

Andrews Hall Smith Hall and Buckingham Hall Renovations Program Plan

University of Colorado at Boulder
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4.00 Preface and Summary

This program plan is for the renovation of Andrews, Smith and Buckingham Halls - student residence halls in the Kittredge Complex at the University of Colorado's Boulder campus. The total project budget for Andrews Hall is \$13,692,374 for 60,588 gross square feet of renovation work; the total project budget for Smith Hall is \$13,318,604 for 56,676 gross square feet of renovation work; and the total project budget for Buckingham Hall is \$14,284,381 for 59,679 gross square feet of renovation work. The renovations of these halls follow the renovation of Arnett Hall in the process of renovating all of the buildings in the Kittredge Complex. Andrews and Smith Halls, completed in 1963, and Buckingham Hall, completed in 1965, have served CU undergraduates well for more than 40 years. There are two drivers for the improvements to these buildings. The first is the broad campus initiative to move toward a residential campus model including the expansion of the current residential academic programs. These programs have been shown to increase the involvement, academic performance, and satisfaction of undergraduate students, and transform the student culture. The University is committed to providing this opportunity to all incoming students. Key to a successful residential campus strategy is attracting sophomores, juniors and seniors to living on campus in the residence halls. This will require adding amenities to some rooms to make them more attractive to these students. The second main driver for the project is the need for general improvements due to the age of the buildings and systems. Chief among those improvements is the addition of air conditioning which is highly desirable to students and has the additional benefit of allowing the buildings to be used for summer conference activities. Renovated space by itself is insufficient to significantly increase conference revenue; the key is additional and appropriate meeting space. Upon completion of the Kittredge Commons renovation, additional conference revenue will be generated.

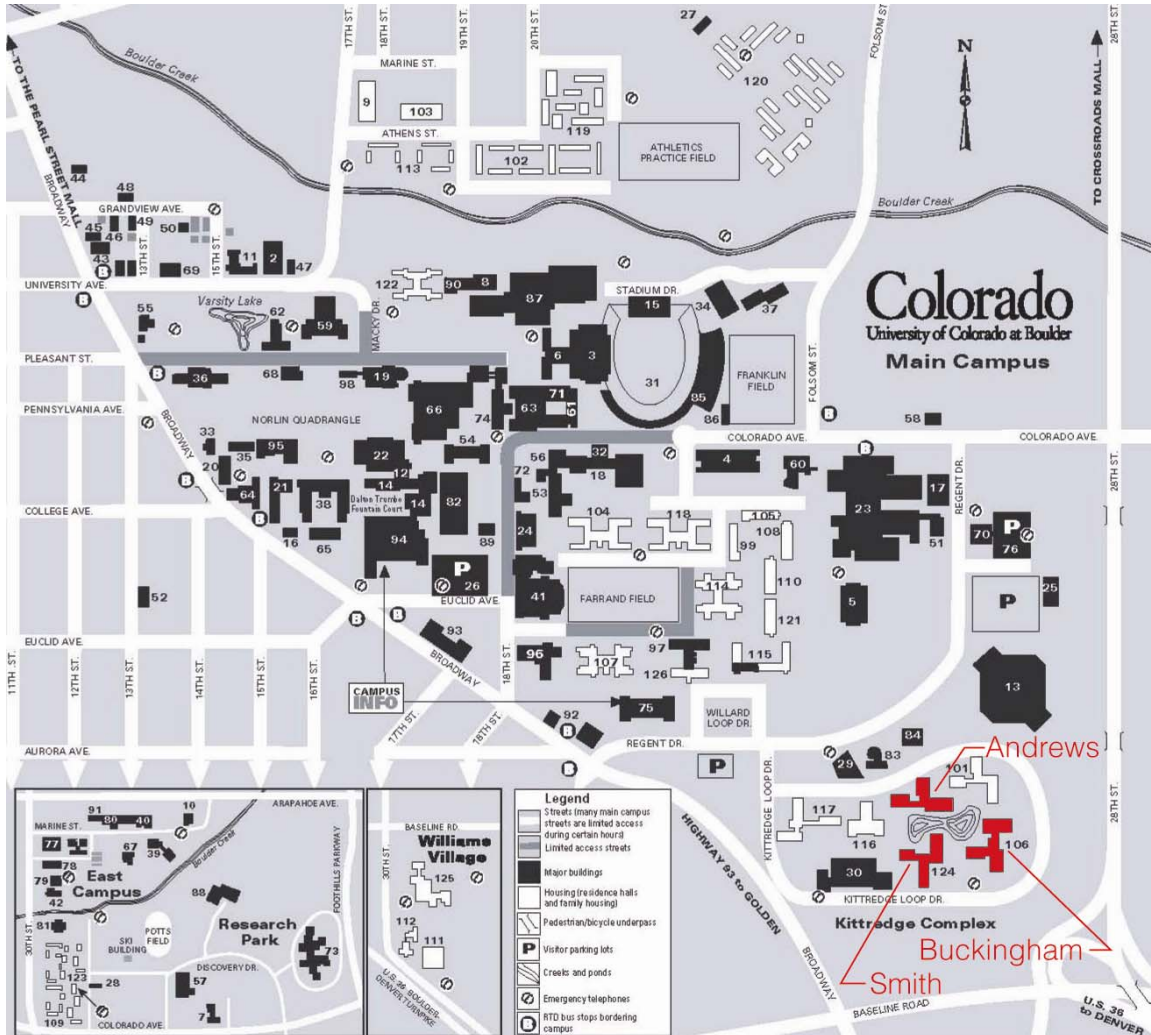
The Campus Master Plan identifies multiple phases of renovation of on-campus housing over the next ten years. This program plan is consistent with the strategy outlined in the Master Plan to include deferred maintenance, accessibility, and code compliance improvements in the renovation project using revenue bond financing, paid for with Auxiliary Services revenues. From the Master Plan:

Maintenance related projects are designed to catch the Department of Housing up to a point where normal operational maintenance can keep pace. These projects include replacement of selected plumbing, heating and electrical systems. Repairs to building structural systems are also necessary. Other projects to be considered include replacement of windows, re-caulking, and energy conservation improvements.

The program planning process was designed to gather the relevant information from all the project stakeholders and to allow the stakeholders to reach consensus on the best balance of improvements with the project budget. The building committee included representatives from Facilities Management and Housing and Dining Services. Staff from both the administrative and the facilities side of the Housing department was represented. Anderson Mason Dale Architects was retained by the University to manage the programming process and to create the program plan document. Student input was solicited through a Residence Hall Association meeting and an on-line survey. Input from the faculty was gathered through the Residential Campus 2020 Planning Group. During the process the committee reviewed a series of scenarios including renovation and new construction options and compared the merits of each within the context of obtaining the best value for the investment. The budget for the project is determined by the Auxiliary Services revenue from student room and board charges. Limiting the cost to students is critical to making on-campus living attractive to students and keeping higher education in Colorado affordable. Thus the resulting renovation strategy detailed in this report provides the most infrastructure improvements to the building and supports the implementation of a residential academic program within a budget that can be covered by auxiliary net pledged revenues without overly burdensome increases in student rents.

Project Location

Andrews, Smith and Buckingham Halls are located in the Kittredge Complex which is at the south end of the main campus, as shown on the location map below:



Project Location Map

Project Schedule

The renovation of Andrews Hall is scheduled to be complete and open to students for the Fall of 2009, with Smith Hall following in 2010, and Buckingham Hall in 2011. In order to meet these deadlines the following key milestones must be met:

- BCPC Approval – May 10, 2007
- CEC Approval – May 21, 2007
- Board of Regents Approval – June 28, 2007
- CCHE Approval – July 25, 2007
- Legislative Approval – February 15, 2008
- Start Construction:
 - Andrews Hall – Summer, 2008
 - Smith Hall – Summer, 2009
 - Buckingham Hall – Summer, 2010

4.03 Program Information – Renovation, Remodel Projects

4.03.1 Program using the facility

The program that uses this facility is the Department of Housing and Dining Services (HDS). HDS is comprised of 45 buildings and 3,060,895 square feet on 101 acres of land not including the building footprints. Housing is provided for undergraduate and graduate students, faculty and staff. The residence halls have a design capacity of 5896 beds in 22 buildings. HDS recently assumed management of Bear Creek Apartments which provides an additional design capacity of 994 apartment beds dedicated to housing non-first year students. University Family Housing provides 847 apartments for students with families, faculty and staff as well as graduate students who are single or with partners.

Dining Services provides 1.78 million student meals per year and 153,000 meals for catering events and conference groups. Dining rooms include Sewall Dining, Libby Dining, and The Farrand Alley, Kittredge Commons, Darley Commons and the Dal Ward Varsity Dining room where the student athlete training table is provided. Cash operations include The Village Market, Hardrive Café, Paizanos Natural and Organic Café, Alley Express, the Emporium at Farrand, Lickety Split and The Snack Bar at Dal Ward. The Alley at Farrand and Libby Dining room were renovated as part of the 1999 Comprehensive Plan for Student Housing.

HDS' mission statement: "Housing & Dining Services provides an exceptional residential and dining experience in support of the mission of the University of Colorado at Boulder. Our vision is to be an organization that is a full partner in the promise to create and support a living and learning community and is a nationally recognized model for the student residential and dining experience." The department recognizes the importance of housing in the context of the educational mission of the University; from the Campus Master Plan:

The knowledge and concepts acquired in the classroom are challenged and shaped by experiences and opportunities outside of the classroom. Housing opportunities at CU-Boulder are intended to create a living-learning environment, helping students gain skills in problem solving and critical thinking.

During the master planning process the Task Force on Creating Living-Learning Environments recommended a number of objectives including the following ones which are particularly relevant to the renovation of Andrews, Smith and Buckingham Halls:

- Provide housing that enhances the living and learning experiences of students.
- Provide housing that is both affordable to students and economically feasible for the University.
- Provide housing that is attractive, modern, and appealing to today's changing students.
- Maintain housing capacity that is no less than the current percentage of undergraduate student enrollment.
- Provide facilities for student activities that promote personal growth and social interests.

Finding the best balance of these objectives is the work of the program planning team. This plan documents the results of weighing the various amenities that are desirable in these residence halls against the available resources and future costs to students.

4.03.2 Interior/exterior space additions

Because of the difficulties of building additions on the existing buildings (see the alternatives section below for more detail), the committee decided that this project work will remain within the existing building envelopes.

4.03.3 Academic Program expansion, new uses

The second primary motivation for these projects is to adapt Andrews, Smith and Buckingham Halls to house residential campus 2020 programs. The Residential Campus 2020 Study Group was formed in 2005 to study the merits of a residential campus system and if the strategy has merit, for the University to look at how it might be implemented on the CU Boulder campus. The Group produced a Residential Campus Report finalized on March 23, 2007 that was used by the program planning team to understand the University's objectives for integrating academic components into the residence halls. Their overall findings are reproduced here:

Our review led us to conclude that a Residential Campus would be a major transformation in the educational experience for students at the University of Colorado at Boulder. The intent is to more fully engage students as active learners in a residential environment that supports their intellectual and personal growth.

The Residential Campus model addresses issues of academic standards, retention, personal responsibility, and relationships with faculty, all of which are matters of importance for the University of Colorado. Residential Campuses by design are a means to integrate faculty and students, living and learning, and community and personal engagement over a multiyear period. Within a Residential Campus, students become a part of a greater educational whole and are actively engaged in supporting the learning enterprise.

One of the key objectives set forth in the report is to create better space for the current residential academic programs as well as expand the number and type of programs into all of the residence halls. Along with the residential academic program, the halls should support recitations, supplemental instruction, seminars and discussion groups. The report also recognized the importance of the spaces to support the Residential Campus, and summarized the basic intent of those spaces below:

Develop more learning and community space:

- *Design community, classroom, and social space which is attractive, engaging and flexible to maximize their use and to increase opportunities for instruction, intellectual activities and community building.*
- *Create amenities which contribute to the development of smaller communities and enhance the interrelationships of students, staff and faculty.*
- *Create rooms or apartments which are attractive to non-first year students, including private baths, shared social/living rooms and clustered living opportunities.*

The study group confirmed that the Kittredge Complex should be the first community to implement the Residential Campus concept. It is a housing facility that can support the expansion of the academic programs which are key components of building the Residential Campus. And as with other residence halls, it is sorely in need of renovation. The report includes the 20 and 25 year draft reports from the Department of Housing and Dining Services Facilities Renovation and Renewal Plan. Arnett Hall, which is nearing the start of construction, is the first renovation project in the Kittredge Complex, with the renovations of Andrews Hall, Smith Hall, and Buckingham Hall to follow. More information on the Plan is included in section 4.03.6 Relationship to Master Plan below. When the renovations are complete, each Hall will house two Classroom/seminar rooms, faculty offices and support spaces for tutoring and administration that will provide a home for other academic support functions in the building.

Adding air conditioning is a high priority for these buildings. The addition of academic space and offices will benefit greatly as will the residential components from the improvement to thermal comfort. An additional benefit is the ability to support expanded summer conference use. The

Kittredge Complex is ideally suited for summer conference use but the lack of air conditioning has prevented the University from taking full advantage of these buildings during the summer. The academic spaces will also serve the summer conference use by providing additional meeting rooms.

4.03.4 Office and service spaces

The program for each building includes three offices to support the academic program and one to two offices for the residence life staff, depending on the specific building. All of the offices will contribute to the residential campus environment. They will be flexible enough to be used for a variety of functions, but initially it is conceived that three will house the academic program director, administrative assistant and faculty members; one will serve as a housing reception/office space; and Andrews Hall will have a fifth office for a residence hall director. Service spaces will be provided to support the individual halls, but there are no general housing support facilities in the scope of this program. Service spaces in the halls will include student laundry room(s), mechanical spaces, electrical/telecommunication spaces, and storage spaces. For more information on specific spaces see section 4.03.11.

4.03.5 Three alternatives

The building committee considered three alternative strategies for how to meet the needs of the hall residents. The first was a renovation that improved the systems and finishes but left the space configurations the same. The second was a complete tear down of the existing halls and construction of new buildings. The third was a renovation that upgraded the systems and finishes and partially re-configured the buildings to accommodate new program needs and attract sophomore, junior and senior residents. The committee decided the third option is the best approach for this project.



Andrews Hall from Southwest



Buckingham Hall from West

Option one, upgrading systems and finishes, does not address the campus goals of attracting non-first year students or the goal of incorporating residential campus principles into all of the halls. And in order to attract non-first year students, the halls must offer a living arrangement with more amenities than a double occupancy bedroom and community bath. Without increases in amenities and privacy, non first year students will be drawn to the off-campus market where they can find these kinds of living arrangements.

Option two, new construction, bears a significantly higher cost than renovation. New buildings of the same level of quality, bed counts and areas would cost approximately \$22.3 million for Andrews Hall, \$20.9 million for Smith Hall, and \$22 million for Buckingham Hall compared to estimated renovation costs of \$13,692,374 for Andrews Hall, \$13,318,604 for Smith Hall, and \$14,284,381 for Buckingham Hall. The committee also recognized that new construction would have a far greater impact on adjacent halls with the noise and disruption of demolition and ground-up construction. The review process for new construction on campus is more demanding than for renovation which would likely prevent a new building from being completed on the desired timeline.



