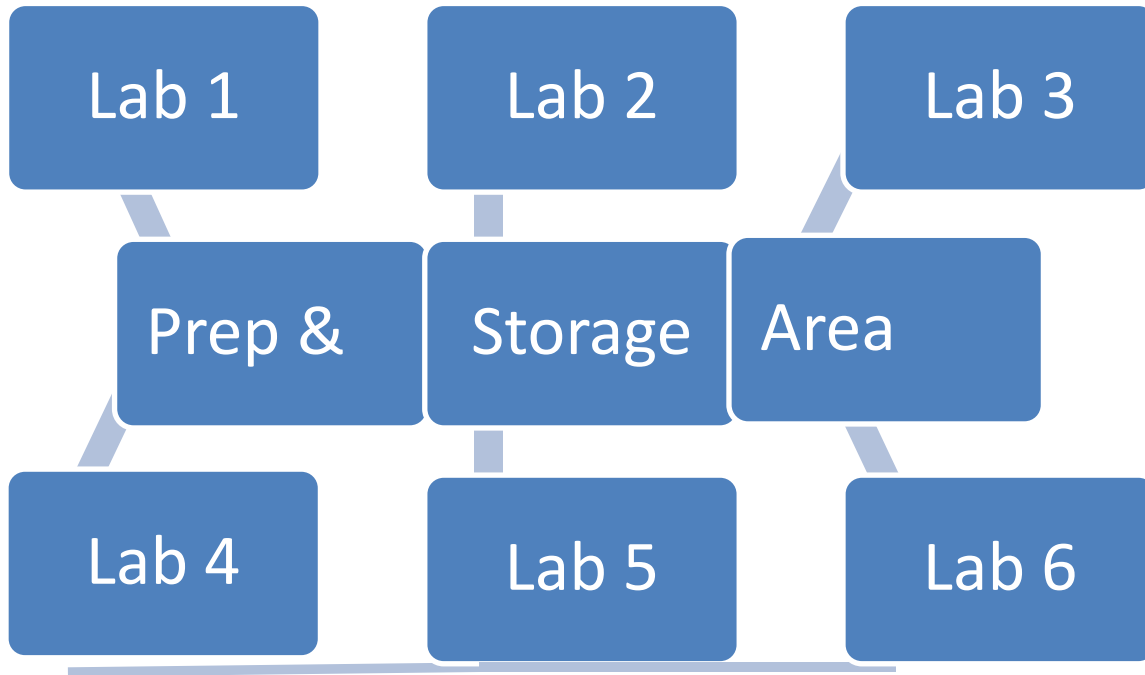
A participatory planning process composed of administration, faculty, and staff was organized, where many views were aired, which fostered sound decision making to yield a functional facility which will respond to the science instructional programs. The planning process assures the best environment for students to pursue science instruction and learning.

SPATIAL RELATIONSHIP

A major condition when designing the science laboratories is that the preparation and storage area is adjacent to all of the laboratories for safe and easy transporting of supplies to the labs for student experiments. When reviewing location of the science wing at Centennial Campus, it was determined to not relocate this area as it meets the condition of having a centrally located preparation and storage area, with access to all 6 of the science laboratories. This area, with the reworking of the pedestrian flow, will provide easy access to all students. Below is a design of how this area will be designed and function.

DIAGRAM:

SCIENCE LABORATORIES & PREPARATION/STORAGE AREA



Maintaining the above design with an enlarged preparation & storage area to accommodate 6 separate preparation areas/stations, one for each lab, to prevent cross contamination.

SITE IMPROVEMENTS AND REQUIREMENTS

With the current location of the science wing at Centennial Campus being maintained, there will no need for any site improvements. The infrastructure is in place and will be upgraded to meet design requirements.

The current square footage that houses six science laboratories, preparation and storage areas will be renovated. Additional assignable square footage of approximately 1270 will be added to this area for pedestrian circulation and expansion of the preparation area to meet deficit needs.

DESIGN REQUIREMENTS

When renovating the science laboratories and the preparation - storage areas at the Centennial Campus, the approximately 12,870 GSF will be redesigned to house 6 laboratories to support the science curriculum as well as the supporting preparation - storage area. When developing the program plan the committee identified the following specifications to be included in the design. All design work will address energy efficiency and to build "green".