Smith Hall from North

Option three, renovation with partial reconfiguration, is the best use of available resources. It is a cost effective way to improve the existing units with new systems and finishes, introduce new unit types that include semi-private bathrooms, and create classroom/seminar and office spaces to support residential academic activities. Another benefit is that renovating an existing building is part of an environmentally sustainable design strategy.

The committee looked at scenarios that included small additions to the buildings that might house the academic and housing support functions. Grade changes and other site conditions make it difficult to locate additions where needed to satisfy the program requirements and functional relationships. The investigation of these options suggested that the best value for available funding would be to build one larger addition for bed spaces elsewhere rather than smaller additions to these halls.

Another supporting reason to keep the academic support space in each hall relatively small is that the long-range plan for Kittredge is to move the dining component to a new dining hall north of the Complex. This will allow the existing commons building to house academic support components such as a large lecture hall, additional seminar rooms and faculty offices. Central desk, mail and the Hard Drive Café will remain in the commons to support the Kittredge-wide community. For these reasons the committee decided not to add square footage to Andrews, Smith and Buckingham Halls as part of this program.

4.03.6 Relationship to Master Plan

This renovation project fits neatly into the framework of campus improvements defined in the Campus Master Plan. The Plan recognizes the need both to renovate and update all of the older on-campus residence halls as well as to expand the living-learning opportunities for undergraduates. In the first five year period the Master Plan identifies approximately \$30 million **[amount should be confirmed]** worth of housing renovation while essentially maintaining the same gross area of housing.

The Draft Residential Campus Report identifies in greater detail the strategy for achieving these renovation projects:

The Department of Housing and Dining Services (HDS) has completed a comprehensive review of current facilities and identified the Kittredge Community as the top priority for renovating to the development of the Residential Campus 2020 concept.

Included in this report are the 20 and 25 year draft reports from the Department of Housing and Dining Services Facilities Renovation and Renewal Plan. The first building in the Kittredge Complex designated for the start of the renovations is Arnett Hall.

The intended order of renovation projects in the Kittredge complex is Arnett, Andrews, Smith Buckingham, Kittredge Commons, and finally Kittredge West. The Renewal Plan calls for one

residence hall to be renovated each year until the entire complex to be completed. This work runs concurrently with the planning and construction of a new dining hall that will accommodate the students living in Kittredge and available to other students, faculty and staff. This will free up the Kittredge Commons for residential academic program functions and other social and support spaces.

The University projects that freshman enrollment will remain flat at 5,000 with a total enrollment of 26,000 to 28,000 students for the next five years. However, the goal is to increase the number of non-first year students living in on-campus housing. The Residential Campus report recommends that 30% of the housing system be occupied by non-freshman students. Ideally each residential academic program will also attract a faculty-in-residence and one to three graduate students to live in the halls and provide academic support.

Enrollment Trends

Enrollment Category	Actual FY	Actual FY	Actual FY	Actual FY	Actual FY	Current FY
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Campus-Wide Full-Time Equivalent Undergrad Students						
a. Master Plan Projection	21,340	21,510	21,802	21,802	21,627	21,685
b. Legislative Authorized FTE						
c. Enrollment FTE *	20,271	21,456	22,683	22,619	22,216	23,500
d. Enrollment (Headcount) **	22,545	23,743	24,799	24,895	24,223	24,484
e. Resident FTE *	13,379	14,231	15,128	15,234	15,272	16,012
f. Non- Resident FTE *	6,892	7,225	7,555	7,385	6,945	7,488
g. Residence Hall Beds	6,136	6,136	6,123	5,912	5,744	5,740
h. Family Housing Units	860	860	860	860	860	860
i. Students in RAP's	1,281	1,337	1,333	1,399	1,444	1,800

	Projected	Projected	Projected	Projected	Projected	Maximum Campus Capacity
	2007-08	2008-09	2009-10	2010-11	2011-12	
a. Master Plan Projection	21,744	21,802	21,802	21,802	21,802	
b. Legislative Authorized FTE						
c. Enrollment FTE *	23,500	23,500	23,500	23,500	23,500	22,700
d. Enrollment (Headcount) **	24,536	24,536	24,536	24,536	24,536	24,900
e. Resident FTE *	16,012	16,012	16,012	16,012	16,012	15,430
f. Non- Resident FTE *	7,488	7,488	7,488	7,488	7,488	7,270
g. Residence Hall Beds***	6,746	6,667	6,621	6,570	6,446	
h. Family Housing Units	860	860	860	860	860	
i. Students in RAP's	2,100	2,310	2,540	2,746	2,974	

* Undergraduate AY

** Undergraduate fall count

*** With the completion of the Kittredge Renovations, the bed count is projected to increase to 6,724 in Fall of 2012

The 1999 Comprehensive Plan for Student Housing included very few action items for these residence halls. The only significant item (new windows) will be addressed by the renovation project for each building. HDS is in the process of addressing this plan as it has already become outdated and does not support the vision of the Campus Master Plan and the Residential Campus 2020 study recommendations. The 1999 Plan took a systems approach that did not address the changing programmatic needs of the students. HDS is now working under a model of complete renovation projects so that systems and program needs can be addressed at the same time. The renovation of Arnett Hall in the Kittredge complex marks the end of the work under the 1999 Comprehensive plan and marks the transition to a new strategy for improving the residence halls through complete renovation projects.

4.03.7 Facility Audit & Facility Condition Index

The table in Appendix E summarizes the facility audit conducted of Andrews, Smith and Buckingham Halls by the University. This was completed as part of a housing system-wide audit prepared by Facilities Management and Housing staff in 2004; only those portions applicable to these three buildings are included in this program plan. A wide range of needed repairs are identified and the urgency of the work ranges from "immediately critical" to "recommended." All of the items in the audit will be addressed in the project scopes.

The Facility Condition Index (FCI) is defined as one minus the ratio of the cost of repair to the cost of replacement (1-repair/replacement.) The University calculates that the FCI for Andrews Hall is .55, Buckingham Hall is .54 and Smith Hall is .55. The FCI for each building after renovation is expected to be in the mid .90's.

4.03.8 Controlled Maintenance Projects of Record

Auxiliary Services at the University of Colorado at Boulder does not receive Controlled Maintenance funds from the State, so there are no Controlled Maintenance projects for Housing and Dining Services. The University has completed three capital projects on Andrews Hall over the last five years - installation of smoke detectors (\$13,000), emergency lighting (\$3,500) and replacing carpeting (\$27,000). Similar capitol projects have been completed on Smith Hall - installation of smoke detectors (\$13,000), emergency lighting (\$3,500) and replacing carpeting (\$25,000), and on Buckingham Hall - installation of smoke detectors (\$13,000), emergency lighting (\$3,500) and replacing carpeting (\$27,000). These projects were funded through room and board revenues.

4.03.9 Impact on functional Areas/Relocation Costs

These renovation projects will not significantly alter the usable space in the buildings. While there will be a reduction in the number of students housed in each building, that space will be used to provide amenities to attract non-first year students and build academic spaces to support the residential campus model.

Upon completion of the renovation of Andrews Hall, the number of available beds will be reduced from 269 to 230 resulting in an annual net revenue loss of \$371,005. Revenue could be regained through a .6% or \$63 increase in room and board per academic year. The construction process will take this building off-line for one academic year (2008-2009).

Upon completion of the renovation of Smith Hall, the number of available beds will be reduced from 242 to 206 resulting in an annual net revenue loss of \$329,990. Revenue could be regained through a .5% or \$56 increase in room and board per academic year, as well as off-set by additional conference revenues following completion of the Kittredge Commons renovation. The construction process will take this building off-line for one academic year (2009-2010).

Upon completion of the renovation of Buckingham Hall, the number of available beds will be reduced from 256 to 228 resulting in an annual net revenue loss of \$412,637. Revenue could be regained through a .6% or \$71 increase in room and board per academic year, as well as off-set

by additional conference revenues following completion of the Kittredge Commons renovation. The construction process will take this building off-line for one academic year (2010-2011).



4.03.10 Historic Building Considerations

While these buildings do not have documented historic significance, they were designed and constructed to be compatible with the Tuscan Vernacular style that Charles Klauder defined in the 1919 Campus Development Plan. This style and palette of materials continues to set the precedent and context for campus buildings even today. The red sandstone walls, clay tile roofs and dark window frames identify Andrews, Smith and Buckingham Halls as part of the Boulder campus. This consistency with the campus fabric will be maintained with the renovation of this project.

4.03.11 List of Planned Spaces and Technologies

The tables below summarize the typical spaces to be included in the renovation projects. The building efficiency factors (net/gross ratio) are measured from the existing buildings. The areas are subtotaled into either the “upgrade” or “remodel” columns. Upgrade includes new systems and finishes; re-model includes the new systems and finishes as well as reconfiguring the walls to make different layouts for the spaces. Following the table is a brief description of each of the spaces. Critical adjacencies are noted in the room description text.

In general, the organizational concept of each hall is to group the public and academic functions at the center of the building and allow each floor/wing to form smaller community groups and provide higher levels of security. The core public area would primarily include the classroom/seminar rooms, offices, the main lounge, reception, kitchen, and accessible public unisex restrooms, with building common spaces and the academic spaces split between the first and second floors. These areas will be connected by a public stairway and new elevator. The floors on each wing will form a cluster that will house between approximately 25 and 40 students, and each cluster will have a Resident Assistant and a lounge for studying and socializing.

More details of the architectural materials for the project are included in the Existing Condition Survey Assessments in section 4.04.2.

Room Area Table – Andrews Hall

	Unit mix	no.	beds/ unit	total beds	%	area	upgrade	remodel	
Private Spaces	single rooms (comm. bath)	8	1	8	3%	110		880	asf
	single rooms (private bath)	6	1	6	3%	205		1,230	asf
	semi suite w/ bath & singles	6	2	12	5%	370		2,220	asf
	double rooms (comm. bath)	86	2	172	75%	190	16,340		asf
	semi suite w/ bath & dbls	8	4	32	14%	580		4,640	asf
	community bathrooms	9				280		2,520	asf
	shared private bathrooms	3				100		300	
	rap fir/graduate apartment	1				1100		1,100	asf
	total	127		230	100%				
Public Spaces	lounge/study - type a	6				240		1,440	asf
	lounge/study - type b	3				320		960	asf
	main lounge/great room	1				750	750		asf
	kitchen	1				120		120	asf
	coffee cart	1				70		70	asf
	reception/info w/ closet	1				250		250	asf
	public restrooms (1 w/ rap)	2				50		100	asf
	vending machine area	1				50		50	asf
	rap classroom/seminar room	1				450		450	asf
	rap classroom/seminar room	1				350		350	asf
	hall director's office	1				150		150	asf
	rap faculty director's office	1				150		150	asf
	rap admin. assistant office	1				120		120	asf
	rap faculty office	1				120		120	asf
	rap work room	1				100		100	asf
	laundry	1				375		375	asf
	sink niches	9				20		180	asf
	custodial closets	9				40		360	asf
	custodial storage	1				250		250	asf
	storage (attic)	1				1400		1,400	asf
Totals	total net						17,090	19,885	asf
	net/gross*						62%	62%	
	total gross area						27,565	32,073	59,637

* grossing factor accounts for stairs, elevators, halls and wall thicknesses.
 Also mechanical rooms, electrical rooms and communication rooms.

Room Area Table – Smith Hall

	Unit mix	no.	beds/ unit	total beds	%	area	upgrade	remodel	
Private Spaces	single rooms (comm. bath)	8	1	8	4%	110		880	asf
	single rooms (private bath)	6	1	6	3%	205		1,230	asf
	semi suite w/ bath & singles	6	2	12	6%	370		2,220	asf
	double rooms (comm. bath)	78	2	156	76%	190	14,820		asf
	semi suite w/ bath & dbls	6	4	24	12%	580		3,480	asf
	community bathrooms	9				280		2,520	asf
	shared private bathrooms	3				100		300	
	hall director's apartment	1				1100	1100?		asf
	total	117		206	100%				
Public Spaces	lounge/study - type a	6				240		1,440	asf
	lounge/study - type b	3				320		960	asf
	main lounge/great room	1				750	750		asf
	kitchen	1				120		120	asf
	coffee cart	1				70		70	asf
	reception/info w/ closet	1				250		250	asf
	public restrooms (1 w/ rap)	2				50		100	asf
	vending machine area	1				50		50	asf
	rap classroom/seminar room	1				450		450	asf
	rap classroom/seminar room	1				350		350	asf
	rap faculty director's office	1				150		150	asf
	rap admin. assistant office	1				120		120	asf
	rap faculty office	1				120		120	asf
	rap work room	1				100		100	asf
	laundry	1				375		375	asf
	sink niches	9				20		180	asf
	custodial closets	9				40		360	asf
	custodial storage	1				250		250	asf
	storage (attic)	1				1400		1,400	asf
	Totals	total net						15,570	17,475
net/gross*							62%	62%	
total gross area							25,113	28,185	53,298

* grossing factor accounts for stairs, elevators, halls and wall thicknesses.
 Also mechanical rooms, electrical rooms and communication rooms.

Room Area Table – Buckingham Hall

	Unit mix	no.	beds/ unit	total beds	%	area	upgrade	remodel	
Private Spaces	single rooms (comm. bath)	8	1	8	4%	110		880	asf
	single rooms (private bath)	6	1	6	3%	205		1,230	asf
	semi suite w/ bath & singles	6	2	12	5%	370		2,220	asf
	double rooms (comm. bath)	85	2	170	75%	190	16,150		asf
	semi suite w/ bath & dbls	8	4	32	14%	580		4,640	asf
	community bathrooms	9				280		2,520	asf
	shared private bathrooms	3				100		300	
	hall director apartment	1				1100		1,100	asf
	total	126		228	100%				
Public Spaces	lounge/study - type a	6				240		1,440	asf
	lounge/study - type b	3				320		960	asf
	main lounge/great room	1				750	750		asf
	kitchen	1				120		120	asf
	coffee cart	1				70		70	asf
	reception/info w/ closet	1				250		250	asf
	public restrooms (1 w/ rap)	2				50		100	asf
	vending machine area	1				50		50	asf
	rap classroom/seminar room	1				450		450	asf
	rap classroom/seminar room	1				350		350	asf
	rap faculty director's office	1				150		150	asf
	rap admin. assistant office	1				120		120	asf
	rap faculty office	1				120		120	asf
	rap work room	1				100		100	asf
	laundry	1				375		375	asf
	sink niches	9				20		180	asf
	custodial closets	9				40		360	asf
	custodial storage	1				250		250	asf
	storage (attic)	1				1400		1,400	asf
	Totals	total net						16,900	19,735
net/gross*							62%	62%	
total gross area							27,258	31,831	59,089

* Grossing factor accounts for stairs, elevators, halls and wall thicknesses.
 Also mechanical rooms, electrical rooms and communication rooms.

Student Rooms/Suites

The majority of the student rooms will have the same configuration; double occupancy bedrooms with shared community bathrooms centrally located in each wing room cluster. There will also be a small percentage of single occupancy rooms. Ideally, rooms of the same type will be as close to identical to each other as possible.

The goal for this project is to have 20% of the beds in unit types that will attract non-first year students. These will be a mix of units that offer semi-private bathrooms and single or double bedrooms. Some of these beds will be in “semi-suites” which consist of two single or two double bedrooms sharing a semi-private bathroom. Some rooms with private baths will also be provided in the mix.



Single rooms will be provided for resident assistants, the goal is to have one resident assistant (RA) per 35 students for first year students, RA's for non-first year students may have up to 70 students. RA's will use the community bathrooms.

Housing has generally found that triple rooms negatively impact student socialization so all of the existing triples have been eliminated in this program plan.

The reconfiguration of suites and the addition of the floor lounges will reduce the total number of beds from the current level of 269 to 230 in Andrews Hall, from 242 to 206 in Smith Hall, and from 256 to 228 in Buckingham Hall. This loss of beds will be absorbed by the currently available capacity at Bear Creek Apartments. If there is demand for more beds in the Kittredge Complex, an addition to the Complex will be considered during subsequent design phases to add bed spaces.

Students like the idea of flexible movable furniture and built-in closets with shelves to maximize storage capability.

Community Bathrooms

Improving the bathroom spaces is high on the list of student priorities. In addition to the more private options mentioned above, students would like to see improved finishes, increased privacy, better lighting and control over the heating and cooling. New bathrooms should be designed to improve privacy by providing a changing area within each shower stall and compartmentalized bathrooms where possible. Bathrooms shall be designed to meet the social and developmental needs of students, as well as accessibility requirements. An attempt will be made to increase the number of plumbing fixtures in each bathroom. In addition to the shared community bathrooms, there will be approximately three unisex accessible bathrooms in each building for students requiring more privacy.

Apartments

Smith Hall currently has a recently constructed Hall Director's Apartment which will remain. A new Hall Director's Apartment needs to be provided in Buckingham Hall. A new Faculty-in-Residence (FIR)/Graduate Apartment needs to be provided in Andrews Hall. Even though Smith and Buckingham Halls will have academic programs, no FIR/Graduate apartments are planned at this time; however, re-analysis of the academic program needs may find that this type of apartment could be desirable. With the exception of the Hall Director's Apartment in Smith, all of the existing apartments in the buildings will be converted to student rooms/suites

Great Room/Main Lounge

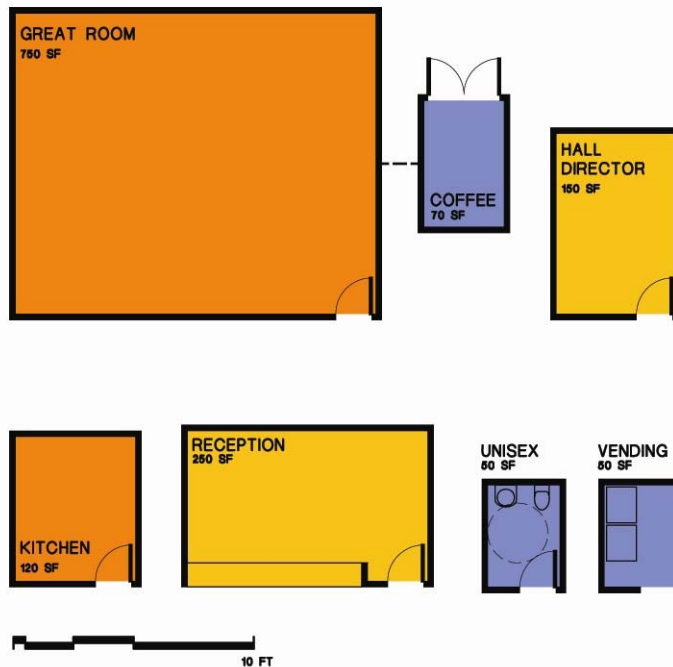
The Great Room/Main Lounge should be adjacent to a primary building entrance, possibly in the same locations as existing lounges. This lounge should serve as the social heart of the building and have a strong connection both to the circulation patterns within the building and the outside.

Food/Beverage Location

Adjacent to the main lounge, a small cart storage closet will be provided with electrical power to store a food and beverage cart. The cart will be pulled out of the closet for special functions. The cart will be self contained from a plumbing perspective, but easy access to the kitchen would be ideal.

Kitchen

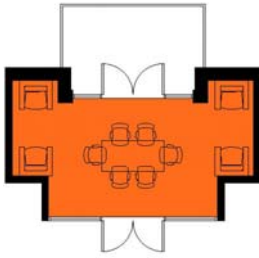
One public kitchen will be included in the renovated building. It should be in close proximity to the main lounge and have upper and lower cabinets, sink, and full sized residential appliances including a range, exhaust hood, refrigerator, dishwasher and microwave. This room should be secured to facilitate its management.



Central Common Spaces

Reception/Information Desk

This space needs to be within easy view of the main building entrance and will serve hall visitors as well as provide a place to store and check out vacuum cleaners, games, etc. during high service hours for residents. There will be a desk or counter and storage closet adjacent to the room. An intern desk area should also be provided in this space.



Floor/Study Lounge

Floor Lounge/Study Lounge

Students noted that small floor lounges are more frequently used than large ones that serve the entire hall. These rooms will function as both social and study spaces. This program plan recommends converting the larger upper student lounge areas into academic spaces and adding smaller floor lounges to each floor of each wing as part of each student room clusters. These spaces should be equipped and furnished to support both study and social functions.

Providing glass from the corridors into these lounges will achieve several things; it enhances the social functionality by being able to see whether there are students in the lounge, it will provide some modest amount of natural light into the corridors, and it provides views through the lounge to the outside which provides a sense of orientation that is currently lacking in the circulation spaces. It would be desirable to have these spaces adjacent to the existing exterior balconies where possible.

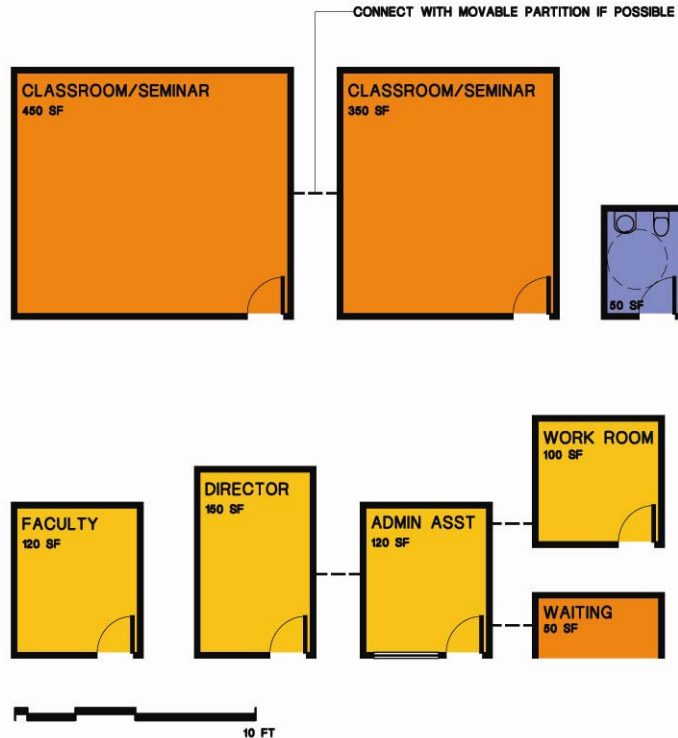
Laundry Rooms

Laundry rooms are currently distributed through the wings of the building. This option is convenient to the students, providing closer proximity to their laundry and good security. However the floor area associated with these spaces may be required for other program requirements, such as the improvements to the community bathrooms. An acceptable alternative will be a single large centrally located laundry room. This alternative allows for the laundry room to become a more social space. Maintenance is also easier with one room rather than multiple rooms.

Classroom/Seminar Rooms

The classroom/seminar rooms are the central support spaces for the Residential Academic Program (RAP). They will serve as spaces for RAP classes as well as other academic meetings and study/review sessions. These rooms should be able to accommodate 15 to 20 people. The furniture should be flexible, i.e. no single large conference table. It is desirable for these two rooms to be connected, where existing building configuration will allow, with a movable partition between the two rooms. This will provide for more flexibility of use. These rooms will need to have teaching technology support, but since the rooms will also be open for unsupervised after-hours activities, the A/V equipment will need to be secured. One natural after-hours function of the room will be as a "home theater" which is highly desirable to the students.

For maximum usefulness for summer conference activities, the public areas of the building, including the main lounge and classroom/seminar rooms, will be easily accessible to visitors but access to the residential corridors will be controlled.



Academic Program Spaces

Offices

Basic offices will be provided for residential Academic Program Faculty and Residence Life staff. The offices will be clustered near the public central areas of the building and each should provide office space for one to two people.

Telecomm Rooms

Rooms and closets for the distribution of phone and data services will be provided based on the needs of the project as determined during the initial design phase of the work.

Custodial Closets

Each floor of each wing will have a custodial closet with a mop sink and storage capability. As the Housing Department moves toward just-in-time delivery there is less need for larger central storage spaces for custodial supplies and linens. However, a larger central storage room, located near the service dock is included in this program.

Storage

In addition to the custodial storage described above, general building storage will be provided. Spaces which cannot be utilized for other program use, such as existing code-compliant attic areas, should be used for this function.

ENERGY CONSERVATION AND ENVIRONMENTAL SUSTAINABILITY

The University has always taken pride in providing leadership in the area of environmental concerns, including sustainable design initiatives. These projects will seek sustainable design solutions that balance the environmental impacts of the project while maintaining affordable living options for students.

In support of the campus' commitment to providing global leadership in sustainability and green/carbon neutral research, education, and implementation, the renovations of Andrews Hall, Smith Hall and Buckingham Hall may provide an ideal opportunity for a new partnership between Housing and Dining Services, the residents, and interdisciplinary academic programs at CU. Preliminary concepts are being developed which may guide the renovations and provide students, experts, industry and local leaders an opportunity to design, implement, and evaluate new sustainable design, construction, technology, equipment and processes as part of their academic programs and by living in the most environmentally modern building at CU. This proposed model will be reviewed by the Residential Campus 2020 implementation team over the next few weeks. In addition, the students and faculty leaders will be in an ideal situation to carry out studies of the impact of behavior on such issues as conservation, recycling, and energy efficiency. This community will be an important element of supporting the commitment to interdisciplinary study and environmental leadership - emerging themes from the Flagship 2030 Initiative

The US Green Building Council has developed a scoring system for sustainable projects called LEED (Leadership in Energy and Environmental Design) that provides a template for sustainable design efforts. The design team will use the LEED checklist as a design tool to review which strategies would be applicable and successful for this project.

The University created one of the first on campus recycling programs in the country; it received the 1995 Campus Recycler of the Year award as the best University recycler in the nation, from the National Recycling Coalition. These buildings will continue to provide locations to collect recyclable materials and the construction contractor will be encouraged to recycle construction waste during the renovation work.

The process of renovation in itself preserves natural resources and saves energy due to the reuse rather than replacement of systems and materials. In cases where replacement or new construction is necessary sustainable and recyclable materials are considered throughout the design and construction process in conjunction with functionality, maintenance, and cost issues. These structures are built with local native stone and clay tile roofing which have a low embodied energy and a very long life span. Building envelope improvements will increase energy efficiency and comfort based on a life cycle cost analysis.

Energy efficient equipment, including Energy Star rated appliances and high efficiency pumps will be specified for the project. New HVAC systems will be more efficient while providing greater comfort to the residents. Low water use plumbing fixtures will be used. High efficiency light fixtures will be used along with lighting controls to maximize light while reducing electrical consumption.

Interior materials will be selected on the basis of durability, low maintenance and low toxicity to ensure high indoor air quality.

MECHANICAL SYSTEMS

Heating

The new hydronic heating systems for Andrews, Smith and Buckingham will be centrally pumped and piped throughout each building. This heating water for each building will be generated through two steam to hydronic heat exchangers. The existing 4" high pressure steam line (130 psig) will be reduced to low pressure steam (10 psig) through a Leslie GPK pressure reducing station (PRV) with two full size valves in parallel. The condensate pump will be powered by compressed air (CA) provided by campus CA and a backup air compressor located in each building. Room heating terminals will be 4-pipe fan coil units (two pipes for heating and two separate pipes for chilled water), with individual wall mounted sensors to control the space temperature. Hydronic cabinet unit heaters will be provided to heat common areas. Hydronic unit heaters will be provided in mechanical rooms. New heating water piping will be either black steel schedule 40 or type L copper. The steam and condensate piping will be black steel schedule 40 and 80 respectively.

Cooling

The new cooling system will be chilled water provided from a remote central chilled water plant. Generally, the main chilled water will be delivered and distributed by the installation of direct buried piping looping the Kittredge Complex. This piping is outside the scope of this project.

Each building will be served by two 5" direct buried chilled water branch (supply and return) pipes from the main piping loop. The Andrews branch piping length is approximately 200 feet total (supply and return) while the Smith and Buckingham branch piping length is approximately 160 feet total. Each chilled water entry room will need to be approximately 10' x 10'. The space will be sized for two pumps (one primary, one stand by), VFD's, control panel electrical panel, air separator, expansion tank, automatic make up water fill, PRV, reduced pressure backflow preventer, coupon rack, filter feeder, metering, piping and isolation valves.

The pumps for each building will be base mounted type with high efficiency inverter duty motors. Each pump will be set on a concrete inertia base and will have individual isolation and check valves as well as flow meters, pressure gauges and flexible pipe connectors. Each pump will have a capacity of approximately 300 GPM @ 65 ft of head, 10 HP each. Each building will have chilled water BTU metering with a 1% accuracy over a range of 100:1. All pumps, VFD's, BTU metering, etc. shall interface and be controlled by the new Andover DDC control system.

The chilled water entry room will have appropriate fire protection sprinkler coverage and smoke detection from the building systems. The pump room if located adjacent to any living space will be provided with an STC rating of 55. The room will require minimum ventilation and heat for freeze protection.

Room air conditioning will be through the same 4 pipe fan coil units as the heating system, mounted in each room. Chilled water piping routed inside the building will be black steel schedule 40 or type L copper.

Supply Air System

The fan coil units will circulate air in each room to heat and cool the space to maintain temperature. Conditioned ventilation air will be ducted to each fan coil unit from a central makeup air handling unit(s) provided for each building wing. The ductwork will be lined galvanized sheet metal. The ventilation air will also provide a building positive air pressure to minimize the infiltration at exterior doors and windows.