Circulation and Egress: Adequate circulation space is important in maintaining a safe environment. Arrangement of fixed and movable furnishings will allow for faculty and students to circulate easily through the space. Good circulation makes for a safer and more accessible lab. Students need to be able to move from one activity to another with accompanying materials. The location of preparation and storage rooms must have both access and security.

ADA Compliance: Accessible lab stations will be integrated into the laboratories. These stations will be designed to be a part of the lab configuration as a whole, rather than isolating these stations away from predominant student groupings. Students with disabilities will be able to fully participate in group activities. The elevated instruction demonstration areas will be removed and changed to be floor level teaching stations.

Safety: Lab safety is fundamental to a successful lab program. The labs are to support lab safety by building in ease of supervision as well as specific safety features.

Class Size: Number of students in a lab has a direct bearing on safety of the labs as well as on quality of educational experience. The National Science Education Standards will be incorporated in the design, in which each lab will accommodate 24 student stations in each of the 6 labs.

Visibility: Unimpeded vision lines, appropriately placed and clear organization are key visual characteristics of safe labs. The layout of the labs will allow for direct lines of vision across the space. Student will be able to see the white boards and other presentation areas in order to benefit from information being presented. The faculty will be able to see all students during lab activities.

Appropriate Ventilation: Provisions will be included for high capacity continuous forced ventilation for all areas of the science laboratories, especially where chemicals are used. The installation of upgraded fume hoods will be installed to protect the safety of staff and students. Energy efficiencies will be identified during the design phase and the use of heat recovery for exhaust systems will be investigated to lessen the utility operating costs.

Lighting: Lighting efficiency will be addressed in the renovation for all areas from demonstration tables, student stations, as well as in general lighting environments. The use of natural lighting will be a major focus during design planning.

Emergency Systems: The following emergency systems will be installed or upgraded during the renovation project.

- **Emergency Call System:** Emergency buttons in the labs and preparation areas so a student or instructor can quickly signal for help in an emergency.
- **Emergency Shut-Off:** Emergency shut-off controls to be installed to shut-off all utilities which serve the demonstration table and the student lab stations. Location is to be quickly accessible to the faculty, but somewhat protected from nuisance use by students.
- **Emergency Eye Wash:** An emergency eye wash station is to be incorporated in every lab and prep area. The stations must be accessible to persons with disabilities.
- **Emergency Shower:** An emergency shower will be installed in the prep area to be readily available to all laboratories.
- **Fire alarm upgrading** will be included and a fire sprinkler system installed if required by building code.
- **Lab room pressure monitors** to establish proper pressure differentials and the likelihood of chemical vapors moving throughout the building will be installed.

Integrating Technology: Integrating technology will be installed into the science facilities. Computers in the science labs will be at the lab stations, not in a separate corner. The technology will be designed for future expansion.

Utility Systems: The Centennial Campus is serviced by the City of Colorado Springs for water, electric, gas, and sewer. Electric, gas, and water lines enter the site from the northwest. Sewer empties north to a line under Academy Boulevard.

The utility systems will be upgraded to meet the needs of the renovation project. Energy savings and LEED standards criteria will be implemented when appropriate.

Utilities for Demonstrations/Student Stations: To complete demonstrations /experimentations, stations will require the following utilities to be supplied. Not all of the utilities will be required in the stations, only those needed for dedicated labs such as chemistry, physics, etc. The utilities are water, power, gas, waste, vacuum and air.

Cadaver Storage: Room for storage of an additional cadaver will be included. When designing this room special requirements are needed such as humidity control and metal shelving.

Biology Laboratory: Room A-159, chemistry laboratory, will also be equipped to be an overflow lab for biology.

Aesthetic Plans

Order... Renovations will complete the architectural fabric of the campus as well support the integrity of the principal structures.

Forms...Shape and structure shall maintain consistency. Introduction to other forms shall be limited and justified on a function basis. .

Scale...Scale is important element in maintaining the order of the campus.

Consistency...The fabric and colors of the campus as a whole shall be maintained. Relationships with other areas shall be developed to enhance consistency.

Waste: Waste handling systems must meet code and regulations. Areas of concern to be addressed during design are acid-resistance, silver extraction and chemical disposal. If the opportunity exists to establish model recycling programs, they shall be implemented.