Exhaust Air Systems

Exhaust air will be provided for the restrooms, kitchen, janitors closet, housekeeping storage and similar spaces. An exhaust fan(s) will be provided for each building wing.

Temperature Controls

A direct digital control system (DDC) will be provided by Andover to maintain building temperature control for the rooms and individual equipment. This will be a new Andover control based system networked to the main CX panel in Kittredge Commons and will be monitored by HFS during business hours and Facilities Management during non-business hours.

Plumbing Systems

A new 3" domestic water service supplies the cold water to each building. In accordance with UCB standards, a reduced pressure type backflow preventer will be provided at the new water service. Vacuum breaker type backflow protection will be provided at equipment connections, janitorial faucets and hose bibs. A new water pressure reducing station will be provided at each building main service to maintain an acceptable operating water pressure. Domestic hot water for each building will be generated through two Armstrong Flo-Rite feed forward type steam-to-hot water generators. 110°F water will be generated and circulated throughout each building with an in-line pump. A new 6" building drain will serve the waste needs of each wing (3 total per building) and connect to the site piping approximately 5'-0" outside the exterior building walls. All domestic water piping will be type K copper. Sanitary waste and vent piping above grade will be copper and no hub cast iron. Below grade waste piping will be hub and spigot type cast iron.

Fire Protection System

An existing 4" main fire service with backflow preventer will remain for each building. A new concealed automatic fire sprinkler system will be provided with full coverage on each floor. The sprinkler system will comply with NFPA 13 for common areas and NFPA 13R for sleeping rooms. Sprinkler systems serving elevator equipment rooms and shaft will be provided per the UCB standards.

ELECTRICAL SYSTEMS

Electrical Distribution System

The new electrical distribution system for each building will include larger pad mounted transformer, new service distribution equipment, new feeders and new panels. New branch circuit panels with adequate spare capacity will serve each floor. The panels will be located in electrical closets. A minimum of three branch circuits will be provided for each resident room, one circuit being dedicated to computer equipment the other serving appliances: refrigerator, microwave etc. The meters for the electrical power to each building should be upgraded to incorporate remote reading.

Lighting System Maintenance personnel stated the wall mounted fixtures in the student rooms were an on-going maintenance issue and should be replaced. The present lighting configuration is not particularly efficient, although the fixtures have been re-ballasted and re-lamped with electronic ballasts and T-8 lamps and incandescent lamps have been replaced with screw-in compact fluorescent lamps. It is recommended to provide new, more attractive luminaires in the bedrooms and common areas.

Existing corridor lighting fixtures including the lights serving the path of egress were upgraded recently with new energy efficient T8 fluorescent lamps and ballasts. The egress and exit luminaires were provided with self diagnostics battery packs. We recommend reusing these lights wherever surface mounted fixtures are needed.

Fire Alarm

The fire alarm systems in Andrews Hall, Smith Hall and Buckingham Hall are connected to the fire alarm control panel in Kittredge Commons, which reports to the UCB campus fire alarm system. The system needs to be upgraded to meet the requirements of the latest edition of NFPA 72 and UCB standards.

Audio and visual notification appliances shall be provided in the means of egress, common areas as well as in each bedroom and outside each sleeping area as defined in the International Fire Code, 2003 edition. In addition, there will be integrated with the Fire Alarm system, a voiceover PA capacity identical to that at Arnett Hall with the ability to voice address by floor, wing and all-call. The single station smoke detector in the bedrooms will be replaced and will be supervised by the building main fire alarm.

A new Simplex 4100U fire alarm control panel with increased capacity will replace the existing fire alarm transponder. The panel will connect to the campus fire alarm system. The transponder is a Simplex fire alarm panel without the control interface features. Existing Simplex fire alarm devices compatible with the new panel will be reused.

Phone/Data System

We recommend replacing existing voice/data system with new. New cables should be concealed in conduit. New voice/data devices will be located at each desk and/or bed in every room. Common areas will be equipped with a wireless network.

We recommend making provision for future wireless access points and cabling to provide wireless networking throughout entire building to integrate the building into the UCB IT wireless initiative.

Security System

A new access controlled security system should be installed at the building entrances and will be accompanied by a two way communication to a permanently manned location in each residence building or on the campus.

We also recommend providing wiring for security cameras at doors and other identified locations, as well as wiring for wheelchair accessible door access systems at the main entries as well as within the building.

Cable TV System

Cable TV distribution system will be provided for the entire building with individual TV connection jacks located in common areas and at each bed in individual rooms.

Remote monitoring system

We recommend adding wiring for remote monitoring of mechanical and electrical systems for maintenance by installing necessary fiber and CAT5e or CAT6 wiring to identified locations.

Communications room

We recommend all communications wiring and equipment be brought together in one room including networking, phone, CATV, security, access, etc

4.04 Building Conditions Survey

This building condition survey is based on visual inspections of the three buildings and adjacent site areas, a review of the original construction documents, review of the deferred maintenance projects identified by the University, and discussions with the Housing Services staff responsible for maintaining and operating the buildings. No invasive testing was included in this survey. Testing information was provided by the University.

4.04.1 Description of Building Conditions

Andrews and Smith Halls were built in 1963 and Buckingham Hall was built in 1965, with the intent to create long-lasting facilities that would serve the University for many years to come. The buildings have weathered their first four decades well, but the life spans of the interior finishes and systems have been reached.

The sites have relatively minor settling issues resulting in some cracked paving and ponding. There are signs of paving joint and site wall joint deterioration. The exterior envelopes of the buildings are generally in good shape except the windows need to be replaced and minor cosmetic problems. Exterior fascias, soffits and railings at Smith and Buckingham Halls have recently been repaired and refinished. This work needs to be included in the Andrews Hall project scope. Smith and Buckingham Halls are only partially accessible for the disabled. Full accessibility needs to be provided to all of the public spaces. The interior surfaces are well worn in all of the buildings and new finishes need to be provided throughout.

Since the University plans to continue using the buildings for their original use (student housing), there are no significant structural changes required. Some interior structural modifications may be necessary related to the academic program spaces, such as relocating columns to create the larger classroom/seminar spaces at Andrews and Smith Halls. Structural modifications will also be required for elevators and ramps to provide for full accessibility. New floor openings may also be required for new mechanical penetrations.

By and large, all of the buildings systems including HVAC, plumbing, electrical, data, fire, and security need replacement.

4.04.2 Existing Condition Survey Assessment

The program plan team led by Anderson Mason Dale Architects with Shaffer Baucom Engineering & Consulting, mechanical/electrical engineers, have prepared existing condition survey included herein.

4.04.2.1 Overall Site Survey

The buildings are sited in a landscaped composition with the other Kittredge buildings organized around a central pond. The landscape is characterized by mature deciduous and evergreen trees and lawn. The landscape scope of this project is limited to repairing or replacing those areas disturbed by the renovation construction work, repairs to existing paving systems, and possible accessibility related modifications.

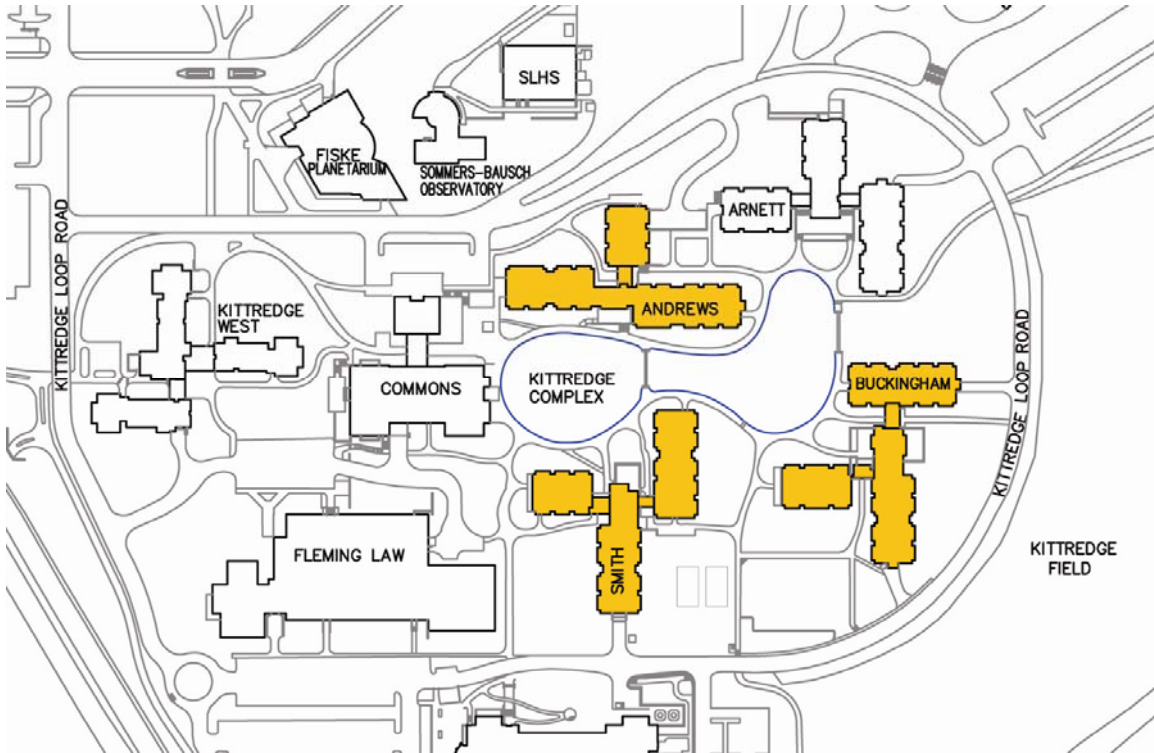


Terrace paving problems



Deteriorated paving and cosmetic issues

The existing site walls, flatwork and stairs have seen a moderate amount of settling and movement. This plan calls for the replacement of flatwork that has settled enough to create tripping hazards when walking through the site, and where settlement has led to drainage problems and significant damage. In addition, some steps may need to be replaced with ramps to improve the accessibility to some building areas. Mortar repairs will be required at some site walls, but there are no significant signs of structural movement.



Site Plan

Some terraces outside of main lounge spaces are currently used for bike storage with bike racks mounted to the slab. New locations should be found for bike racks on concrete pads and the terraces returned to their original use as outdoor gathering places for students. Fixed furniture in the terrace is a welcome amenity to students who use outdoor spaces the better part of the academic year. The furniture should be vandal resistant and permanently mounted to the slabs. New ramps shall be 5 feet wide at a minimum to facilitate snow removal. Pavement should be added to muddy areas that are used as shortcuts by residents. Drainage problems need to be corrected as part of the renovation work. New curbs and paving should be provided at existing loading dock drives. The landscaping portion of the work should comply with the Housing Landscape Master Plan of 2002 which established design guidelines for all housing projects.



4.04.2.2 Building Envelopes

The building envelopes are generally in good condition and have been well-maintained. The one exception is the windows which are ready to be replaced.

Walls

The exterior walls of the buildings are constructed of reinforced 6" concrete block masonry faced with 6" red sandstone veneer. The cavities are grouted solid consistent with standard practice on the CU Boulder campus. The interior plaster is applied directly to the inside face of the concrete masonry. This wall assembly is a very durable and long term system. With periodic re-pointing of the outside stone, there is no reason the walls cannot last indefinitely. Currently there are some very minor areas that are in need of re-pointing. Note that the stone should be re-pointed with mortar that is softer than the sandstone to ensure that the mortar rather than the stone deteriorates over time as moisture moves through the wall assembly.

There is no vapor barrier or air infiltration barrier in the basic wall assembly except at the top of the wall where the wood glue-laminated beams are integrated with the wall assembly. In this area there is a vapor barrier on the inside and building paper on the outside to protect the wood from moisture.

The insulation value of the existing materials is estimated at about R 3.85 including the value of the interior and exterior air films. Insulation should be added to the exterior walls to improve the R-value. Adding insulation to the interior faces would reduce the available floor area within the student rooms which are already very tight. The University should consider the payback on improved energy-efficiency versus the first cost of adding the insulation.

Windows

The original room windows are aluminum frame with single glazing, operating as horizontal sliders. The operable sash sections are generally very loose in the frame implying that they allow significant air infiltration into the building. These windows form the weak link in the thermal envelope of the building both from an insulation and an air infiltration perspective. The single glazing provides essentially no thermal resistance and similarly the frames are not thermally broken, therefore offering little thermal resistance. The locking mechanisms have largely been supplemented by a large cotter pin attached to a short piece of sash chain that can be inserted in various holes to fix the window in closed or partially open positions. It is recommended to replace

all existing windows with aluminum windows with thermally broken frames and low-e insulating glass units. New window frames should be dark bronze in color to match the existing windows and shall have the most durable insert screens available. Glass aluminum framed walls in areas like the main lounge should also be replaced with a thermally broken aluminum storefront/curtainwall system with insulating glass.



Windows show deterioration



Fascia repair/repaint required at Andrews

Roof

The existing roofs are the original clay tile. Like the wall system, this roof is a long term system; there are clay tile roofs on campus that are still in service after 70 years. A recent maintenance project replaced cracked tiles and this will continue to be an ongoing maintenance cost. The roof assembly consists of 2x6 purlins on glue-laminated wood beams with 7/8" wood sheathing. The clay tiles are underlaid with roofing felt. The 5/8" gypsum board ceiling is attached to the 2x6 purlins and faced in wood tongue & groove ceilings and soffits. There is 3-1/2" batt insulation in the 2x6 space. Additional insulation will be added to the roof assembly at the interior side.

In addition to maintaining the roof tiles, there are minor maintenance repairs to the fascia, soffits, and roof flashing. Fascias and soffits at Smith and Buckingham have been recently refinished. At Andrews Hall, the fascia boards will be scraped and re-painted and the wood soffits refinished. Minor repair and replacement of wall to roof flashing is necessary in a few areas. Additional roof guards, gutters/downspouts, and repairs to existing installations may be necessary at critical areas of pedestrian traffic or drainage problems.

4.04.2.3 Structural Systems

Roof Structure

The existing roof structures consist of sloping wood glu-laminated beams supporting 2x6 framing and 1 inch wood sheathing which bear on top of the beams. The glu-laminated beams are supported on steel pipe columns and extend several feet beyond the exterior walls creating varying sized roof overhangs. The roof structure appears to be in good condition. If new openings are required through the roof, as long as they fit between the wood glu-laminated beams, the 2x joists and wood sheathing can be easily modified.

Floor Structure

The existing floors in the building wings consist of a 7 inch deep two-way concrete flat plate slab reinforced with mild steel reinforcing. The bridges connecting the wings at the second level consist of one-way 8 inch deep concrete slab with edge beams and the stairs accessing the floors are typically steel framed construction. The slabs are supported on relatively closely spaced steel

pipe columns with the perimeter columns buried within the exterior masonry walls and supported on a continuous grade beam foundation. It appears that all floor slabs are structured reinforced slabs with the exception of slabs at mechanical rooms which are 6 inch thick slab-on-grade. It appears that the rest of the ground level slabs are over crawl spaces.

The existing floor slabs appear to be in good condition in the areas where they could be viewed. Concerning new slab openings, concrete flat plates can accommodate small openings preferably in the center half of the slab span between supporting columns without adding strengthening. If openings are closer to the columns or need to be large enough to accommodate new ducts, supplemental framing or new masonry shaft walls may be required. Due to steel shear plates embedded in the slabs at each of the steel pipe columns, new openings, including plumbing and conduit penetrations, should not be located any closer than 12 inches from the column centerlines.

Foundations

The perimeter foundations consist of reinforced concrete grade beams spanning between drilled concrete caissons. The foundations for the interior columns consist of isolated caissons formed and poured up through the crawl space to the bottom of the ground level concrete flat plate floor slab. The building foundations appear to be in good condition based on lack signs indicating structural movement.

Site Walls

The existing low site retaining walls up to 30 inches above the lowest grade consist of two wythes of unreinforced stone supported on a continuous concrete footing. The taller site retaining walls consist of 8 inch concrete cantilevered walls veneered with 6 inches of stone veneer bearing on continuous footings.



Site wall with deteriorated mortar joints

There no significant signs of structural movement in the site walls. The mortar joints in some areas are in need of replacement, either because of mortar deterioration or weak repairs in the past. Some of this joint degradation appears to be the result of poor drainage conditions where grade is higher on one side of the wall. The drainage problems should be corrected to minimize future maintenance. The stone cap head joints should also be redone in some areas.

Further investigation is needed to determine the cause of the large horizontal cracks in the walls along the east edge of the plaza paving at the south side of the building and to determine if the cracking noted extends through the concrete wall behind the stone veneer.

4.04.2.4 Building Systems

Heating

The heating systems in Andrews, Smith and Buckingham are more than 40 years old each and are reported to have developed leaks and are of questionable condition. They are beyond their useful life expectancy. Therefore, we recommend a complete replacement be considered.

Cooling

There is no cooling system currently in the building. Based on student input, air conditioning is strongly desired.

Supply Air System

There is no central supply air system to provide conditioned ventilation air to each room. Therefore, we recommend that one be provided to supply recommended amounts of outside air to each space.

Exhaust Air Systems

The existing exhaust air system ductwork and fans are more than 40 years old. This system is beyond its useful life and is recommended to be replaced.

Temperature Controls

The existing temperature controls are inadequate and incomplete. A new DDC based Andover control system is recommended to provide better control and monitoring of equipment and reduce energy consumption.

Plumbing Systems

The existing plumbing system consisting of the fixtures, domestic cold and hot water, circulation, sanitary waste and vent, and roof drain piping, is more than 40 years old. The domestic water and waste piping systems are reported to have developed leaks and the system is generally of questionable condition. It is beyond its useful life expectancy. Therefore we recommend a complete replacement be considered.

Fire Protection Systems

The existing fire sprinkler system was installed in 1995 and appears to be functional. However, the piping was installed exposed in many areas inviting vandalism and is visually unattractive. Therefore, we recommend, replacing the fire sprinkler piping downstream of the fire service main and installing it concealed above the ceiling or in soffits.

Electrical Distribution System

The electrical distribution system in Andrews Hall is not configured for ready maintenance and does not appear to meet National Electrical Code (NEC) requirements for access. Access to the main switchboard is through a student's room, which is not an optimal situation. Only some of the maintenance personnel are familiar with the access to the switchboard location. We were not able to survey the existing equipment however based on the configuration of existing equipment in the other buildings we anticipate the equipment will require replacement or upgrading. Relocating the main switchboard would be very expensive and is not recommended. Reconfiguration of the space to permit ready access to the switchboard would require reassignment of the student living space and may require significant architectural modification.

The main distribution switchboard for Smith Hall is located in an electrical closet located in a main corridor. When the right side door is open it interferes with one of the corridor doors, such that when a person using the corridor opens the door it hits the door to the

electric closet. This creates a potentially a dangerous situation if an electrician was working on a unit in the switchboard and the access door closed on him/her. The switchboard is an 800 amp Square-D QMB fusible unit, the QMB equipment is still in production, however it may be necessary to upgrade the equipment to provide overcurrent protection for additional lighting and receptacle panelboards.

The main distribution switchboard for Buckingham Hall is located in an electrical closet located in a main corridor. One of the doors to the electrical closet cannot be opened fully due to interference with a light fixture, resulting in inadequate working clearance at the front of the switchboard. The switchboard is a Square-D QMB fusible unit; however the main nameplates have been removed. The Square-D QMB fusible system is still in production and appears to be serviceable, however it may be necessary to upgrade the system to provide overcurrent protection devices for additional lighting and receptacle panelboards. There is also a fire sprinkler head located directly over the switchboard, which may create a hazard if the head was discharged by accident or as an act of mischief.

Presently the electrical meters for each building require manual reading by a member of the electrical maintenance staff. As part of the upgrade the meter should be replaced with a remote reading type and a telecommunications line extended to the meter location. The meters would report to the campus wide utility monitoring system.

The receptacles in the student residence rooms in all three buildings appear to be configured to one branch circuit per room. This results in extensive use of plug strips and extension cords to supply power to computers, microwave ovens, refrigerators, televisions, stereo sets, and other miscellaneous appliances. There should be (3) circuits per student room to provide adequate power for the residents. This upgrade will require the installation of additional panelboards on each level to provide adequate power. The circuits should be distributed horizontally on the floors rather than vertically to minimize future troubleshooting activities.

One issue to be addressed during the design of the electrical upgrades is providing adequate space for raceways. Extensive use of surface raceway was noted indicating the access above the ceilings is limited.

Lighting System

The majority of the light fixtures in all the buildings are old, surface mounted on the ceiling and/or wall. Due to old age, the lighting fixture reflectors have lost most of their reflectivity; consequently the lighting level in the bedrooms, corridors and common areas is low. Even with the new T8 32 watt lamps that were retrofitted in existing lights to reduce energy usage, the lighting level remained low. Elimination of the wall mounted general illumination fixtures in the student rooms and use of ceiling mounted fixtures with a reading lamp at the bed locations should be considered. Incandescent lamps have been replaced with screw base self-ballasted compact fluorescent lamps.

The original exit light fixtures have been replaced with recent manufacture polycarbonate housing fixtures. These fixtures are not vandal resistant and have been damaged and or removed in many areas. Consideration should be given to replacing the exit light fixtures with vandal resistant fixtures with LED lamping or installing vandal shields, secured with tamper resistant hardware at the exit lights. We recommend replacing the exit lights with an Exitronix LED sign with tamper resistant hardware.

The existing exterior light fixtures are primarily incandescent PAR floodlight fixtures mounted on the building overhangs. These fixtures require personnel-lifts for re-lamping and in many cases are inaccessible due to foliage growth. Recessed fixtures in exterior applications are left on 24 hours per day due to removal of the manual switches to prevent

tampering by the building residents. Use of pole mounted full cutoff optic fixtures or bollard fixtures with shields to replace the building mounted floodlight fixtures should be considered. If bollard fixtures are selected the fixtures should be of substantial construction, such as the Gardco BRM822, to mitigate damage from vandalism. Some of the entry points have been provided with shoe box style fixtures over the doors. These fixtures should be replaced with an architectural wall mounted fixture with full cut-off optics. All egress doors should be provided with an exterior emergency lighting fixture in accordance with the International Building Code (IBC) 2003 edition. This could be a 12VDC lamp in the exterior fixture with a remote battery inside the building.

A lighting control system should be provided for the exterior lighting fixtures. The system would utilize a photocell and time clock to provide lighting and control the operating costs and should be line voltage type with readily replaceable plug-in type contactors. The system should provide for key controlled manual override of the automatic system. The time clock function could be provided by a Building Automation System such as the Andover in use at UCB.

Fire Alarm

The existing fire alarm system needs to be upgraded to meet the requirements of latest edition of NFPA 72 and UCB standards. The existing system is configured as Simplex addressable transponders with local annunciators in Andrews, Smith and Buckingham Halls reporting to a Simplex fire alarm control panel (FACP) in Kittredge Commons. The FACP reports to the campus wide fire alarm and detection monitoring system. A transponder is an addressable fire alarm panel without the control functions, limited control, e.g. silence, reset, display scroll, is available at the building annunciator. This system provides reliable detection and is serviceable however it requires an additional person at the Kittredge Commons location during maintenance and testing. Installation of a FACP at each building will allow fire alarm maintenance personnel the ability to update programming and perform other diagnostic functions at the building. It appears the majority of the detection devices and notification appliances will be able to be reused on the upgrade.

A voiceover public address system needs to be integrated with the fire alarm system, with the ability to voice address by floor wing and all-call. Capacity shall be the same as the new system at Arnett Hall.

We recommend the existing single-station smoke detectors be replaced with devices with integral sounder and visual notification for ADA compliant sleeping areas, supervised by the fire alarm system. Detection in the corridors outside the sleeping areas requires review for compliance with IFC requirements. Although under the International Fire Code (IFC) 2003 edition, Group R-2 occupancy fully sprinkled building with automatic flow switches activating the notification appliances only requires one manual pull station we strongly recommend providing manual pull stations at egress points within the building.

Detection for elevator recall should be evaluated to verify the configuration meets the current requirements of ANSI A17.1, Safety Code for Elevators and Escalators, the IFC and IBC.

Phone/Data System

The building is equipped with voice and data devices. The system cables are routed in surface mounted wire-ways installed in the corridor ceiling and on bedroom walls. Condition of the cables is unknown. The data cables may require upgrading to CAT5e or CAT6 to be consistent with UCB current IT standards. Each residence room is served by 2 data outlets and one phone outlet. Additional data outlets may be required to integrate remote utility metering and remote monitoring of the Andover Building Management System.

Security System

We recommend providing a new security system in accordance with UCB standards. Due to the nature of the facility the location and type of security sensors should be reviewed with the Department of Housing and Campus Police. Closed Circuit Television (CCTV) Cameras at exterior entrances especially near bicycle racks may reduce potential for some criminal activities.

The access control system is compatible with the current campus standard cards.

Cable TV System

The building is not equipped with a TV cable system that extends to each bedroom. The Department of Housing should evaluate whether this change is required.

4.04.2.5 Interiors

Since these renovations are driven in significant part by needed repairs and upgrades to the interior architectural components, this supplementary information is provided. The programming process included gathering information from students about their preferences for the Halls at a Residence Hall Association meeting and through an on-line survey of students currently living in the halls. 1800 students responded to the survey. Several issues related to the physical environment of the building emerged as consistent top priorities: Improvements to the bathrooms, acoustic separation, access to a kitchen, improved lighting (warm and plentiful,) and better control over the interior temperature. Other desirable qualities were carpeted floors and colorful interiors that help to create a warm residential atmosphere. Flexible furniture, spaces and increased student privacy are also issues that came up more than once. Storage space is welcome to students and built-in storage is preferred for its greater capacity. The issue given top priority by the greatest number of students remains low rents, which is a reminder that careful attention to providing maximum value is critical to the success of the project.

The University has preliminary asbestos assessments for the buildings. Final assessments need to be performed to confirm status of 'presumed' materials listed below. The renovation work will include abating these hazardous materials. Following is a summary of the hazardous materials found in these buildings. The information applies for all three buildings unless indicated otherwise:

*UNIVERSITY OF COLORADO - DEPARTMENT OF HOUSING
ASBESTOS ASSESSMENT FACILITY IMPROVEMENT
MEASURES (FIM)*

1.0 ASBESTOS SUMMARY

1.1 Asbestos-Containing Materials (ACM)

- > Pipe insulation in mechanical rooms and tunnel*
- > Floor tiles*

1.2 Presumed Asbestos Containing Materials (PACM)

- > Roofing/flashing*
- > Pipe insulation throughout balance of building (see 1.1 above)*
- > Window putty*
- > Insulated doors*
- > HVAC flex connectors*
- > Adhesives*

- > *Chalkboards*
- > *Light fixtures*
- > *Ceiling tiles in Smith Hall, rooms 144, CRC100, and bathrooms*
- > *Drywall joint compound and surfacing materials (except plaster)*

1.3 *Non-asbestos-Containing Materials*

- > *Ceiling tiles (except as noted above)*
- > *Plaster*

Before construction, a lead paint screening of the entire building should be completed. Initial samples have not shown the presence of lead paint, but a complete screening is still called for, affected systems may include windows, doors and other architectural components.

The students named acoustic separation as one of their most important criteria. The typical interior wall assemblies consist of metal studs with 3/8" gypsum lath and 3/8" plaster on metal clips on both sides. This assembly has a high STC (sound transmission coefficient) rating in theory, but often the clips are not effectively isolated and there are back-to-back outlets that penetrate the acoustic rating. Acoustical batt insulation should be added to some walls to improve the acoustical separations.

The finishes in the restrooms including the tile and countertops are in need of upgrades and the layouts of the bathrooms do not accommodate accessibility requirements or student preferences. This program plan includes reconfiguration of the existing community bathrooms to provide greater privacy and meet accessibility standards. A separate bathroom that would serve students with special needs should be included in the re-configuration at several locations in the buildings. In the areas of the building to be re-configured into semi-suites a single bathroom will be shared by two double bedrooms or two single rooms, and several rooms will have private baths.

Generally, accessibility within the buildings is good, elevators are provided within two of the three wings in each building, Modifications will be required in Buckingham Hall and Smith Hall to make ground floor lounges accessible from the interior of the buildings. New elevators will be required to serve the second level academic spaces since the existing elevators are located somewhat remotely in the secured residential wings. Approximately 5% of the living units will need to be fully accessible.

The doors and hardware throughout the building have served their useful life and will need replacement. The door hardware should be upgraded to provide card access. Some door frames may be able to be re-used in the areas where partitions are not going to be moved.



Non-Compliant Guardrails



Exposed Building Systems

4.04.3 Financial Report

Cost Estimate

The cost estimates were prepared based on drawings of the existing buildings and the general scope of renovations and quality level of the final projects as defined during the programming process. This is intended to determine reasonable budgets for the projects rather than accurate costs of each individual system. The following table summarizes the total project costs including construction cost, FF&E and owner's soft costs. Detailed conceptual cost estimates were used as a tool to generate unit costs that are plugged into this summary tables. The total construction cost varies depending on the amount of total reconfiguration of the existing spaces. The areas of upgrade versus re-model are taken from the room area tables in Section 4.03.11 of this program plan.