Ventilation: Adequate ventilation is a prerequisite to a safe and comfortable learning environment. Science activities introduce contaminant sources which are unique within the college. Contaminant sources in the science programs may be chemicals, biological organisms, and other substances. Therefore, the science laboratory renovations will accommodate mechanical requirements above and beyond those of the general classroom.

The ventilation system with the laboratories contributes to lab safety within the framework of an overall safety plan. Within that context, the following systems are specifically required:

- ❖ Air from the labs should not be recirculated into other spaces
- ❖ Volume of air exhausted from lab is to exceed supply air flow into the room

- ❖ Fume hoods to be installed to exhaust fumes from activities
- ❖ Rooms that house bio-hazards or storage of chemicals require aggressive ventilation

Asbestos and Other Hazards:

Asbestos: The existing laboratory work stations for students and instructors have been inspected and the surfaces of these stations contain asbestos. This condition has also been identified in floor tiles, ceiling tiles, mastics and pipe installations. Costing for special handling/removal of the asbestos has been included in the cost project estimates.

Hazards: Hazards associated with the renovation are contaminated ducts, contaminated fume hoods, and acid waste piping. Special clean-up for the removal of acid lines, fume hoods and circulation duct that may contain acid have been included in the cost projections.

Green Building Goals

The significance of green initiatives on college campuses is becoming increasingly evident. Sustainable facilities are a reality and even a necessity for forward-thinking colleges.

Sustainability initiatives in existing buildings promote significant benefits ranging from enhanced productivity to operational savings. The college's renovation design planning will focus on "green" dollars for the greatest effect. Water conservation and treatment, energy efficiency, indoor air and environment, and quality materials provide sustainability. The college will evaluate which of these initiatives will provide the greatest benefits for "green" investment. The college realizes including sustainable design into the renovation project is not an alternative; it is a mainstream approach in the project design.

Design Requirements Summary

Designing for science education poses complex challenges. Materials for use in the science activity areas must be evaluated for durability, maintenance and safety. Laboratory work surfaces, cabinetry, equipment, safety systems, and other components must be chosen for long-term, frequent, and reliable use. These will be addressed during the design phase of the project.

Planning for Sustainability: Long-term educational and structural implications will be addressed in the design phase as well as educational, environment and physical sustainability.

Educationally Sustainable: Planning will take into account current ways of managing the college's science curriculum and that the proposed plan meets the needs of the curriculum and match ways in which students learn.

Environmentally Sustainable: Natural light and ventilation and also the responsible management of chemicals and other waste will be included in the design.

Physically Sustainable: Ensuring "fitness for purpose" is an essential part of the design. Flexibility to match and meet a range of learning styles will be a part of the design plan.

PROJECT SCHEDULE

The project schedule for the renovation of the science laboratories and support areas will not commence until State Legislation approval of general funding for this project. Once approved by the Governor, the college will hire professional services to begin the design phase. Construction schedule will have to be aligned to have very little impact on the science curriculum. There will be minor relocation of certain laboratories during some times of the renovation and minor interruption of utility services. Any disruptions will be held at a minimum and the institution's planning will be to have little impact to the students and their educational success.

COST ESTIMATE

This capital improvement project is a renovation of existing space with the construction of no new space anticipated. Currently there are 6 science laboratories, lab prep area, storage, and office space in the science area. The plan is to increase the lab prep area and create a continuous traffic flow in the science area so patrons will not have to exit and re-enter the building to circulate in this area. To accomplish this, 2 general academic classrooms will be taken out of inventory and incorporated into the science area to add square footage to the current overcrowded preparation and storage areas and create of a hallway for continuous pedestrian flow. Being a science laboratory environment, the costs have been allocated high per square foot, calculated on 12,870 GSF. MEANS Cost Data© and recent experiences from remodel of science labs has been used to determine the estimated project costs.

The calculations of the overall "Professional Services" have been estimated slightly higher than the Department of Higher Education recommendation of 15% maximum for renovation projects (16% estimated). This is due to the potential for abatement of contaminated systems, and the proper study and demolition monitoring that may be necessary. Being a science laboratory renovation, ventilation is very sensitive and it is the College's intent to engage the services of an HVAC commissioning agent. In addition, it is the College's intention to have an independent project manager to oversee the project on behalf of the College.