Project Cost Summary Tables

Arnett Hall

	Cost per GSF	Total Project Cost	Prior Appropriation	Future Request FY 2008- 2009	Future Request FY 2009- 2010	Future Request FY 2010- 2011	Other Future Requests
A. Land Acquisition		\$0					\$0
B. Professional Services							
1. Master or Program Planning		\$0					\$0
2. Architect / Engineer (bdg.)		\$1,114,638					\$1,114,638
3. Architect / Engineer (other)		\$24,640					\$24,640
4. Construction Management		\$265,239					\$265,239
5. Code Review		\$0					\$0
6. Site Information and Tests		\$73,104					\$73,104
7. Other (_____)		\$0					\$0
8. Total Professional Services		\$1,477,621	\$0	\$0	\$0	\$0	\$1,477,621
C. Construction							
1. Building							
a. New (0 GSF)		\$0					\$0
b. Renovate (60,588 GSF)	\$157.24	\$9,526,801					\$9,526,801
c. Demolish (0 GSF)		\$0					\$0
d. Hazardous Materials		\$196,305					\$196,305
e. Other		\$186,335					\$186,335
2. Site Work		\$168,000					\$168,000
3. Landscaping		\$32,400					\$32,400
4. Utilities		\$319,856					\$319,856
5. Other (_____)		\$0					\$0
6. Total Construction Cost		\$10,429,698	\$0	\$0	\$0	\$0	\$10,429,698
D. Equipment and Furnishings							
1. Equipment		\$11,000					\$11,000
2. Furnishings		\$366,066					\$366,066
3. Communications		\$125,500					\$125,500
4. Other (_____)		\$0					\$0
5. Total Equipment Cost		\$502,566	\$0	\$0	\$0	\$0	\$502,566
E. Miscellaneous							
1. Art in Public Places		\$0					\$0
2. Relocation Costs		\$41,500					\$41,500
3. Project Contingency		\$1,240,989		\$0	\$0	\$0	\$1,240,989
4. Total Miscellaneous Costs		\$1,282,489	\$0	\$0	\$0	\$0	\$1,282,489
F. Total Cost		\$13,692,374	\$0	\$0	\$0	\$0	\$13,692,374
Source of Funds:							
Capital Construction Funds							
Capital Construction Funds -- Exempt							
Cash Funds							
Cash Funds -- Exempt		\$13,692,374	\$0	\$0	\$0	\$0	\$13,692,374
Federal							

Smith Hall

	Cost per GSF	Total Project Cost	Prior Appropriation	Future Request FY 2008- 2009	Future Request FY 2009- 2010	Future Request FY 2010- 2011	Other Future Requests
A. Land Acquisition		\$0					\$0
B. Professional Services							
1. Master or Program Planning		\$0					\$0
2. Architect / Engineer (bldg.)		\$1,179,992					\$1,179,992
3. Architect / Engineer (other)		\$24,640					\$24,640
4. Construction Management		\$257,977					\$257,977
5. Code Review		\$0					\$0
6. Site Information and Tests		\$69,744					\$69,744
7. Other (_____)		\$0					\$0
8. Total Professional Services		\$1,532,353	\$0	\$0	\$0	\$0	\$1,532,353
C. Construction							
1. Building							
a. New (0 GSF)		\$0					\$0
b. Renovate (56,676 GSF)	\$161.95	\$9,178,482					\$9,178,482
c. Demolish (0 GSF)		\$0					\$0
d. Hazardous Materials		\$183,630					\$183,630
e. Other		\$179,634					\$179,634
2. Site Work		\$168,000					\$168,000
3. Landscaping		\$32,400					\$32,400
4. Utilities		\$307,813					\$307,813
5. Other (_____)		\$0					\$0
6. Total Construction Cost		\$10,049,959	\$0	\$0	\$0	\$0	\$10,049,959
D. Equipment and Furnishings							
1. Equipment		\$11,500					\$11,500
2. Furnishings		\$360,783					\$360,783
3. Communications		\$115,500					\$115,500
4. Other (_____)		\$0					\$0
5. Total Equipment Cost		\$487,783	\$0	\$0	\$0	\$0	\$487,783
E. Miscellaneous							
1. Art in Public Places		\$0					\$0
2. Relocation Costs		\$41,500					\$41,500
3. Project Contingency		\$1,207,009		\$0	\$0	\$0	\$1,207,009
4. Total Miscellaneous Costs		\$1,248,509	\$0	\$0	\$0	\$0	\$1,248,509
F. Total Cost		\$13,318,604	\$0	\$0	\$0	\$0	\$13,318,604
Source of Funds:							
Capital Construction Funds							
Capital Construction Funds -- Exempt							
Cash Funds							
Cash Funds -- Exempt		\$13,318,604	\$0	\$0	\$0	\$0	\$13,318,604
Federal							

Buckingham Hall

	Cost per GSF	Total Project Cost	Prior Appropriation	Future Request FY 2008- 2009	Future Request FY 2009- 2010	Future Request FY 2010- 2011	Other Future Requests
A. Land Acquisition		\$0					\$0
B. Professional Services							
1. Master or Program Planning		\$0					\$0
2. Architect / Engineer (bldg.)		\$1,161,882					\$1,161,882
3. Architect / Engineer (other)		\$24,640					\$24,640
4. Construction Management		\$276,742					\$276,742
5. Code Review		\$0					\$0
6. Site Information and Tests		\$74,912					\$74,912
7. Other (_____)		\$0					\$0
8. Total Professional Services		\$1,538,175	\$0	\$0	\$0	\$0	\$1,538,175
C. Construction							
1. Building							
a. New (0 GSF)		\$0					\$0
b. Renovate (59,679 GSF)	\$166.80	\$9,954,171					\$9,954,171
c. Demolish (0 GSF)		\$0					\$0
d. Hazardous Materials		\$193,360					\$193,360
e. Other		\$194,159					\$194,159
2. Site Work		\$168,000					\$168,000
3. Landscaping		\$32,400					\$32,400
4. Utilities		\$317,058					\$317,058
5. Other (_____)		\$0					\$0
6. Total Construction Cost		\$10,859,148	\$0	\$0	\$0	\$0	\$10,859,148
D. Equipment and Furnishings							
1. Equipment		\$12,000					\$12,000
2. Furnishings		\$413,251					\$413,251
3. Communications		\$125,500					\$125,500
4. Other (_____)		\$0					\$0
5. Total Equipment Cost		\$550,751	\$0	\$0	\$0	\$0	\$550,751
E. Miscellaneous							
1. Art in Public Places		\$0					\$0
2. Relocation Costs		\$41,500					\$41,500
3. Project Contingency		\$1,294,807		\$0	\$0	\$0	\$1,294,807
4. Total Miscellaneous Costs		\$1,336,307	\$0	\$0	\$0	\$0	\$1,336,307
F. Total Cost		\$14,284,381	\$0	\$0	\$0	\$0	\$14,284,381
Source of Funds:							
Capital Construction Funds							
Capital Construction Funds -- Exempt							
Cash Funds							
Cash Funds -- Exempt		\$14,284,381	\$0	\$0	\$0	\$0	\$14,284,381
Federal							

Project Funding

These projects will be funded by revenue bonds issued by the University and paid for out of room and board revenues from Auxiliary Services. Modest annual rent increases spread across the entire housing system will pay for the renovation projects. Rent increases will recognize the effects of increases at comparable institutions and the rates within the City of Boulder rental market.

Appendix A **Applicable Codes**

The following list of codes, regulations, and guidance documents have been adopted by the State Buildings Programs effective July of 2005, and as such shall govern the renovation design of the first project on the schedule, Andrews Hall. Some codes may be updated prior to the renovations of Smith and Buckingham Hall. The most current codes shall be confirmed with the University prior to the start of each project.

2003 International Building Code (IBC)
2003 International Mechanical Code (IMC)
2003 International Energy Conservation Code (IECC)
2005 National Electric Code (NEC)
2003 International Plumbing Code (IPC)
2003 International Fuel Gas Code (IFGC)
National Fire Protection Association Standards (NFPA)
2001 ASME Boiler and Pressure Vessel Code
2001 National Boiler Inspection Code (NBIC)
2002 Controls and Safety Devices for Automatically Fired Boilers CSD-1
2001 Boiler and Combustion Systems Hazards Code, NFPA 85
1998 ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities

Appendix B **List of Source Documents**

"Draft" Residential Campus Report, January 13, 2006
Residential Campus Study Group

University of Colorado, Campus Master Plan
Approved by the Board of Regents in February of 2000
<http://www.colorado.edu/masterplan/>

University of Colorado - Department of Housing
Asbestos Assessment Facility Improvement Measures – Arnett Hall
June 26, 2004

Housing Audit Summary – Requirement List Report
VFA, Inc. August 10, 2004

Appendix D
Furniture Budget

These budgets were based on all new furniture for each project. Unit costs are escalated 7% for each successive project.

Andrews Hall

furniture	number	unit cost	total cost
student suites			
	230		
beds	230	\$214	\$49,220
student desks (w/ drawer unit)	230	\$385	\$88,550
task chairs	230	\$144	\$33,120
dressers	230	\$230	\$52,900
blinds (w/ const. budget)	0	\$0	\$0
bookcase	115	\$214	\$24,610
task light	230	\$27	\$6,210
floor lounges			
	9	rooms	
armchair	36	\$337	\$12,132
conference table 3x6	9	\$642	\$5,778
side chairs	54	\$107	\$5,778
draperies	9	\$1,338	\$12,042
main lounge			
armchair	2	\$337	\$674
3 seat couch	2	\$770	\$1,540
coffee table	2	\$139	\$278
side chairs	6	\$107	\$642
café table 30" round	3	\$225	\$675
draperies	1	\$6,634	\$6,634
classroom/seminar rooms			
	2	rooms	
conference table 3x6	12	\$642	\$7,704
task chairs	40	\$145	\$5,800
draperies	2	\$3,663	\$7,326
offices (includes reception)			
	5	rooms	
office chair	6	\$321	\$1,926
office workstation	6	\$1,926	\$11,556
file cabinets	6	\$375	\$2,250
side chairs	7	\$107	\$749
blinds (w/ const. budget)	0	\$0	\$0
laundry			
folding tables	4	\$214	\$856
furniture purchase cost			\$338,950
freight, handling, installation			8%
total installed cost			\$366,066

Smith Hall

furniture	number	unit cost	total cost
student suites			
	206		
beds	206	\$229	\$47,174
student desks (w/ drawer unit)	206	\$412	\$84,872
task chairs	206	\$154	\$31,724
dressers	206	\$246	\$50,676
blinds (w/ const. budget)	0	\$0	\$0
bookcase	115	\$229	\$26,335
task light	206	\$29	\$5,974
floor lounges			
	9	rooms	
armchair	36	\$361	\$12,996
conference table 3x6	9	\$687	\$6,183
side chairs	54	\$114	\$6,156
draperies	9	\$1,432	\$12,888
main lounge			
armchair	2	\$361	\$722
3 seat couch	2	\$824	\$1,648
coffee table	2	\$149	\$298
side chairs	6	\$114	\$684
café table 30" round	3	\$241	\$723
draperies	1	\$7,098	\$7,098
classroom/seminar rooms			
	2	rooms	
conference table 3x6	12	\$687	\$8,244
task chairs	40	\$155	\$6,200
draperies	2	\$3,919	\$7,838
offices (includes reception)			
	4	rooms	
office chair	5	\$343	\$1,715
office workstation	5	\$2,061	\$10,305
file cabinets	5	\$401	\$2,005
side chairs	6	\$114	\$684
blinds (w/ const. budget)	0	\$0	\$0
laundry			
folding tables	4	\$229	\$916
furniture purchase cost			\$334,058
freight, handling, installation			8%
total installed cost			\$360,783

Buckingham Hall

furniture	number	unit cost	total cost
student suites			
	228		
beds	228	\$245	\$55,860
student desks (w/ drawer unit)	228	\$441	\$100,548
task chairs	228	\$165	\$37,620
dressers	228	\$263	\$59,964
blinds (w/ const. budget)	0	\$0	\$0
bookcase	115	\$245	\$28,175
task light	228	\$31	\$7,068
floor lounges			
	9	rooms	
armchair	36	\$386	\$13,896
conference table 3x6	9	\$735	\$6,615
side chairs	54	\$122	\$6,588
draperies	9	\$1,532	\$13,788
main lounge			
armchair	2	\$386	\$772
3 seat couch	2	\$882	\$1,764
coffee table	2	\$159	\$318
side chairs	6	\$122	\$732
café table 30" round	3	\$258	\$774
draperies	1	\$7,595	\$7,595
classroom/seminar rooms			
	2	rooms	
conference table 3x6	12	\$735	\$8,820
task chairs	40	\$166	\$6,640
draperies	2	\$4,193	\$8,386
offices (includes reception)			
	4	rooms	
office chair	5	\$367	\$1,835
office workstation	5	\$2,205	\$11,025
file cabinets	5	\$429	\$2,145
side chairs	6	\$122	\$732
blinds (w/ const. budget)	0	\$0	\$0
laundry			
folding tables	4	\$245	\$980
furniture purchase cost			\$382,640
freight, handling, installation			8%
total installed cost			\$413,251

Appendix E

Facility Audit

(Information taken from 'Capital Project List Analysis FY '06')

Asset Name: Andrews Hall

Asset Number: 410

Prime System: Ceiling Finishes

Requirement Name	Category	Priority	Cost
Replacement of Glued Acoustical Ceiling Tile	Appearance	2: Potentially Critical	\$159,551
Ceiling Finishes Totals:			\$159,551

Prime System: Communications and Security

Requirement Name	Category	Priority	Cost
Replace Detectors (Hardwire)	Code: Compliance Life Safety	2: Potentially Critical	\$32,400
Communications and Security Totals:			\$32,400

Prime System: Domestic Water Distribution

Requirement Name	Category	Priority	Cost
Domestic Hot and Cold Water Piping is beyond useful life	Functionality	2: Potentially Critical	\$309,370
Domestic Water Distribution Totals:			\$309,370

Prime System: Electrical Service and Distribution

Requirement Name	Category	Priority	Cost
Building Wiring Out-Dated	Functionality	2: Potentially Critical	\$221,152
Electrical: Panelboards	Energy	2: Potentially Critical	\$37,599
Replace Existing Receptacles with GFI Receptacles	Code Compliance	1: Currently Critical	\$2,324
Switchgear Beyond Useful Life	Functionality	2: Potentially Critical	\$47,034
Electrical Service and Distribution Totals:			\$308,109

Prime System: Elevators and Lifts

Requirement Name	Category	Priority	Cost
Elevators not equipped with smoke tight doors	Code Compliance: Life Safety	2: Potentially Critical	\$15,418
Elevators and Lifts Totals:			\$15,418

Prime System: Emergency Light and Power Systems

Requirement Name	Category	Priority	Cost
Electrical: Exit Lights Need Battery Back-Up	Energy	2: Potentially Critical	\$48,492
Emergency Lighting Needs Battery Back-Up	Life Safety	2: Potentially Critical	\$36,408
Not All Exit Signs Properly located/illuminated	Code Compliance: Life Safety	2: Potentially Critical	\$1,465
Exit Sign Missing	Code Compliance: Life Safety	2: Potentially Critical	\$489

Emergency Light and Power Systems Totals: \$86,365

Prime System: Floor Finishes

Requirement Name	Category	Priority	Cost
VAT in Poor Condition – Student Rooms and Stairs	Appearance	2: Potentially Critical	\$371,472

Floor Finishes Totals: \$371,472

Prime System: Heat Generating Systems

Requirement Name	Category	Priority	Cost
Hydronic Heating Piping Is 40 Years Old	Beyond Rated Life	3: Potentially Critical	\$429,981

Heat Generating Systems Totals: \$429,981

Prime System: Interior Doors

Requirement Name	Category	Priority	Cost
Door wedged open by wall	Code Compliance: Life Safety	2: Potentially Critical	\$1,300
Doors not equipped with Magnetic Holders	Code Compliance: Life Safety	2: Potentially Critical	\$8,702
Doors not equipped with latches	Code Compliance: Life Safety	2: Potentially Critical	\$3,565
Doors with improper fit	Code Compliance: Life Safety	2: Potentially Critical	\$3,801
Doors not equipped with automatic closers	Code Compliance: Life Safety	2: Potentially Critical	\$1,206
Door will not operate without key	Code Compliance: Life Safety	2: Potentially Critical	\$223

Interior Doors Totals: \$18,797

Prime System: Interior Windows

Requirement Name	Category	Priority	Cost
Add tempered glass At one window	Code Compliance: Life Safety	2: Potentially Critical	\$983

Exterior Windows Totals: \$983

Prime System: Landscaping

Requirement Name	Category	Priority	Cost
Improve Irrigation	Appearance	2: Potentially Critical	\$20,400

Landscaping Totals: \$20,400

Prime System: Lighting and Branch Wiring

Requirement Name	Category	Priority	Cost
Electrical: Lighting General	Energy	2: Potentially Critical	\$358,073

Lighting and Branch Wiring Totals: \$358,073

Prime System: Partitions

Requirement Name	Category	Priority	Cost
Exit passageway is not direct	Code Compliance: Life Safety	2: Potentially Critical	\$10,389

Partitions Totals: \$10,389

Prime System: Roofing

Requirement Name	Category	Priority	Cost
Provide Snow Stops at Entries	Operations	2: Potentially Critical	\$4,500

Roofing Totals: \$4,500

Prime System: Sanitary Waste

Requirement Name	Category	Priority	Cost
Sanitary - Waste and Vent Original and Beyond Life	Functionality	2: Potentially Critical	\$274,386

Sanitary Waste Totals: \$274,386

Prime System: Sprinklers

Requirement Name	Category	Priority	Cost
Fire Extinguishers not Clearly visible	Code Compliance: Life Safety	2: Potentially Critical	\$675

Sprinklers Totals: \$675

Prime System: Stairs

Requirement Name	Category	Priority	Cost
Guardrail not at appropriate height	Code Compliance: Life Safety	2: Potentially Critical	\$10,963

Stairs Totals: \$10,963

Andrews Hall Totals: \$2,411,832

Asset Name: Smith Hall

Asset Number: 409

Prime System: Ceiling Finishes

Requirement Name	Category	Priority	Cost
Replacement of Glued Acoustical Ceiling Tile	Appearance	2: Potentially Critical	\$107,976

Ceiling Finishes Totals: \$107,976

Prime System: Communications and Security

Requirement Name	Category	Priority	Cost
Replace Detectors (Hardwire)	Code: Compliance Life Safety	2: Potentially Critical	\$23,940

Communications and Security Totals: \$23,940

Prime System: Domestic Water Distribution

Requirement Name	Category	Priority	Cost
Domestic Hot and Cold Water Piping is beyond useful	Functionality	2: Potentially Critical	\$287,331

Domestic Water Distribution Totals: \$287,331

Prime System: Electrical Service and Distribution

Requirement Name	Category	Priority	Cost
Building Wiring Out-Dated	Functionality	2: Potentially Critical	\$208,164
Panels outdated	Energy	2: Potentially Critical	\$55,798
Replace Existing Receptacles with GFI Receptacles	Code Compliance	1: Currently Critical	\$2,106
Switchgear Beyond Useful Life	Functionality	2: Potentially Critical	\$47,034

Electrical Service and Distribution Totals: \$313,102

Prime System: Emergency Light and Power Systems

Requirement Name	Category	Priority	Cost
Electrical: Exit Lights Need Battery Back-Up	Energy	2: Potentially Critical	\$37,247
Emergency Lighting Needs Battery Back-Up	Life Safety	2: Potentially Critical	\$41,783
Exit lights- modifications	Code Compliance: Life Safety	2: Potentially Critical	\$20,881
Emergency Light and Power Systems Totals:			\$99,911

Prime System: Elevators and Lifts

Requirement Name	Category	Priority	Cost
Elevator openings need fire rated doors	Code Compliance: Life Safety	2: Potentially Critical	\$24,054
Elevators and Lifts Totals:			\$24,054

Prime System: Floor Finishes

Requirement Name	Category	Priority	Cost
VAT in Poor Condition – Student Rooms and Stairs	Appearance	2: Potentially Critical	\$347,163
Floor Finishes Totals:			\$347,163

Prime System: Interior Doors

Requirement Name	Category	Priority	Cost
Stair doors need to be fire rated	Code Compliance: Life Safety	2: Potentially Critical	\$7,907
Exit passageway doors not fire rated	Code Compliance: Life Safety	2: Potentially Critical	\$25,600
Fire door damaged	Code Compliance: Life Safety	2: Potentially Critical	\$800
Fire doors missing latch	Code Compliance: Life Safety	2: Potentially Critical	\$4,011
Doors with improper fit	Code Compliance: Life Safety	2: Potentially Critical	\$2,666
Fire doors with louvers	Code Compliance: Life Safety	2: Potentially Critical	\$7,500
Interior Doors Totals:			\$48,484

Prime System: Landscaping

Requirement Name	Category	Priority	Cost
Improve Irrigation	Appearance	2: Potentially Critical	\$19,000
Landscaping Totals: \$19,000			

Prime System: Lighting and Branch Wiring

Requirement Name	Category	Priority	Cost
Electrical: Lighting General	Energy	2: Potentially Critical	\$337,253
Lighting and Branch Wiring Totals: \$337,253			

Prime System: Partitions

Requirement Name	Category	Priority	Cost
Hatch in rated ceiling	Code Compliance: Life Safety	2: Potentially Critical	\$146
Partitions Totals: \$146			

Prime System: Roofing

Requirement Name	Category	Priority	Cost
Provide Snow Stops at Entries	Operations	2: Potentially Critical	\$3,500
Roofing Totals: \$3,500			

Prime System: Sanitary Waste

Requirement Name	Category	Priority	Cost
Sanitary - Waste and Vent Original and Beyond Life	Functionality	2: Potentially Critical	\$255,955
Sanitary Waste Totals: \$255,955			

Prime System: Sprinklers

Requirement Name	Category	Priority	Cost
Extinguishers cabinets painted to match surrounds	Code Compliance: Life Safety	2: Potentially Critical	\$475
Storage in inappropriate areas	Code Compliance: Life Safety	2: Potentially Critical	\$200
Sprinklers Totals: \$675			

Prime System: Stairs

Requirement Name	Category	Priority	Cost
Missing handrail	Code Compliance: Life Safety	2: Potentially Critical	\$400
Stairs Totals: \$400			

Smith Hall Totals: \$1,868,890

Asset Name: Buckingham Hall
Asset Number: 411

Prime System: Ceiling Finishes

Requirement Name	Category	Priority	Cost
Replacement of Glued Acoustical Ceiling Tile	Appearance	2: Potentially Critical	\$137,786
Ceiling Finishes Totals:			\$137,786

Prime System: Communications and Security

Requirement Name	Category	Priority	Cost
Replace Detectors (Hardwire)	Code: Compliance Life Safety	2: Potentially Critical	\$23,520
Communications and Security Totals:			\$23,520

Prime System: Domestic Water Distribution

Requirement Name	Category	Priority	Cost
Domestic Hot and Cold Water Piping is beyond useful	Functionality	2: Currently Critical	\$303,999
Domestic Water Distribution Totals:			\$303,999

Prime System: Electrical Service and Distribution

Requirement Name	Category	Priority	Cost
Building Wiring Out-Dated	Functionality	2: Potentially Critical	\$218,134
Electrical: Panelboards	Energy	2: Potentially Critical	\$54,994
Replace Existing Receptacles with GFI Receptacles	Code Compliance	1: Currently Critical	\$2,541
Switchgear Beyond Useful Life	Functionality	2: Potentially Critical	\$47,034
Electrical Service and Distribution Totals:			\$322,703

Prime System: Elevators and Lifts

Requirement Name	Category	Priority	Cost
Elevator openings need fire rated doors	Code Compliance: Life Safety	2: Potentially Critical	\$23,199
Elevators and Lifts Totals:			\$23,199

Prime System: Emergency Light and Power Systems

Requirement Name	Category	Priority	Cost
Electrical: Exit Lights Need Battery Back-Up	Energy	2: Potentially Critical	\$39,202
Emergency Lighting Needs Battery Back-Up	Life Safety	2: Potentially Critical	\$43,574

Exit Signs – not illuminated or poor location	Code Compliance: Life Safety	2: Potentially Critical	\$27,387
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Emergency Light and Power Systems Totals: 110,163

Prime System: Floor Finishes

<u>Requirement Name</u>	<u>Category</u>	<u>Priority</u>	<u>Cost</u>
VAT in Poor Condition – Student Rooms and Stairs	Appearance	2: Potentially Critical	\$345,778

Floor Finishes Totals: \$345,778

Prime System: Heat Generating Systems

<u>Requirement Name</u>	<u>Category</u>	<u>Priority</u>	<u>Cost</u>
Hydronic Heating Piping Is 40 Years Old	Beyond Rated Life	3: Necessary - Not Yet Critical	\$422,704

Heat Generating Systems Totals: \$422,704

Prime System: Interior Doors

<u>Requirement Name</u>	<u>Category</u>	<u>Priority</u>	<u>Cost</u>
Doors on rated passageway not rated	Code Compliance: Life Safety	2: Potentially Critical	\$16,005
Rated doors missing closers	Code Compliance: Life Safety	2: Potentially Critical	\$1,095
Rated doors have louvers	Code Compliance: Life Safety	2: Potentially Critical	\$7,500
Fire doors missing latch	Code Compliance: Life Safety	2: Potentially Critical	\$3,565

Interior Doors Totals: \$28,165

Prime System: Landscaping

<u>Requirement Name</u>	<u>Category</u>	<u>Priority</u>	<u>Cost</u>
Improve Irrigation	Appearance	2: Potentially Critical	\$20,000

Landscaping Totals: \$20,000

Prime System: Lighting and Branch Wiring

<u>Requirement Name</u>	<u>Category</u>	<u>Priority</u>	<u>Cost</u>
Electrical: Lighting General	Energy	2: Potentially Critical	\$339,201

Lighting and Branch Wiring Totals: \$339,201

Prime System: Partitions

Requirement Name	Category	Priority	Cost
Stairwells not Enclosed	Code Compliance: Life Safety	2: Potentially Critical	\$23,477

Partitions Totals: \$23,477

Prime System: Roofing

Requirement Name	Category	Priority	Cost
Provide Snow Stops at Entries	Operations	2: Potentially Critical	\$3,000

Roofing Totals: \$3,000

Prime System: Sanitary Waste

Requirement Name	Category	Priority	Cost
Sanitary - Waste and Vent Original and Beyond Life	Functionality	2: Potentially Critical	\$269,469

Sanitary Waste Totals: \$269,469

Prime System: Sprinklers

Requirement Name	Category	Priority	Cost
Fire Extinguisher cabinets painted to match surrounds	Code Compliance: Life Safety	2: Potentially Critical	\$475

Sprinklers Totals: \$475

Buckingham Hall Totals: \$2,373,639

Appendix F Code Review

This code review is based on the 2003 International Building Code (IBC) which will be the code in effect for the first project, Andrews Hall. Codes may be updated prior to the renovations of Smith and Buckingham Halls, therefore, the most current codes should be confirmed with the University prior to the start of each project.

7.1 The Building

7.1.1 Building height and area

Andrews Hall:

Building Height: Approx. 36' / 4 stories. Area: 60,588 square feet. (IBC 502.1)

Smith Hall:

Building Height: Approx. 35' / 3 stories. Area: 56,676 square feet. (IBC 502.1)

Buckingham Hall:

Building Height: Approx. 35' / 3 stories. Area: 59,679 square feet. (IBC 502.1)

7.1.2 Building occupancy and use groups

Occupancy: R-2, dormitory (IBC 310.1)

Incidental use areas with one hour separation: Laundry room, storage rooms. (IBC 302.1.1)

Accessory use areas: Lounges (assembly) no separation required if less than 750 SF. (IBC 302.2.1)

7.1.3 Building location with respect to adjacent properties and roads

Andrews Hall:

All of the adjacent building and roads are on University property.

North: 35 feet to midpoint of road, 30 feet to midpoint between adjacent building

South: 55 feet to midpoint between adjacent building

East: 40 feet to midpoint between adjacent building

West: 35 feet to midpoint between adjacent building

Smith Hall:

All of the adjacent building and roads are on University property.

North: 55 feet to midpoint between adjacent building

South: 50 feet to midpoint of road

East: 50 feet to midpoint between adjacent building

West: 40 feet to midpoint between adjacent building

Buckingham Hall:

All of the adjacent building and roads are on University property.

North: 40 feet to midpoint between adjacent building

South: 40 feet to midpoint of road

East: 50 feet to midpoint of road

West: 50 feet to midpoint between adjacent building

7.2 Building Fire Resistance

7.2.1 Type of construction

No information is available on the original construction types for the buildings. There are no fire ratings indicated around the structural components of the buildings. Since the roof structures are wood, and do not appear to meet the type IV-Heavy Timber requirements, the construction type will be Type V using current IBC designations. (IBC 602.5) Since there are no confirmed ratings on the structures, this makes the buildings Type VB construction. (IBC Table 601)

The construction type for the renovated buildings shall be determined by the design team during the design phase of each project, working with code authority. One possible strategy is to consider the building type VA which would allow a three story building up to 40' tall and 12,000

square feet (per table 503.) Height increases for sprinklered buildings would allow for a four story building up to 60' tall per IBC 504.2. Area increases per IBC 506 are calculated here per equations 5-1 and 5-2:

Increase due to frontage = $100[1-.25]1 = .75$

Increase due to sprinklers = 200%

Allowable Area = $12000+[12000*75]100+[12000*200]100 = 45000$ SF

Thus the allowable area is less than the area of each project, but the layout of the buildings lend themselves to dividing up the buildings with fire walls. Fire walls will require a 3 hour rating per IBC 705.4.