Due to the obsolete equipment and furnishings that will have to be replaced, these also have been allocated at a slightly higher percentage based on the need to replace them. It is anticipated that relocation of some of the instruction due to disruption of the program delivery during constructions will need to take place; therefore relocation costs have been included.

Science Laboratories Renovations

Proposed Budget

Land Acquisition

Land Purchase Cost	\$0
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Professional Services

Master Plan/PP	.00%	\$ 0
Site Surveys, Investigation Reports (Haz. Matl's)	1.00%	\$ 25,740
Architectural/Engineering/Basic Services	15.00%	\$386,100
Code Review/Insections	1.00%	\$ 25,740
Program/Project Management	3.00%	\$ 77,220
Mechanical Commissioning Services	2.00%	\$ 51,480
Abatement Air Quality Monitoring	1.00%	\$ 25,740
Advertisement, Etc.	1.00%	\$ 25,740

Total Professional Services	\$617,760
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Construction

Infrastructure		
Service/Utilities/Public Improvements		\$0
Structure/Systems/Components		
Asbestos Abatement		\$ 77,220
Renovate	12,870 gsf @ \$194 per gsf	\$2,496,780
Other		\$0

Total Construction Cost	\$2,574,000
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Equipment and Furnishings

Equipment		\$ 241,820
Furnishings		\$ 226,100
Communications & Information Technology	6.00%	\$ 154,440

Total Equipment & Furnishings Costs	\$ 622,360
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Miscellaneous

Art in Public Places	1.00%	\$ 25,740
Relocation Costs – Preparation Lab		\$ 30,000
Other Costs		\$ 0

Total Miscellaneous Costs	\$ 55,740
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TOTAL PROJECT COSTS	\$3,869,860
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Project Contingency

5% for New		\$ 0
10% for Renovation		\$ 386,986

Total Contingency Requested	\$ 386,986
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TOTAL BUDGET REQUEST	\$4,256,846
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FINANCING EXPLANATION

The projected project costs of \$4,256,846 will be financed with State of Colorado general funds through the capital development approval process. The hiring of an architect for the schematic phase will be solicited following the approval and signing of the Long-Bill by the Governor. The renovations of all areas will be coordinated to assure there is little impact on the student's learning environment.

Appendix A

Laboratory Course Usage

Appendix B

Proposed Equipment & Furnishings List

Appendix C

Science Laboratories Utilization

Appendix D

Third Party Review

Appendix E

Map of Aspen Bldg, 1St Floor

And

Science Laboratories Area

**CENTENNIAL CAMPUS
SCIENCE LABORATORIES
LABORATORY COURSE USEAGE**

COURSE NAME	COURSE PREFIX	REQUIRED LAB HOURS
Astronomy I	AST 101	30
Astronomy II	AST 102	30
Basic Biology Concepts	BIO 090	30
Science of Biology	BIO 105	30
Basic Anatomy & Physiology	BIO 106	30
General College Biology I	BIO 111	30
General College Biology II	BIO 112	30
Basic Ecology	BIO 148	30
Plant Taxonomy	BIO 149	30
Animal Biology	BIO 150	30
Biology of Plants	BIO 154	30
Human Anatomy & Physiology I	BIO 201	30
Human Anatomy & Physiology II	BIO 202	30
Microbiology	BIO 204	45
Cell Biology	BIO 211	30
Molecular Biology	BIO212	30
Genetics	BIO 224	30
Introduction to Chemistry I	CHE 101	30
Introduction to Chemistry II	CHE 102	30
General College Chemistry I	CHE 111	45
General College Chemistry II	CHE 112	45
Organic Chemistry I	CHE 211	60
Organic Chemistry II	CHE 212	60
Physical Geography - Landforms	GEO 111	30
Physical Geography - Weather & Climate	GEO 112	30
Physical Geology	GEY 111	30
Historical Geology	GEY 121	30
General Meteorology	MET 150	30
Basic Physics	PHY 101	30
Physics: Algebra-Based I	PHY 111	45
Physics: Algebra-Based II	PHY 112	45
Physics: Calculus-Based I	PHY 211	45
Physics: Calculus-Based II	PHY 212	45
Integrated Science I	SCI 155	30
Integrated Science II	SCI 156	30
Reptile & Amphibian Husbandry	ZOO 105	30
Mammal Husbandry	ZOO 125	30