7.2.2 Fire resistance of structural members (include sprinklered building exceptions)

See above: No fire ratings are established for the structural members. (IBC Table 601)

7.2.3 Fire resistance of all exit routes including stairs, corridors, and ramps

Corridors shall be ½ hour fire rated (IBC Table 1016.1) assuming fully sprinklered building.
Stairs and ramps shall have a 1 hour fire rated enclosure. (IBC 1019.1)

7.2.4 Fire resistance of vertical openings and shafts

Shafts shall have a one hour rating. (IBC 707.4)

7.2.5 Fire resistance of special occupancy enclosures such as storage rooms and hazardous areas

Incidental use areas with one hour separation: Laundry room, storage rooms. (IBC 302.1.1)

7.2.6 Fire resistance of other building elements such as partitions, doors, and exterior wall openings.

Corridor doors: 20 minute rating (IBC Table 715.3)
Other walls & partitions non-rated (IBC Table 601 Type VB)
No limits on opening in exterior walls due to fire separation distance. (IBC Table 704.8)

7.2.7 Sealing of penetrations.

Penetrations through fire-rated assemblies shall be protected by the requirements of the IBC Section 712.

7.3 Ignition Prevention

7.3.1 Identify potential ignition sources and related code requirements

See 7.1.2 above for incidental storage use.

7.3.2 Identify hazardous locations and the required classifications

There are no hazardous (Group H occupancy) components in this program.

7.4 Fuel Control

7.4.1 List amount and type of combustible material, e.g., fire retardant treated wood, that may be used.

(See also 7.9, Special Hazards.)

The roof structure and decking is made of wood with wood ceiling and soffits on the top floors. The rest of the structure is non-combustible consisting of steel columns, concrete slabs and concrete masonry. Type V construction allows for the use of any building materials permitted by code. (IBC 602.5)

7.4.2 Identify and list interior finish classifications in exit paths, places of assembly, and all other areas.

All spaces in the building including vertical exits and exit passageways, exit access corridors and other exitways, and rooms and enclosed spaces shall have a Class C flame spread rating as long as the building is fully sprinklered. (IBC Table 803.5)

7.4.3 Identify allowable types of furniture.

7.5 Means of Egress

- 7.5.1 Determine and list occupant load factors and occupant loads for each floor and for each major space within a floor, e.g., assembly areas.
Occupant load factor for a dormitory is 50 gross square feet per person. (IBC Table 1004.1.2)
Occupant load factor for lounges and classrooms/seminar rooms is 15 net square feet per person. Public spaces shall be less than 750 square feet each.
Each floor of each wing requires two means of egress. Worst case is the central wing which is 8092 gross square feet total including 988 net square feet of public areas. Total occupant load is 208 which will require two exits. (IBC Table 1018.1)
Occupant load calc: $(8092-988)/50+988/15=208$.
- 7.5.2 Determine the minimum number of exits required for each floor and for each major room, e.g., assembly areas and labs, within a floor.
All individual rooms and spaces in the program require only one exit access door. (IBC Table 1014.1)
- 7.5.3 Determine the minimum width of exits required for each floor and for each major room, e.g., assembly areas within a floor, ADA requirements.
Minimum door width required: 32" clear. (IBC 1008.1.1/ANSI 117.1 - 404.2.3)
Egress width requirements for fully sprinklered R Occupancy: 0.2" per occupant for stairs, 0.15" per occupant for other egress components. (IBC Table 1005.1) Minimum requirements for components shall govern: 44" minimum width for stairs (IBC 1009.1) and corridors. (IBC 1016.2)
- 7.5.4 Determine the maximum allowable travel distance.
Maximum travel distance (with sprinklers) is 250 feet. (IBC Table 1015.1)
- 7.5.5 Determine the maximum allowable dead-end.
Maximum allowable dead end is 20 feet. (IBC 1016.3)
- 7.5.6 Determine the maximum common path of travel allowed.
The maximum allowable common path of travel is 75 feet. (IBC 1013.3)
- 7.5.7 Determine the swing direction requirements.
All doors to individual spaces may swing into the space since no spaces in the program have an occupant load greater than 50. All doors in corridors and doors from the corridors to the outside shall swing in the direction of egress. (IBC 1008.1.2)
- 7.5.8 Determine the place of refuge requirements; number, size, and location.
Areas of refuge are not required since the building will be fully sprinklered. (IBC 1007.3 Exception 3)
- 7.5.9 Determine exit signage requirements.
Exit signs required in corridors. (IBC 1011.1 exceptions 1 & 3)
- 7.5.10 Determine exit lighting requirements.
Exit lighting required in corridors and stairs, not in student suites. Provide 1 foot-candle at the floor. (IBC 1006.1 Exception 3)
- 7.5.11 Determine emergency power supply requirements.
Exit lighting will require emergency power. (IBC 1006.3)

7.6 Smoke Management Systems

- 7.6.1 Determine smoke resistance requirements for corridors, lobbies, etc. N/A
7.6.2 Determine any active and/or passive smoke extract requirements. N/A

7.6.3 Determine locations and sequence of operations for all smoke and fire/smoke dampers and duct detectors.
Fire smoke dampers at rated shaft penetrations and corridors walls per IBC 716.5.3 through 716.5.4.
Make-up air from central AHU: Supply duct smoke detectors (no return ducts, 100% outside air)

7.6.4 Determine stair pressurization requirements. N/A

7.6.5 Determine high-rise building requirements. N/A

7.6.6 Determine basement requirements. N/A

7.7 Fire Suppression Systems

7.7.1 Determine portable fire extinguisher requirements: type, spacing, and location.

Portable fire extinguishers required per IFC 906.1. Provide extinguishers per IFC section 906 and NFPA 10.

7.7.2 Determine automatic sprinkler system requirements: type, hazard classification, water supply, drainage, fire department connection, zone limitations, test equipment, exempt areas, and supervision.

Automatic sprinkler system to be designed and installed per the IBC Section 903.3 and NFPA 13.

7.7.3 Determine standpipe system requirements: type/class, number, location, minimum pressure, supervision, and fire department connection.

Standpipe not required per IBC 905.3.1

7.7.4 Determine fire department access and suppression provisions: hydrant locations, fire department access roads, and fire lanes.

Paved access for fire trucks is available on the north, east and west sides of the building.

Hydrants to be provided per 2003 IFC Appendix C.

7.8 Fire Detection and Alarm Systems

The new fire alarm system will be design to meet the requirements of the 2003 IBC, IFC, UCB standards and NFPA.

7.8.1 Determine manual pull station requirements: type, spacing, and location.

Manual pull stations will be located at each exit, and at each floor. Additional pull stations will be provided if the travel distance exceeds code allowed maximum distance.

7.8.2 Determine automatic detector requirements: type, spacing, and location.

Ionization and thermal detectors will be provided in elevator lobbies, elevator machine room and shafts, electrical and telecommunications rooms and at the location of fire alarm panel. Duct detectors will be provided in all AHU equipment with a supply and return cfm exceeding the minimum code requirements.

Single station smoke detectors connected to the building power system and supervised by the fire alarm system will be provided in each resident room.

7.8.3 Determine occupant notification and alarm requirements: type (horn, horn/strobe, speaker strobe) and location. (Verify impact of interior rooms.)

Audio and visual notifications appliances, horn/strobes, will be located in corridors, common spaces and resident rooms. All strobes will be synchronized. Speaker/strobes in the student rooms and in the corridors/public areas should be on separate circuits. Areas for public notification via the integrated public address system should be segregated by floor, wing and all-call.

7.8.4 Determine sequence of operation of all systems, e.g., that are connected to or monitored by the building detection and alarm system. Examples include, fan shutdown, smoke management systems, and stairwell pressurization systems.

In general the sequence of operation of the system will be as follows:

Activation of any initiating device, detector, pull station, flow switch, will activate the alarm throughout and the exterior horn/strobe; will report the status at the FACP and FAA and to the Campus main FACP.

Detector in the elevator lobby, elevator machine room and elevator shaft activation will recall the elevator, report status to the FACP, FAA and Campus main FACP and sound the alarm in the building.

Smoke detectors will shut down the served AHU and report as Supervisory signal at the FACP, FAA and Campus main FACP. The thermal detector will shunt trip the elevator circuit breaker.

Flow switch activation will sound the alarm throughout; will activate the exterior horn/strobe and fire department connection bell/strobe.

7.9 Special Hazards

No special hazards are included in this program plan.

7.9.1 Limits of flammable liquids and other hazardous material (chemical/gas inventory)

7.9.2 Hazardous material spill control

7.9.3 Hazardous material containment

7.9.4 Explosion protection and venting

7.9.5 Hazardous material detection systems

7.9.6 Hazardous labs ventilation systems, hoods and chemical and gas storage cabinets.

7.9.7 Special suppression systems for special hazard areas.

7.10 Building Services

7.10.1 Emergency generator.

Emergency system is not required. Exit and egress lighting is provided with self testing 90 minutes battery back up.

7.10.2 Elevators.

Hoistway enclosures per IB Section 3002

One hour rated shaft (IBC 707.4)

7.10.3 Access to space and functions by persons with disabilities.

Public areas will meet the requirements of the ADA as defined in the ANSI 117.1 standard. This will include accessible routes throughout the public spaces and corridors as well as fully accessible public restrooms.

Student bedrooms and suites will meet the requirements of the Fair Housing Act. The scope of these requirements is defined in the IBC Section 1107. Seven of the units shall be fully accessible (Type A) and two of those shall have roll-in showers. (IBC Table 1107.6.1.1) Type B units will not be required in this building. (IBC3409.1 Exception)

7.11 Plumbing

Minimum number of plumbing fixtures required per IBC table 2902.1: One water closet and lavatory per 10 occupants, one shower per 8 occupants, one drinking fountain per 100 occupants, and a minimum of one service sink.

Domestic water supply and distribution piping shall be sized in accordance with Chapter 6 and Appendix E of the IBC.

Sanitary drainage and vent piping per Chapter 7 of the IBC.

7.12 Ventilation and Exhaust

Ventilation systems to be designed in accordance with Chapter 4 of the IMC.

Exhaust to be designed in accordance with Chapter 5 of the IMC.

7.13 Electrical

Electrical Systems will be designed per the 2005 NEC.

7.14 Other Issues identified by the design team

Access and service space clearances around appliances to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of any required fire-resistance-rated assembly. In accordance with the IMC 306.1

Condensate disposal: Condensate from all cooling coils and evaporators shall be conveyed from the drain pan outlet to an approved place of disposal per IMC 307.2.1.

Outside air intakes shall be located in accordance with IMC 401.5.

Steam and hydronic piping shall be design in accordance with Chapter 12 of the IMC.

Ductwork construction shall be designed in accordance with SMACNA HVAC duct construction standards.

Appendix G

Information Technology Requirements

Communication Standards and Codes

- 1) Comply with University of Colorado standards at <http://fm.colorado.edu/construction/standards/> with follow-up with Information Technology Services (ITS) department for any Addendums.
- 2) Comply with industry standards, which include but are not limited to ANSI/TIA/EIA, BICSI, NEC, ASTM, FCC, IEEE, ISO, UL, etc.

Engineering

- 1) All projects that include or affect communication at the University of Colorado shall be engineered by a communication consultant and certified by BICSI as an RCDD.
- 2) All engineering will follow UCB Division 27 and most current CSI communication standard format including both "T" AutoCAD files for the Information Technology Services (ITS) department at completion and follow Division specification from the CSI Master Format.
- 3) Engineering will address affects of both existing and new infrastructure. The engineering and construction must also address removing all temporary lines.
- 4) The engineering will address all cabling for both the Information Technology Services (ITS) department and Qwest cabling (ISP and OSP) with parallel infrastructure.
- 5) Consultants will work with at least four departments within ITS which will include Media services, Plant, Computing center, and Voice/Data services.
- 6) Projects will be turnkey with the understanding that only ITS contractors will be splicing and/or removing into the backbone cabling and will also be connecting the services (MAC) to the infrastructure at the cost of the projects. All patch cords are project costs and to be provided prior to completion as ITS requests.
- 7) All new communication rooms shall comply with ANSI/TIA/EIA 569 for sizing, spacing and stacked.
- 8) The communication rooms shall not be located next to electrical or elevator rooms.
- 9) The communication rooms shall be located so that all parts of
- 10) Pathways will be crosschecked with other utilities existing and new for the project to confirm spacing and future access by engineers and consultants of the project.
- 11) Removals will be documented and provided to ITS and specified to be completed by certified communication contractors. Once cabling is removed others can remove the pathways.
- 12) No other service will share Communication rooms or pathways which include but are not limited to Qwest, Ccure, security, intercom, alliance networks, etc.
- 13) Special services such as Andover, Fire alarms, Qwest, Elevators, card readers, and Labs need to be addressed and infrastructure provided for when needed. Extra time will be required for testing prior to service installation and all labeling is to be completed at testing walk.
- 14) All cabling will be specified to run back to the communication rooms with the exception of some special Labs which can not mix voice and data in the same faceplates. All cabling in a faceplate will home to the same communication room.
- 15) All riser and tie fiber or copper cables within the building will home back to the MDF communication room.
- 16) No liquid piping or electrical panels other then what is requested by ITS is allowed within the communication rooms. Fire sprinkler legs are required and installed per codes.
- 17) Fire stopping will be specified to Electrical contractor for pathway installations and for communication contractor for pathway closure.
- 18) Specifications should include plan to card readers to be active 3 weeks prior to completion for all communication rooms to secure all equipment and access.
- 19) Data equipment may not be specified at construction CD's as equipment may be outdated by time of installation. Comply with timeframe of specification of equipment with ITS and housing staff.

- 20) Typical cabling is two category 5e cables to a faceplate, with only one cable to wall phones and wireless boxes.
- 21) All fiber projects need to include schematic drawing per UCB-ITS standard.
- 22) Power needs should include but not be limited to dedicated and isolated 20 amp circuits per TIA/EIA, Grounding bus bar with connections and lighting for each communication room.
- 23) All communication rooms are to be tied into the common building ventilation.
- 24) The communications pathways shall be a horizontal system.
- 25) The communication back boxes shall not be nipped.

Contractors

- 1) All communication contractors will be certified to the current cabling standards for both cabling and hardware.
- 2) Electrical contractors are to provide the pathways per the standards listed above. Communication contractors will provide all voice and data cabling.
- 3) The communication contractor must comply with all ITS division specifications including but not limited to testing, labeling, inspections, jack numbering, etc. of which need to be supplied directly to the ITS department.
- 4) Contractors must use construction phone and data service through Qwest communications or other providers.
- 5) The communications contractor must provide faceplate numbers to ITS 4 weeks prior to completion and per current ITS division standards.
- 6) In addition to the prints with jack numbers that need to be provided to ITS prior (4 weeks see specifications) to completion ITS will also need prints with highlighted changes provided at the walk through for testing one week prior to turnover.
- 7) Keys to the communication rooms need to be provided to ITS during construction.
- 8) A project schedule needs to be included and provided prior to construction with a set date for completion and turnover. The schedule must also allow commissioning time for testing of all the jacks prior to the completion date with all jacks pre-tested.
- 9) Elevators, Andover and fire alarm must be tested and labeled prior to owner occupancy and will require adequate scheduling for these services to be installed prior to other services in the building.
- 10) Electrical circuits must be installed 3 weeks prior to installing and testing of electronics in communication rooms.
- 11) 24 hour contacts must be supplied to ITS.